GoSmart BSR

Methodology for Transnational Smart Specialisation Strategy

Policy Paper

GO SMART
INNOVATE ACROSS BORDERS

Methodology for Transnational Smart Specialisation Strategy

Policy Paper

Project Partners

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Abbreviations

BSO	Business Support Organisation
BSR	Baltic Sea Region
EDP	Entrepreneurial Discovery Process
EU	European Union
FDI	Foreign Direct Investment
GVC	Global Value Chain
ICT	Information and Communication Technology
JTSS	Joint Transnational Smart Strategies (by SMEs)
LP	Lead Partner
LQ	Location Quotient
M&E	Monitoring and Evaluation
NACE	Economic Activities Classification
	(Nomenclature des Activités Économiques dans la Communauté Européenne)
NGO	Non-Governmental Organisation
NUTS	Nomenclature of Territorial Statistical Units
	(Nomenclature des Unités territoriales statistiques)
S3	Smart Specialisation Strategy
SME	Small and Medium-size Enterprise
SWOT	Strengths and Weaknesses, Opportunities and Threats (analysis)
PSC	Project Steering Committee
R&D	Research and Development
R&D&I	Research and Development and Innovation
RIS	Regional Innovation Strategy
RIS3	Research and Innovation Strategy for Smart Specialisation
TIBS	Transnational Innovation Brokerage System
Trans-S3	Transnational Smart Specialisation Strategy

Dear Readers,

Smart specialisation has become the buzzword of recent years, especially among those working in the areas of innovation, regional competitiveness and development, SMEs development, etc. The question is whether this attractive term will also become an effective policy concept and be equipped with appropriate instruments to take regions and their economies to higher, more productive and competitive levels. In this light, we have decided to add to the many efforts of turning smart specialisation into better policy and practice.

By identifying the underlying essence of smart specialisation as 'becoming globally competitive in selected combination of sector/technology/theme/knowledge domains', we have engaged several regions of the Baltic Sea Region from Denmark, Estonia, Finland, Germany, Latvia, Lithuania and Poland, to work out their common smart specialisation priorities and specific domains which are considered 'opportunity areas' of establishing joint, globally competitive positions. This, we believe, will be possible only by practical and business-driven innovative projects of key economic actors, specifically small and medium-size enterprises (SMEs) which are forced to compete not by scale but by 'smartness', and which need wise, structured policy support.

At this stage of our journey on the smart specialisation road, we are glad to present you with a methodological proposal for Transnational Smart Specialisation Strategy (Trans-S3) which we believe can be universally applied to any group of regions. This is our first major product within the 'Strengthening smart specialisation by fostering transnational cooperation (GoSmart BSR)' project (2017-2020). We consider this methodology a useful policy tool for internationalisation and innovation at the transnational level. It will be to our great satisfaction if many policy makers across Europe get familiar with the proposed methods and apply them in their own regions and countries to build global competitiveness based on their shared strengths and opportunities.

We hope that the format of the publication will prove to be reader- and user-friendly. For this purpose, we have run the narrative in two distinct but interlinked components:

■ general methodology description and recommendations (how to do it)

■ specific ways of application and lessons learned by us (how did we do it).

Enjoy reading, learning and getting inspired, maybe to work on your regions' own transnational smart specialisation strategy...

With kind regards,

Wiesław Urban

GoSmart BSR Project Coordinator

Professor at Bialystok University of Technology, Faculty of Engineering Management

The proposed methodology for Transnational Smart Specialisation Strategy (Trans-S3) was developed and applied in the framework of the Interreg Baltic Sea Region programme, within the 'Strengthening smart specialisation by fostering transnational cooperation (GoSmart BSR)' project (2017-2020).

The Trans-S3 methodology was inspired by the understanding of the project partners that the ultimate goal of smart specialisation strategies is for regions to become globally competitive and to become engaged in global value networks. This view was confronted with the reality of the existing smart specialisation strategies which encourage and support competitiveness through innovation within their regional/national contexts and often downplay wider, international coopetition. Consequently, the Trans-S3 methodology allows transitioning from the concept of a competitive region to the concept of a competitive group of regions. In this respect, it represents an internationalisation and innovation policy tool set at a transnational level.

The Trans-S3 methodology is not declared as a final and ultimate solution for transnational competitiveness or innovativeness but rather as a tool helping to develop such a strategy, and to identify the Trans-S3 priorities and domains for groups of transnational regions. As a novel concept, it is expected to benefit from potential users' comments, contributions, and further applications.

The methodology contains general notes and justifications, categories of used data sources, a process algorithm for the identification of transnational smart domains, problem solving recommendations and other relevant guidance. It heavily builds on and adapts the standard S3 steps contained in the respective EU guidelines, by addressing some of the important challenges of the transnational context such as: the geographical disconnection of the target regions, differentiated regional characteristics and unique governance systems, incompatible policy mixes and the lack of permanent management structures for transnational smart specialisations.

More specifically, the Trans-S3 methodology is presented in this publication in two separate components:

A. 'Specific component – Trans-S3 identification' – This stand for all steps, or as they were called within the GoSmart BRS project, sequences, which lead to the selection of smart priorities and domains at the transnational level. The specific component covers the following sequences: 1/Search for common sets (defining initial priorities), 2/Analytical of review and profiling target regions (verifying priorities), 3/Markets and technology trends review (refining priorities), 4/Internationalisation potential assessment (assessing priorities), 5/Stakeholders consultations and entrepreneurial discovery (finalising priorities).

B. 'General component – Trans-S3 management' – This stand for the elements which need to accompany the identification of smart priority areas and are described towards the end of the outline. At the same time, it is necessary to stress that the Trans-S3 general component is the one which governs all steps and sequences, and regulates the whole strategy. The general component covers the following elements: 1/Governance, 2/Shared vision, 3/Action plan, 4/Monitoring and evaluation.

The first component is discussed in more detail as it requires more adaptation and adjustments in relation to the EU standard S3s methodology.

The document is structured in a way which should be suitable to the readers who are interested only in general ideas (explained in the chapter to 'Methodlogical outline') and to those who are interested in more details as well as want to learn about the direct experiences from the application of the Trans-S3 methodology by the GoSmart BSR project (described in the chapter 'Detailed methodology and its application'). For easy use of the publication, within the texts dedicated to the detailed methodology and its outcomes, the more general sections are marked by the 'HOW TO DO IT' title, while the experiences, tools and products developed by the GoSmart BSR project when elaborating is own Trans-S3 are marked with by 'HOW DID WE DO IT' title. These are found both in the chapter 'Detailed methodology and its application' and 'Final Trans-S3 priorities and domains, way forward'.

The Trans-S3 methodology is presented only after it had been 'tested' by the GoSmart BSR project and thus some important lessons learned and policy recommendations were formulated. They are presented in the last chapter in full and summarised below:

Conclusions and lessons learned:

■ Standard S3 methodology can be used in any setting, including a transnational one (as shown in Trans-S3);

■ Challenges related to the transnational character of Trans-S3 are manageable within the existing methods and tools;

■ Trans-S3s should be considered complementary to regional (and national) S3s;

■ Trans-S3 approach can usefully inform regional (and national) S3s, especially in the international dimensions of smart specialisations;

■ Dedicated governance (management) systems need to be developed for Trans-S3s as the existing ones show high differentiation among transnational regions.

Policy recommendations:

At the EU level:

■ promotion of internationalisation as an important aspect of smart specialisation;

■ development of Trans-S3s for the EU transnational cooperation areas (and within existing transnational cooperation programmes as well as macro-regional development strategies);

■ mainstreaming positive experiences and successful initiatives of internationalisation-innovation policy at transnational level.

At the regional/ national level:

■ removing overly inward-looking aspects of S3s by expanding cross-regional and transnational dimensions of innovation;

■ intensifying transregional/ transnational collaboration in the internationalisation-innovation policy;

■ refocusing internationalisation and innovation policy on key innovation actors, that is the small and medium-sized enterprises.

Introduction

At the level of ideas, the main reason for the elaboration of a Transnational Smart Specialisation Strategy and for this publication comes from the understanding formed among the 'GoSmart BSR' project partners that **the ultimate goal of smart specialisation strategies is for regions to become globally competitive.**

Today competitiveness is not measured in terms of a region/country capacity to develop an integrated industry, but rather to achieve the best position in Global Value Chains,i.e., the capacity to join, remain part of and to move up within the GVCs.[1] For many regions, becoming globally competitive requires long-term efforts in building competitive and cooperative[2] internal and external networks which allow their knowledge domains (and related industries) to deepen specialisations and provide world class products and services.

Figure 1: Understanding modern coopetition (cooperation and competition)

GENERAL CONCEPTS

GLOBALISATION

COOPETITION

SPECIALISATION

SPECIFIC CONCEPTS
(predominantly international and global)

SYSTEM /
REGIONAL COMPETITION
VALUE CHAIN / NETWORK
TRADE
FDI
R&D&I
DOMAIN
MARKET NICHE
CAPACITY

Source: Own elaboration.

Smart specialisation strategies can greatly enhance this journey by focusing on the key forces driving today's competition in advanced economies which is knowledge, research and development, and innovation. Understanding that competitiveness has to be considered globally is well reflected by the European Union, e.g. by selecting strategic value chains, preliminarily: connected, clean, autonomous vehicles, smart health, low-carbon industry, hydrogen technologies and systems, industrial Internet of Things, cyber-security, complimenting other initiatives in value chains: batteries, microelectronics[3] and high-performance computing.

The RIS3 approach requires focusing on value chains (primarily European and/or GVCs) which means in practice looking beyond the regional and national administrative boundaries. When considering GVCs, transregional/transnational linkages and flows of goods, services, knowledge and in general, value, are very important. Furthermore, 'interregional collaboration should be pursued whenever similarities or complementarities with other regions are detected'.[4] Yet, many EU regions and countries do not fully consider transregional/transnational collaboration as an effective way to support innovation and growth.

Internationalisation, especially in the sphere of research and development, and innovation (R&D&I) allows making regional enterprises and economies more inter-linked, more dynamic and competitive, by the mere fact of opening and inviting more cooperation and competition (see figure: 1) from outside of the region and outside of the country. However, **while the existing smart specialisation strategies encourage and support competitiveness through innovation within their regional/national environments they tend to downplay important dimensions of wider, international coopetition.** This gap can be minimized by taking smart specialisation strategies to the next, transnational level.
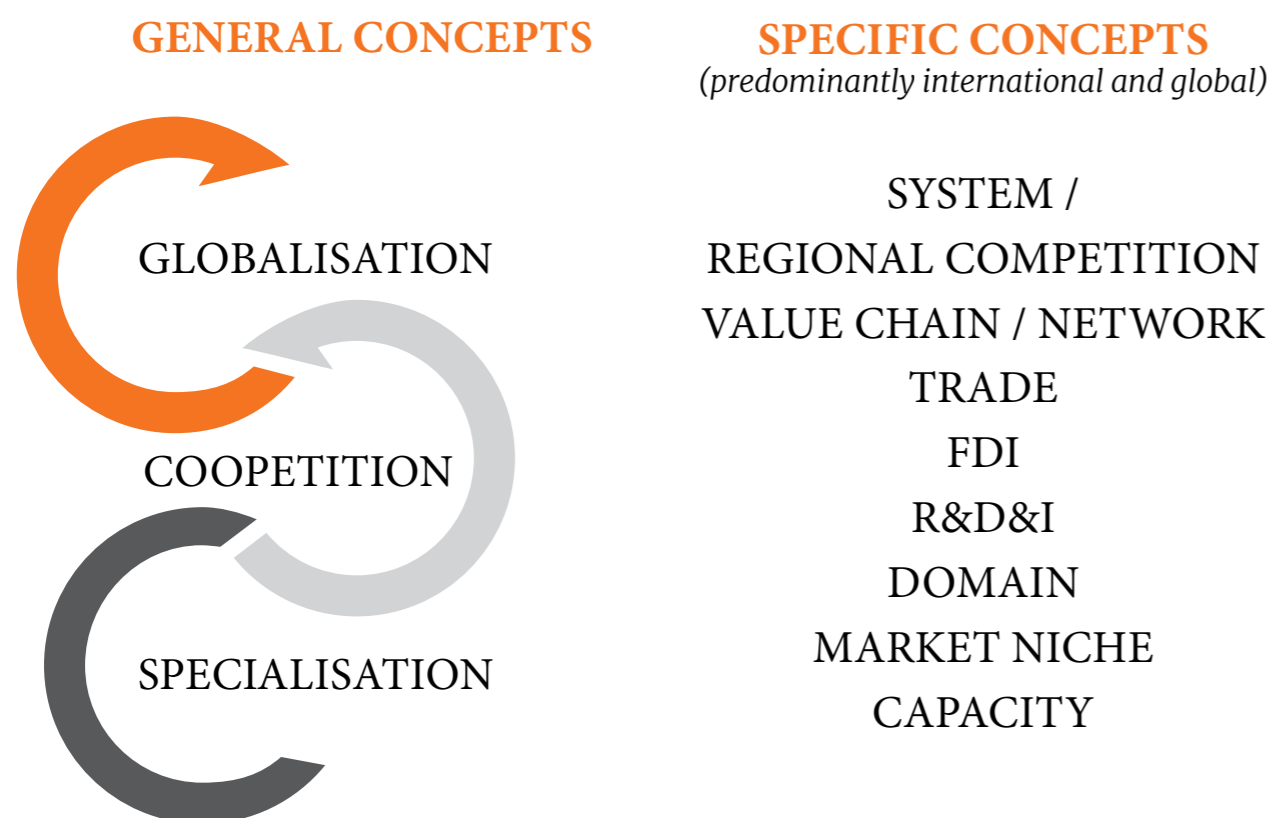
The GoSmart BSR project partners have been continuously working on making their regions and countries more competitive, by supporting internationalisation, innovation, clustering and other initiatives with a special focus on the key economic actors, the small and medium-sized enterprises (SMEs). The GoSmart project attempted to take the smart specialisation model to interregional/international dimension. Part of this ambition was to work out a methodology of transnational smart specialisation strategy and apply it to the partner regions. The presented Trans-S3 methodology is a concrete product of joint work and effort.

The Trans-S3 methodology and this publication does not aim at providing a complete instruction of designing a transnational smarts specialisation strategy but rather proposes a dedicated methodology on how such a strategy can be developed, and more specifically how Trans-S3 priorities and domains can be identified. The methodology contains:

- General methodological notes and justification, including limitations;

- Categories of data source categories and their interpretation/assessment;

- Step by step algorithm for application, including detailed computations;

- Problem solving guidelines;

- Guidance on interpretation of findings.

As the Trans-S3 methodology is a novel concept and a novel application, it is not free from weaknesses and areas for improvement. While the shortcomings are hopefully not too many and small, and fall exclusively on the authors, the benefits can be wide, provided that the adoption and further work on the concept is taken forward by others.

[1] Based on: Brennan L., Rakhmatullin R. (2015). Global Value Chains and Smart Specialisation Strategy. EUR 27649 EN.
[2] The so called 'coopetition' or simultaneous interplay between competition and cooperation, as in: Brandenburger A. M., Nalebuff B. J. (1996): Co-opetition. Co-opetition 1. Revolutionary Mindset that Redefines Competition and Co-operation 2. The Game Theory Strategy that is Changing the Game of Business, Crown Business.

[3] European Commission (2019). News: European Commission announces the Key Strategic Value Chains. http://s3platform.jrc.ec.europa.eu/-/european-commission-announces-the-key-strategic-value-chains?inheritRedirect=true&redirect=%2Fvalue-chains (17 Feb 2019).
[4] European Commission (2018). Smart Specialisation Platform. About our methodology - the rationale. http://s3platform.jrc.ec.europa.eu/value-chains (par.3).

About Smart Specialisation Strategies

Smart specialisation strategies are considered a new and promising policy tool for building more knowledge-based and more competitive economies. The essence of S3 is the concentration public resources in knowledge investments on selected activities to strengthen or develop comparative advantage in existing or new areas with three important dimensions[5]:

■ Scientific, technological and economic specialisation in the development of comparative advantage and in driving economic growth;

■ Policy intelligence for identifying domains of present or future comparative advantage;

■ Governance approach with the key role of regions, private stakeholders and entrepreneurs in translating S3 into economic and social benefits.

The broader rationale for S3 is predominantly economic, linked to the concepts of comparative advantage and regional competitiveness. S3s play a key role in developing and implementing strategies for innovation and economic transformation, responding to economic and societal challenges, improving regional internal and external competitive and cooperative connections (triple and/or quadruple helix networks, knowledge triangles, university-business cooperation, clusters, etc.), helping to accumulate a 'critical mass' of resources to build competitive positions, which in turn promote knowledge spill overs and technological diversification.

In the European Union, smart specialisation strategies have a strong regional focus as they are closely linked to and integrated into regional development (cohesion) policy with the aim of making innovation a priority for all regions, improving the innovation processes, focusing investments and creating synergies between European policies and funding, complementing national and regional schemes and private investments. Furthermore, such strategies (RIS3, S3) currently constitute an ex-ante conditionality for all EU Member States' regions
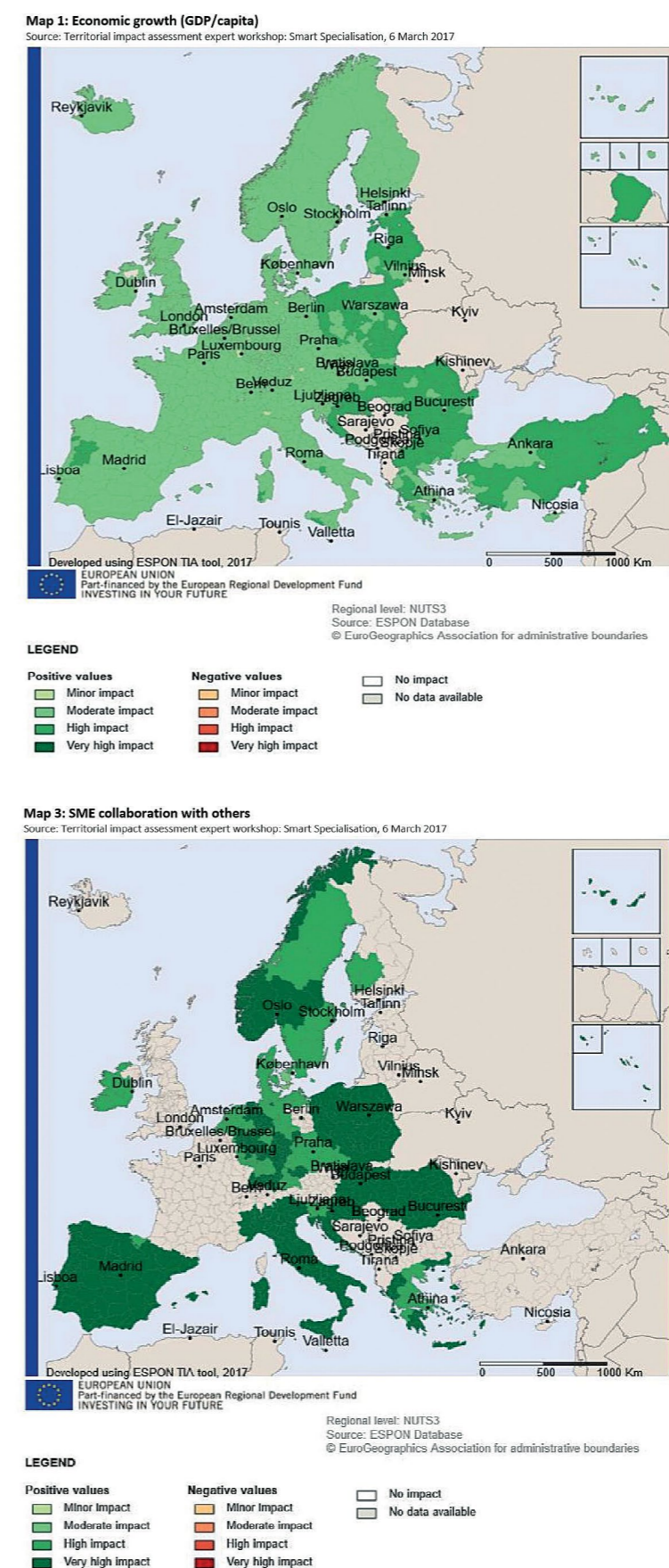
for EU funding related to research and development, and innovation objectives.

In simple terms, all EU regions must have in place smart specialisation strategies which an: based on a SWOT or similar analysis to concentrate resources on a limited set of research and innovation priorities; outline measures to stimulate private research, technology and development (RTD) investments; contain a monitoring and review system, and an adopted at the national level a framework outlining available budgetary resources for research and innovation as well as a multi-annual plans for budgeting and prioritisation of investments linked to EU priorities. Thus, S3s have become a standard policy tool in the research, technology and development, and innovation area. In this respect, S3s of the EU regions provide for more targeted cohesion and structural funds support geared towards smart growth and knowledge economy across Europe, in line with the EU central goals for 2014-2020 which are investments for growth and jobs, and territorial cooperation.

The regional and national Research and Innovation Strategies for Smart Specialisation (RIS3, S3) are integrated, place-based economic transformation agendas[6]. Their most important objectives and characteristics are the following:

■ Focusing policy support and investments on key national/regional priorities, challenges and needs for knowledge-based development;

■ Building on each country/region's strengths, competitive advantages and potentials for excellence;

■ Supporting technological as well as practice-based innovation and aim to stimulate private sector investment;

■ Getting stakeholders fully involved and encourage innovation and experimentation;

■ Being evidence-based and including sound monitoring and evaluation systems.

Figure 2: Positive impacts of smart specialisation strategies

Source: European Committee of the Regions (CoR) (2017): Territorial impact assessment smart specialisation, https://cor.europa.eu/en/our-work/Documents/Territorial-impact-assessment/smart-specialisation.pdf, access 30.10.2018

[5] European Commission (2009). Knowledge for Growth, http://ec.europa.eu/invest-in-research/pdf/download_en/selected_papers_en.pdf
[6] European Commission (2014). National/regional innovation strategies for smart specialisation (RIS). http://ec.europa.eu/regional_policy/sources/docgener/informat/2014/smart_specialisation_en.pdf

While the benefits of RIS3/S3 have not been extensively researched yet, there are some initial indications that elaborating and implementing these strategies can benefit regional (and national) economic structures by:[7]

■ More business to business, business to research, research to research, research to community and business to community interactions;

■ Increased investments and new 'leading businesses' attracted to regions;

■ High level support professionals moving into designated innovation hubs.

It is posited that **smart specialisation strategies have a significant territorial impact, especially with regard to economic, social and territorial cohesion, mostly by improving competitiveness and performance of European regions and by improving local governance and public services[8].** Preliminary analyses indicate that S3s have positive impact on SMEs collaboration, economic growth (GDP per capita) and to a lesser extent, on employment and government effectiveness.

The above observations encourage further work on the smart specialisation concept and its application. The Trans-S3 methodology looks at these topics by focusing on a number of interconnected issues such as internationalisation, transnational value networks, promotion of open innovations among enterprises, especially SMEs, etc. The **Trans-S3 methodology allows transitioning from the concept of a competitive region to the concept of a competitive group of regions,** potentially making smart specialisation strategy a transnational development policy tool.

About GoSmart BSR project

The Project "Strengthening smart specialisation by fostering transnational cooperation (GoSmart BSR)" is implemented with the support of the European Regional Development Fund Baltic Sea Region Programme 2014-2020[9]. From October 2017 to September 2020 the project unites 8 partners from 7 countries – Bialystok University of Technology (Lead Partner, Poland), Podlaska Regional Development Foundation (Poland), Vidzeme Planning Region (Latvia), Valga Town Government (Estonia), Public Institution Lithuanian Innovation Centre (Lithuania), Kouvola Innovation Ltd. (Finland), Hamburg Institute of International Economics (HWWI) (Germany), Business Aabenraa (Denmark).

The main aim of the GoSmart BSR project is to increase capacity of innovation actors (innovation intermediaries, authorities, research institutions, enterprises) to apply smart specialisation approach. The idea is to integrate countries of low innovation potential with more developed regions of the Baltic Sea Region (BSR) by mutual learning, translating smart specialisation strategies into practical joint actions of SMEs, employing and sharing best practices from more developed regions. The project in fully integrated with 3S concept and aims to foster effective cooperation in transnational approach between industry, R&D sector and authorities. The main expected results are a functioning and sustainable Transnational Innovation Brokerage System and SMEs Joint Smart Strategies implemented across partner regions.

The GoSmart BSR project makes an important contribution to the existing interregional cooperation under S3, which takes place for example in the frame of the EU Macro-Regional Strategies[10] and of other Interreg projects focused on smart specialisation:

■ EmpInno (http://www.empinno.eu)

■ Smart Blue Regions (https://www.submariner-network.eu/projects/smartblueregions/about-smart-blue-regions)

■ BSR Stars S3 (http://www.bsr-stars.eu/bsr-stars-s3/)

■ LARS (https://www.lars-project.eu/home/)

■ RDI2CluB (http://www.rdi2club.eu/)

■ Smart-up BSR (https://projects.interreg-baltic.eu/projects/smart-up-bsr-151.html)

Interregional collaboration in S3 is becoming increasingly important [11], both for the reasons related to opening S3s to global value creation (as mentioned in the introduction chapter) and for shared learning.

Figure 3: Project partners

Source: European Committee of the Regions (CoR) (2017): Territorial impact assessment smart specialisation, https://cor.europa.eu/en/our-work/Documents/Territorial-impact-assessment/smart-specialisation.pdf, access 30.10.2018

[7] OECD (2013). Innovation-driven Growth in Regions: The Role of Smart Specialisation. https://www.oecd.org/innovation/inno/smart-specialisation.pdf
[8] European Committee of the Regions (2017). Smart specialisation plays an important role in promoting territorial cohesion. Press release 23/05/2017. https://cor.europa.eu/en/news/Pages/Smart-specialisation-plays-an-important-role-in-promoting-territorial-cohesion.aspx
[9] https://gosmartbsr.eu/
[10] European Commission (2018): Smart Specialisation Platform. S3 cooperation in the frame of the EU Macro-Regional Strategies. http://s3platform.jrc.ec.europa.eu/eu-macro-regional-strategies

[11] Cortijo A. M., Esparza M. R., Fernández S. T., Marinelli E., Arregui P. E. (2018). Synergies between Interreg Europe and Smart Specialisation A methodological proposal to enhance policy learning, EUR 29390 EN, Luxembourg: Publications Office of the European Union, ISBN 978-92-79-96382-7, doi:10.2760/572859, JRC113414

Introduction

The elaboration of the Trans-S3 for multiple regions was one of the main elements supporting the GoSmart BSR project idea, that is 'strengthening smart specialisation by fostering transnational cooperation'. The GoSmart BSR project addresses low capacity for innovation in less developed regions of the Baltic Sea by, among others: mutual learning, translating S3s into practical SMEs joint actions, and employing best practices from more developed regions. The project is fully integrated within the 3S concept and aims to foster effective cooperation in transnational approach between industry, research and development (R&D) sector, and public authorities.

Although created within the GoSmart BRS project context, **the proposed Trans-S3 methodology can be widely used in any situation when multiple regions attempt to intensify their collaboration based on the smart specialisation concept.**

General description

The key element of Trans-S3 and one of its main challenges, is to identify (which in practical terms means to select) the common smart specialisation priority areas and their underlying knowledge and economic domains for groups of regions rather than for a single region. This raises a number of challenges. The Trans-S3 methodology aims to address these challenges and provide an applicable solution, a 'recipe' on how to elaborate and manage transnational smart specialisations.

Under the 'standard' application of S3 methodology, which is usually applied to a region (less frequently a country), a set of six steps has been developed and used across the European Union (and beyond)[12]:

1. Analysis of the regional context and potential for innovation;

2. Set-up of a sound and inclusive governance structure (participation);

3. Production of a shared vision about the future of the region;

4. Selection of a limited number of priorities/domains for regional development;

5. Establishment of coherent policy mixes;

6. Integration of monitoring and evaluation mechanisms.

While considering all these elements, an adaptation was made to the transregional/transnational context and as a result a Trans-S3 methodology was developed by the GoSmart BSR project partners. The main challenges when adapting the general guidance on S3 were related to the interregional/international nature of Trans-S3 and to the fact that in this new context, a priori governance systems which could be adapted and applied, were practically non-existent. This is one of the reasons why the management of Trans-S3 (later in the text called the 'general component') was treated with some limitations, while the specific component dedicated to the identification of Trans-S3 priorities and domains, was given a more prominent position.

Some of the key challenges in developing the Trans-S3 as compared to a standard regional (or national) S3 were:

■ Geographical context being „disconnected" (large distance in physical and development terms, different economic structures, and innovation levels among target regions and countries, etc.);

■ Temporary and relatively weak governance structures (project based);

■ Agreement on shared vision difficult to „disconnectedness" and weak governance;

■ Policy mixes generally not compatible at trans-national level, funding largely differentiated except for EU horizontal programs;

■ Monitoring and evaluation set in the project context, not easily transferrable to permanent trans-national structures.

The transnational smart specialisation strategy methodology, outlined in this chapter, explains briefly the approach proposed for the identification of transnational/transregional smart specialisation priority areas, which is considered the key element of the Trans-S3. Other elements of this strategic management tool are also presented.

Later in the text, for the purpose of methodological clarity, the Trans-S3 methodology is split into two main parts:

A. 'Specific component – Trans-S3 identification' – This stands for all steps, or as they were called within the GoSmart BRS project, sequences, which lead to the selection of smart priorities and domains at the transnational level. The specific component covers the following sequences: 1/Search for common sets (defining initial priorities), 2/Analytical review and profiling of target regions (verifying priorities), 3/Markets and technology trends review (refining priorities), 4/Internationalisation potential assessment (assessing priorities), 5/Stakeholders consultations and entrepreneurial discovery (finalising priorities).

B. 'General component – Trans-S3 management' – This stands for the elements which need to accompany the identification of smart priority areas and are described towards the end of the outline. At the same time, it is necessary to stress that the Trans-S3 general component is the one which governs all steps and sequences, and regulates the whole strategy. The general component covers the following elements: 1/Governance, 2/Shared vision, 3/Action plan, 4. Monitoring and evaluation.

The outcome, which is the final Trans-S3, is developed on the basis of these two interrelated components and supported by a strategic level analysis summarising the key considerations (Strengths, Weaknesses, Opportunities and Threats as proposed in the text or similar analytical methods). The Trans-S3 forward-oriented aspects (objectives, measures, etc.) reflect what had been learned in the Trans-S3 elaboration process, including answers to the 'what should be done' question, reached through wide consultations and entrepreneurial discovery.

To better understand the proposed Trans-S3 methodology in relation to the standard, widely applied S3 methodology, an explanatory scheme is provided on the next page.

In the case of the Trans-S3 for the GoSmart BSR partner regions, it has to be made clear that the forward-oriented part of the strategy is rather narrow as it had been largely predefined by partners before engaging in the project, and focused on international joint smart strategies at the micro level, i.e. led by groups of SMEs. Of course, other Trans-S3s can take the form of 'fully-fledged' strategies, depending on the particular objectives and agreements made among the participating regions.

Table 1: Relations between standard S3 and Trans-S3 methodologies

Standard S3 methodology [13]	Trans-S3 methodology	
	Components	Sequences and elements
1. Analysis of the regional context and potential for innovation	A. 'Specific component – Trans-S3 identification'	Predominantly the sequences: 2/Analytical review and profiling of target regions, 3/Markets and technology trends review, 4/Internationalisation potential assessment
2. Set-up of a sound and inclusive governance structure (participation)	B. 'General component – Trans-S3 management'	Predominantly the element: 1/Governance
3. Production of a shared vision about the future of the region	B. 'General component – Trans-S3 management'	Predominantly the element: 2/Shared vision
4. Selection of a limited number of priorities/domains for regional development	A. 'Specific component – Trans-S3 identification'	Predominantly the sequences: Sequences: 1/Search for common sets, 5/Stakeholders consultations and entrepreneurial discovery
5. Establishment of coherent policy mixes	B. 'General component – Trans-S3 management'	Predominantly the element: 3/Action plan
6. Integration of monitoring and evaluation mechanisms.	B. 'General component – Trans-S3 management'	Predominantly the element: 4/Monitoring and evaluation.

A. Specific component

The Trans-S3 identification process is described below in an easy 5-sequence logic with each part representing different analytical and consultative set of methods and their expected outcomes.

The sequences 1-5 are directly applicable in a situation when each of the target territories possesses its own S3 (regional, national, or both). These individual S3s are considered a legitimate and useful starting point for the identification of the Trans-S3 priorities and domains. In this case, finding common smart specialisation areas and their underlying knowledge and economic domains, simply described, becomes an exercise of selecting common sets and refining this selection through appropriate further analyses with participation of the various stakeholders.

The application of the standard six steps of S3 elaboration (mentioned earlier) would be required in the case in which target regions did not possess their regional S3s. Still, the application of the standard six steps is not easy in the transregional/transnational context, especially in terms of establishing an appropriate governance system and setting up a common policy mix. However, the six steps are universal enough to be applied (with necessary adaptations) to any type or size of territory as long as an effective dialogue can be ensured among all parts of that territory, given the necessary adaptations.

Following the proposed sequences 1-5 leads to establishing the Trans-S3 priorities and specific domains in a coherent, logical, and integrative manner, which reflects the main underlying concepts of the smart specialisation strategies (see figure below). It is important to note that the whole process is to a high degree iterative (verifications and validations are carried out throughout all the sequences), highly participatory, and allowing extensive feedback loops.

Figure 4: Specific component – Trans-S3 identification
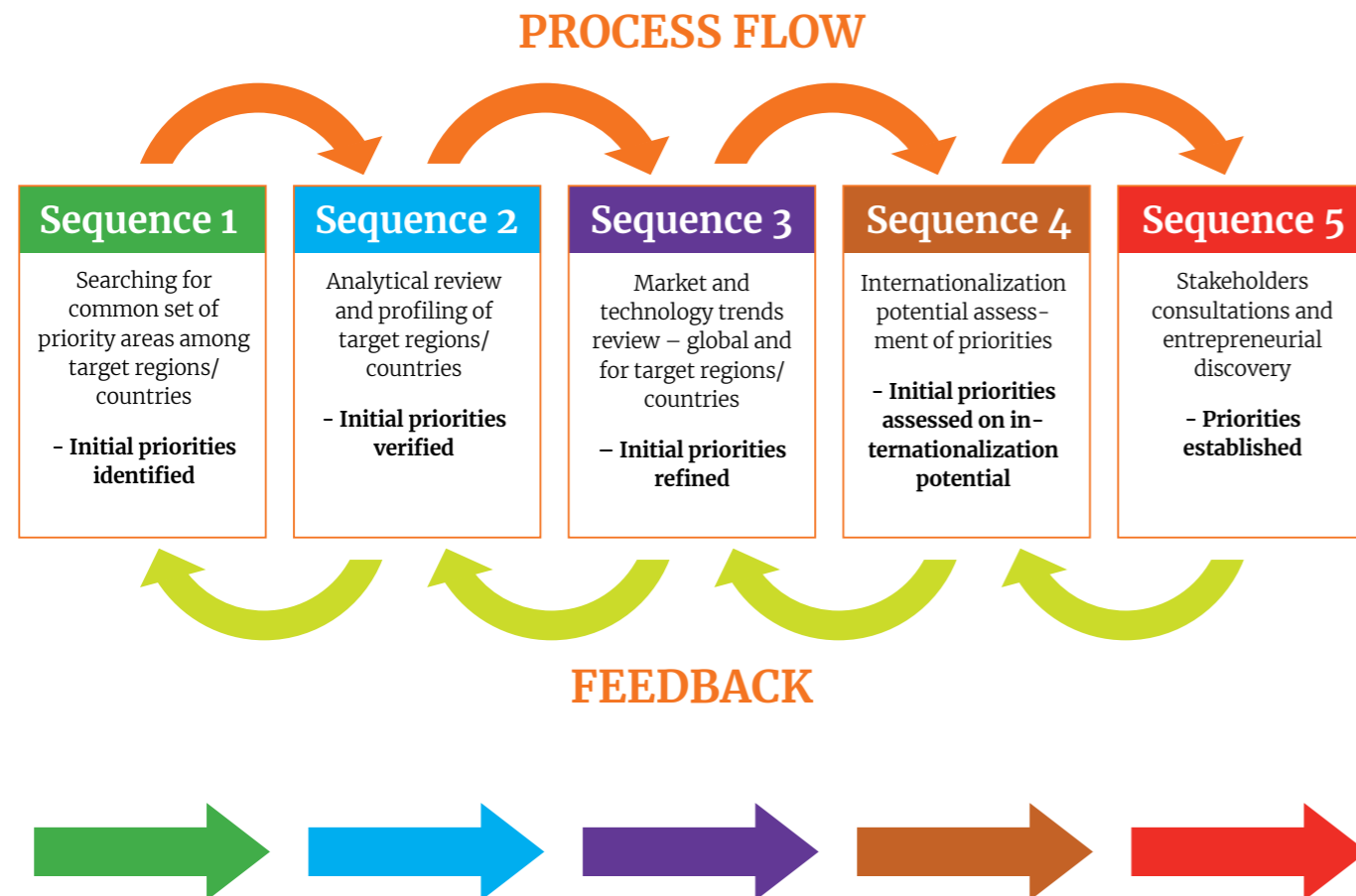
Source: Own elaboration.

**Sequence 1: Searching for common set**

Assuming the existence of formally adopted S3s for the concerned territories (at different regional and/or national levels), the first analytical task is to compare the sets of the national-level (high level) smart specialisation priority areas and to identify the common ones.

Information on national S3s can be obtained from a number of sources (the S3 national documents directly or the information published online which is presented in a uniform way, e.g. in the European Commission InfoRegio fact sheets on national smart specialisations)[14]. Whichever the source, it is advisable to cross-check the information as the sources can differ by the level of detail, the definitions used, and the dates of publication.

By analysing the national-level S3s, it is relatively simple to list all smart specialisation priority areas for the concerned countries (and indirectly regions, as long as there is no significant conflict between the national and regional levels). Immediately, it becomes apparent that there are priority areas which are common for the majority of countries and these should be considered the initial common smart specialisation priority areas among target regions/countries. The cut-off point between the common and the uncommon priority areas has to be decided by experts. A simple majority-minority rule can be applied, e.g. if at least 50% of the concerned regions/countries share particular priority areas these can be considered common. Of course, the more regions/countries share the given priority areas, the stronger the argument to consider them to be the common ones.

At this point, usually only the general (or broad) smart specialisation priority areas can be identified (such as: Key Enabling Technologies, Manufacturing & Industry). As these are not easily translated into applicable concepts,
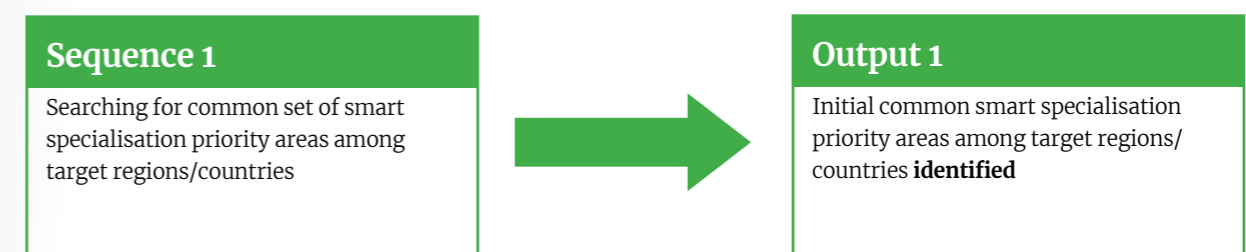
further analysis is required. A study of S3 documents in more detail is needed and the following tasks carried out:

■ Listing all smart knowledge domains, sectors/sub-sectors, technologies and themes (in short: domains) – both at the national and regional levels (S3s at NUTS1, NUTS2 and NUTS3 levels). This is the starting point which allows not to lose any domains which can be the subject of further analysis.

■ Consolidating the regional smart specialisation domains from the various S3 levels within each target territory (region/country). These consolidated regional domains are the basis for cross-regional/transnational consolidation.

■ Consolidating the cross-regional/transnational domains by identifying the common ones and allocating them to the appropriate smart specialisation priority areas previously defined. The specific domains which clearly fall outside of the selected general priority areas should be eliminated (they are considered important for individual regions but not so for the transnational territory and economy).

As a result of the above analysis and combination of selection methods, the initial Trans-S3 (common smart specialisation priority areas and their underlying common knowledge domains, sectors/sub-sectors, technologies and themes) are defined. They can be presented in a tabular form, specifying the common smart specialisation priority area and the specific knowledge/technology domains and themes.

The result of this sequence is **the initial identification and the dual definition of Trans-S3,** both in terms of general smart priority areas and their underlying and more spe-

Figure 5: Sequence 1

Source: Own elaboration
[14] European Commission: InfoRegio fact sheets on smart specialisations, 2017, http://ec.europa.eu/regional_policy/en/information/publications?title=&languageCode=en&themeId=41&tObjectiveId=1&typeId=20&countryId=0&periodId=3&fundId=0&policyId=14&search=1 (retrieved 9.02.2018).

cific knowledge domains, sectors/sub-sectors, technologies and themes. The benefit of the proposed approach is that while the cross-country/cross-region general common priorities are identified, they are also explained by the specific common smart domains, which can be the subject of further concretized analysis and consultations.

Sequence 2: Analytical review

There is a need of a supplementary analytical review and profiling of the target territories. The main reasons for doing so are the following:

- Resetting the reference points for priority areas and domains from the ones applied in the elaboration of the individual national and/or regional S3s.

- Cross-checking that the identified common smart specialisation priority areas (and their underlying domains) are statistically important currently, i.e. at the time when the Trans-S3 is being elaborated.

- Verifying that the conditions and trends in the target territories have not significantly changed between the time when their individual S3s had been adopted and currently.

- Bringing in updated hard evidence into the process as some (if not most) smart specialisation strategies have some degree of normative policy-making and/or even wishful thinking.

Perhaps the first reason is the most critical one. If the existing regional S3 was defined on the basis of reference territory, now the perspective changes quite dramatically. To illustrate, the basic statistical tool used for the S3 elaboration is the Location Quotient[15] (LQ) which at the
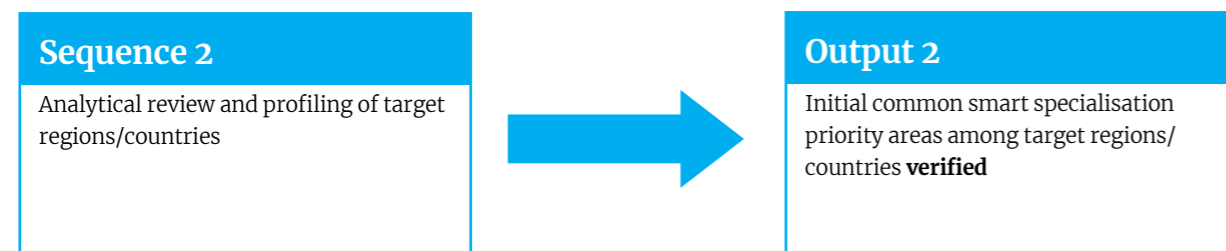
regional level compares the concentration of a sector, industry in question in the region to that of the country (or a larger region containing the analysed one). At the national level, the LQ compares the concentration of a sector in question in the given country to a greater territory (a group of countries, such as for example the European Union or the Baltic Sea Region).

When elaborating the Trans-S3 each target territory can be compared in terms of calculating its LQ by referring to the concentration level of the sum of the target territories or to a greater reference territory, such as for example the Baltic Sea Region, the European Union, the OECD countries, or even globally. This change of perspectives is important as the Trans-S3 actually covers a completely new territory which needs to be statistically analysed and assessed on its concentration, dominance, or put simply, specialisations. Some of these specialisations in the end will be usually considered smart specialisations. More advanced statistical tools can be used from among those usually applied in the S3 processes (input-output analysis, benchmarking, etc.).

Conducting statistical analysis when elaborating the Trans-S3 is also warranted by the fact that usually the situation is such that the existing individual S3s were conceived and adopted some years ago. While these strategies might be still generally valid, not all of them have been regularly reviewed and updated while the economic realities, challenges and technologies change.

It seems plausible to suggest that each initially identified smart specialisation priority area and each domain should undergo the review. Also, new priorities and domains should be considered, to the extent the statistical data supports their relevance and importance.

Figure 5: Sequence 2

Source: Own elaboration

Through the analytical review and profiling of the target territories, **the initially identified Trans-S3 can be verified,** that is some smart specialisation priority areas and their underlying domains can be added or eliminated, based on convincing statistics. Expert judgement should be applied and justifications provided for further phases of the Trans-S3 elaboration to build consensus (or to make further adjustments) by evidence-based consultations and by joint (entrepreneurial) discovery among the involved stakeholders (see sequence 5 for further details).

Sequence 3: Market and technology trends review

Sequence 3 is somewhat similar to the previous one but now other aspects heavily influencing the Trans-S3 are studied (see figure 3). While static and past data are the

Figure 7: Sequence 3
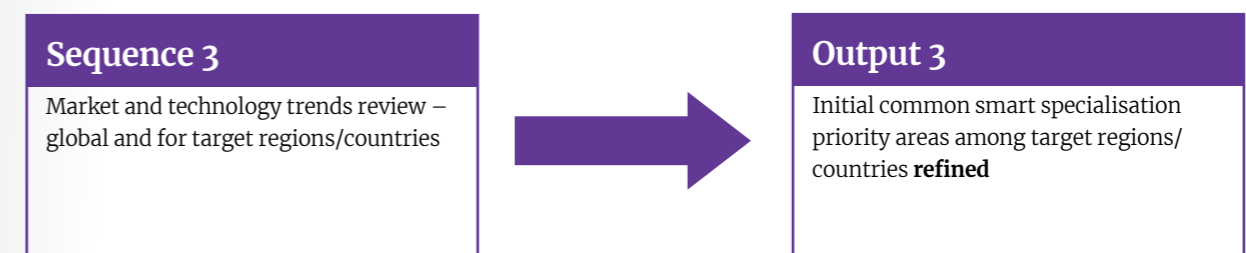
Source: Own elaboration

Again, some Trans-S3 smart specialisation priority areas and their underlying domains can be added or eliminated, based on convincing arguments. This sequence provides yet another important verification of the initial Trans-S3 and refines it.

Sequence 4: Internationalization potential

Since the transregional/transnational aspects are at the core of the Trans-S3 concept, it is highly relevant to assess the potential of the previously initially identified, verified, and refined smart priorities and domains (in sequences 1-3).

Here the pragmatic and application aspects of the Trans-S3 are in the focus (see figure below). While the

subject of analysis under the sequence 2, this sequence is more outward- and future-oriented. Relevant markets and technological trends affecting the target territories are analysed, based on statistical data, industry and technology forecasts, qualitative analysis, or foresight studies.

The market, industry and technology trends should be collected and analysed by researching generally available publications such as sector and technology journals or publications made available by recognized institutions or international organizations. Arguments for and against the initially identified Trans-S3 (the general priority areas and the specific domains) should be weighted and judgment should be applied to decide how the market and technology trends influence and moderate them.

initial and somehow already validated smart priorities and domains are seemingly ready, not all of them are prone to be the subject of transregional/transnational cooperation activities. This will depend on a number of factors, just to mention a few: attractiveness of market niches served/to be served, proximity of the involved territories in terms of technological advancement, existence of clear comparative advantages, regulations such as the ease of establishing joint operations, outsourcing, direct investments; even cultural linkages and differences among the involved territories might have significant impact.

[15] The Location Quotient (LQ) is a way of quantifying how concentrated or dominant a particular industry, cluster, occupation, or demographic group is in a given territory (e.g. the region) as compared to a greater reference territory (e.g. the country). The LQ can reveal what makes a particular region specialised or unique in comparison to the greater reference territory.

Figure 8: Sequence 4

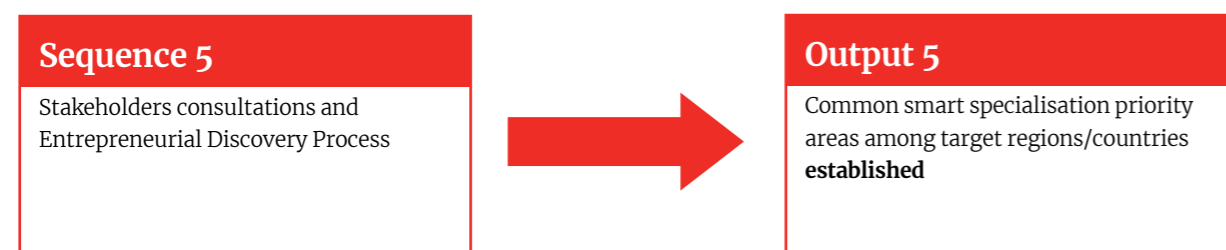| Sequence 4	Output 4
Internationalization potential assessment of priority areas	Common smart specialisation priority areas among target regions/countries **assessed on internationalization potential**
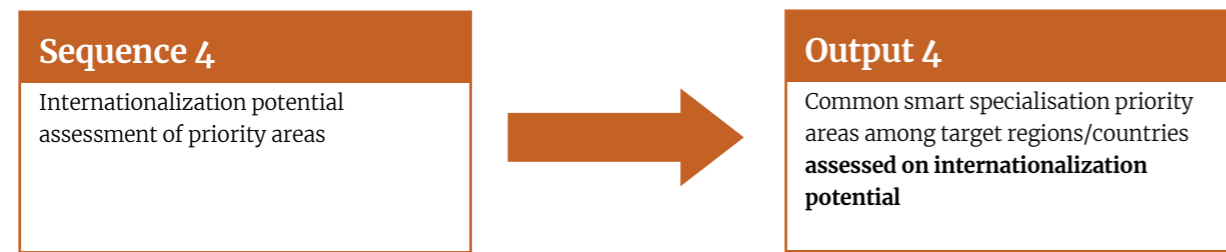
It is posited to apply a qualitative and consultative approach among the experts (or working groups) involved in the elaboration of the Trans-S3 as a way to assess the internationalization potential of each selected common smart priority and domain from the perspective of each target territory. Simple tools can be used such as evaluation/scoring grids which would consider each common domain and each type of internationalization models (sourcing and cooperation in the supply chain, technology and innovations sharing – sourcing, outsourcing some core process abroad, outsourcing of some supporting operations abroad, marketing and distribution alliances within partnering countries, marketing and distribution alliances for joint overseas expansion, new technologies and new products co-invention, innovation alliances, etc.).

The Trans-S3 domains which receive high (sufficiently high) scores should be considered further as appropriate for the final content of the Trans-S3. It is required that the experts involved in this sequence are well aware of the functioning of their regional businesses in the transregional/transnational context. Their assessments should be backed up by arguments for or against the internationalization potentials of all reviewed domains, which are later available for discussions and consultations among wider stakeholders' groups (see the next sequence).

Sequence 5: Stakeholders consultations

The outputs of all the previous sequences (1–4) constitute the input to the final sequence (see figure below) in the elaboration of the Trans-S3. This phase is concerned with wide stakeholders' involvement, broad consultations and running what is called the Entrepreneurial Development Process (EDP) which:

- Encourages and ensures an inclusive and interactive bottom-up involvement of participants representing all quadruple-helix environments (policy, business, academia, non-governmental sector) through which the proposed smart domains can be assessed and new potential ones identified, mostly based on market and/or technological opportunities identified in the process.

- Provides a vehicle for integrating entrepreneurial knowledge from many environments and institutions by making connections and partnerships more frequent and stronger.

Many tools can be used for the EDP such as communication platforms, including transregional/transnational ones, information provision on emerging market and technological opportunities, building networks and associations, clustering, technology extension information and services, online consultations, workshops. The important issue is to make sure that participation is encouraged as much as non-conventional ideas.

Figure 9: Sequence 5

Sequence 5	Output 5
Stakeholders consultations and Entrepreneurial Discovery Process	Common smart specialisation priority areas among target regions/countries **established**

Source: Own elaboration

The sequence of broad consultations with an integrated EDP is the final one before arriving at the Trans-S3 specialisations. As proposed earlier, **the Trans-S3 is defined in terms of smart specialisation priority areas and specific domains. At this point the Trans-S3 can be considered established.**

One additional note needs to be made. While stakeholder consultations and entrepreneurial discovery are stressed in this last sequence, they should be present in all phases and elements of Trans-S3 elaboration and management. Any type of decision and discussion should include the key stakeholders and allow all to make contributions. Some non-standard observations can be very useful to the overall understanding of the situation and building consensus, especially in an international setting.

B. General component

The Trans-S3 management (general) component, differentiated but intrinsically linked to the specific component, allows the identification of smart priorities to be carried out in a purposeful, agreed, and rational manner and the Trans-S3, once adopted to be effectively implemented. As the elements comprising this general (management) component are fairly 'generic' and applicable regardless of the geographic context, they do not differ much between a typical regional (or national) S3 and a Trans-S3. In this sense, the standard S3 methodology can be used without much modification.

To avoid confusion about the applicable and recommended methods related to the Trans-S3 general component, which are in essence directly derived from the standard S3 methods[16], the latter ones are only summarised below, while some more specific recommendations and experiences from the GoSmart BSR project, are provided in the next chapter.

Element 1: Governance

Governance is broadly all about ensuring transparency, participation and ownership. In the context of Trans-S3 this means developing and applying effective mechanisms to:

- Bring different stakeholder groups, optimally representing the quadruple helix (business, re-

search, public authority and non-governmental spheres);

- Work together towards Trans-S3 and then jointly implement the strategy across different geographical, economic, political and cultural realities.

This second governance aspect of Trans-S3 is more challenging as differences across countries (regions in different countries) in respect of strategic planning and coordination are sometimes very substantial and can become an important obstacle. For example, business representation and political influence is quite different in countries with obligatory and non-obligatory business association regulations. Public authorities in different national and sub-national contexts hold different degree of effective power, also in relation to innovation policy. These and other realities of different countries and regions, make the governance aspects of Trans-S3 difficult and requiring high sensitivity, diplomacy and consensual efforts. In a broader sense, Trans-S3 has to consider multiple and highly differentiated interest groups, markets, and societies.

Not surprisingly, several governance bodies should be established and working in a coordinated manner for Trans-S3. Typically, a steering group, expert groups and working groups of different scope, tasks, and composition, need to be activated and supported.

Element 2: Shared vision

In the context of Trans-S3, a common vision about the future of the region cannot be formulated in a simple manner for the basic reason that this strategy applies to many regions (geographically disconnected, economically, politically and culturally different). More coordination and communication efforts are required to bring participants to a consensual vision in a transregional/transnational setting.

Analytical work, conducted within the specific component of Trans-S3 elaboration, especially by: regional profiling (sequence 2), markets and technology trends review (sequence 3), wide consultations and joint discovery (sequence 5), contributes to developing a com-

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[16] European Commission: Guide to Research and Innovation Strategies for Smart Specialisations (RIS 3) , 2012, http://ec.europa.eu/regional_policy/sources/docgener/presenta/smart_specialisation/smart_ris3_2012.pdf (retrieved 1.02.2018)

mon understanding of the current situation and the future scenarios shared by the involved regions. In reaction to these scenarios, broad challenges and opportunities, a common vision addressing the Trans-S3 agenda, can be reached and promoted.

In the context of Trans-S3, two-prone communication seems to be equally important – among the involved regions while building consensus as well as toward external partners and wide stakeholder groups to promote the idea of joint international strategy formulation and implementation. This is justified by a higher level of disconnectedness among regions from different countries as compared to one or a few regions from a single country.

Element 3: Action plan

For Trans-S3, it is extremely challenging to create a complete coherent policy mix, single instruments, joint budgets, etc., for the basic reason of differentiation of applicable political and policy realities among the target regions, mentioned before.

Still, it is necessary and possible to work out and agree at least a simple roadmap and/or an action plan containing what will be done by the partner regions to accomplish the agreed Trans-S3 objectives. Typically, the Trans-S3 action plans will focus on what can be done jointly and/or separately by the involved regions but with the same underlying logic and expected effects in relation to the applied policy instruments and support systems. For example, it can be expected that regions developing a joint transnational smart specialisation strategy will agree to:

■   Modify their underlying regional S3s to accommodate more intensive cross-regional collaboration in research and development;

■   Build or develop joint or mirror support systems for certain aspects of their research and development and innovation spheres;

■   Jointly promote common solutions and make aware of concerns other regions and decision-makers at national and higher levels, e.g. the leaders of the European Union.

Relatively simple road maps and action plans under Trans-S3 can be effective, even though full integration of policy instruments and funding is normally impossible. It is sufficient that the partners gear their instruments and budgets towards the same strategic goals and then coordinate and monitor Trans-S3 implementation.

Joint pilot projects on the basis of Trans-S3 can be especially interesting as they open more policy and funding options to reach the agreed transregional/transnational objectives. Lessons from such joint projects can be reintegrated into the further cycles of Trans-S3 and mainstreamed in many ways.

Element 4: Monitoring and evaluation

Monitoring and evaluation (M&E) is an indispensable sub-system of any strategy. The same applies to Trans-S3, despite the challenge to build joint ownership and hold partners responsible. For the M&E system of Trans-S3 to be effective, it needs to be defined in measurable terms throughout the strategic levels (general objectives, specific objectives, result and output indicators, etc.).

Performance of Trans-S3 as well as changes of the strategic context among the partner regions and in the external environments, e.g. global societal challenges, markets dynamics and new technology trends, need to be captured by M&E, allowing Trans-S3 updates and adaptations which, despite changing conditions, are able to secure the ultimate objectives. In most cases, the M&E elements of Trans-S3 will be expressed within the strategy itself and reflected in the associated action plan (element no. 3 described above). A peer review system can be a useful element of monitoring and evaluation of Trans-S3, also acting as a motivation factor among the collaborating regions.

Detailed methodology and its application

The proposed Trans-S3 methodology is presented in this chapter in more detail, providing policy makers and smart specialisation practitioners with in-depth instructions and suggestions on each step of Trans-S3 elaboration, and more specifically, on the steps leading to the identification of transregional (transnational) S3 priorities and domains. It is hoped that this way of presenting the topics will help the readers to follow general instructions and for those interested in the actual application and further details, to benefit from the experiences of the GoSmart BSR project. All topics are presented in two parts:

■   Instructions, challenges and possible options and solutions – indicated by the below heading:

HOW TO DO IT?

■   Application of the methodology by the GoSmart BSR project partners in the actual context of the seven target regions – indicated by the below heading:

HOW DID WE DO IT?

These experiences refer to the seven target regions which joined forces to form the GoSmart BSR partnership (country, NUTS2/NUTS3 name and abbreviation):

■   Denmark – Region Syddanmark (NUTS2 - DK03)

■   Estonia - South Estonia (NUTS3 - EE008)

■   Finland - Kymenlaakso (NUTS3 - FI1C4)

■   Germany - Hamburg (NUTS 2 - DE600)

■   Latvia - Vidzeme (NUTS2- LV00)

■   Lithuania - Lithuania (NUTS2 - LT01)

■   Poland - Podlaskie (NUTS2 - PL34).

It is worth noting that these regions are very diverse in terms of their size (area, population), spatial and functional characteristics (metropolitan, capital city, rural, mixed), and statistical category (NUTS1, NUTS2, NUTS3). Furthermore, they are different in terms of regional development level and innovativeness, indicated by among others: different levels of their EU 2020 regional indexes and R&D expenditures as a share of GDP.

This combination and variation of regional characteristics presented some challenges, especially in terms of statistical data collection and analyses. In some cases, especially for the category of small regions (NUTS3), analytical work was carried out on the basis of information available for their relevant larger (containing) units (NUTS2).
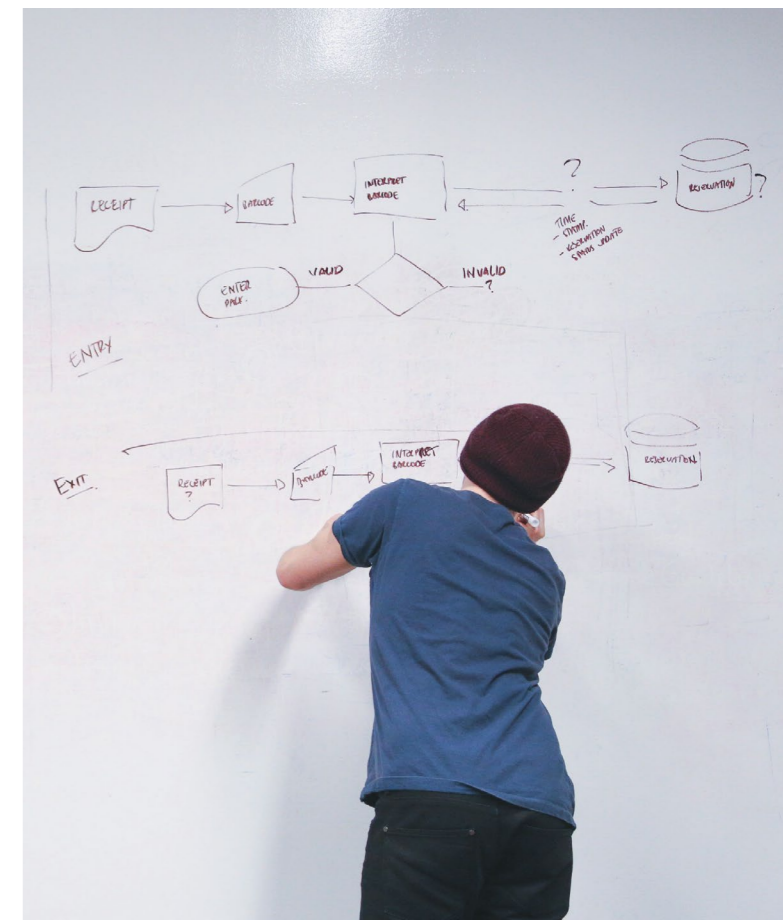
A. Specific component – Trans-S3 identification

As indicated earlier, the specific component – 'Trans-S3 identification', leads to the establishment of an agreed list of priorities and specific thematic domains which constitute the thematic scope and the limits of smart specialisations among the target regions. Consequently, when implementing Trans-S3, these areas and themes should become the focus of common efforts to jointly innovate and enhance internationalization.

1. Search for common sets (defining initial priorities)

HOW TO DO IT?

As stated in the Trans-S3 methodology outline (previous chapter), the existence of regional (and/or national) S3s among the European regions is commonplace - 177 EU regions and 16 non-EU regions[17] are involved in the specialisation strategy platform, most if not all of them possessing own strategies. This is a good starting point of searching for common smart priorities and domains by either comparing the information available on the platform (information encoded in a standard form) and/or S3 documents.

Listing and comparing the existing regional S3 priorities gives a quick overview of common areas which can be included in the initial Trans-S3 priorities. Of course, decisions need to be taken as to what is considered 'common'. While no questions arise if all regions share the same priority, multiple questions arise if only some of the concerned regions share the same priority. A simple majority rule can be applied or other cut-off algorithms, as long as the most popular priorities among the regions are selected. It has to be stressed that this sequence is only a preliminary step and that both the elimination and addition of other priorities is possible in later sequences on the basis of evidence and consultations among the regional partners and other stakeholders.

The main challenge of this sequence is to analyse and compare indirect information or directly the S3 documents which are sometimes differently structured and use different nomenclatures, definitions and descriptions of smart priorities and domains, furthermore some are available only in national languages. In this case, the existing S3 priority classifications and interpretations are useful. For example, the S3 Platform[18] defines and encodes the smart priorities of regions (and where applicable, countries) using the following dimensions: description, economic domain, scientific domain, and policy objective categories, making them easier for comparison.

When looking at different scale territories (in the EU, regional S3s are usually developed for NUTS2 but also NUTS1 or NUTS3 regions), decisions need to be taken, which layer of information to consider. For example, a region at NUTS2 level (e.g. a province) might have its own priorities and at the same time be part of a region at NUTS1 level (e.g. a country) which also has its priorities. Usually these priorities will overlap but not always. For the purpose of the initial identification of Trans-S3 priorities, some expert judgement needs to be applied as to which geographical and policy levels should be considered the most relevant.

A selection of the common areas, based on the above described or other similar methods, will produce a preliminary list of Trans-S3 priorities which are most common to the target regions. It is advisable to express the Trans-S3 in two ways: general priorities and within them, specific domains (defined by knowledge areas, sectors/sub-sectors, technologies and themes). For example, a general priority 'Human health & social work' may contain a domain 'Innovative medicine, medical technology, biotechnology, biomedicine, new treatments and medical devices, digital applications in health and well-being, advanced diagnostics, genetic engineering and research'. While for policy objectives and subsequent management of the Trans-S3, the priority is rather wide and to some extent vague, the domain is much more informative and precise. This dual definition of the initial Trans-S3 areas, in terms of general priorities and specific domains, allows better future concentration of resources and efforts and the development of appropriate support targeting these specific domains.

HOW DID WE DO IT?

The GoSmart BSR project partners carried out this sequence in February - March 2018 by initially looking at the national level S3 priority areas of the seven countries involved in the project on the basis of general level information published by the European Commission[19]. This resulted in identifying the strong 'candidates' for Trans-S3 priority areas which were included in the list and the weak 'candidates' which were, at least for the time being, excluded.

Strong candidates for Trans-S3 priority areas:

1. Human health & social work activities (all countries) – 7;

2. Key Enabling Technologies (all countries except Denmark) – 6;

3. Manufacturing & industry (all countries except Lithuania) – 6;

4. Information & communication technologies (all countries except Denmark and Lithuania) – 5;

5. Sustainable innovation (four countries: Denmark, Finland, Germany, Poland) – 4.

Weak candidates for Trans-S3 priority areas:

6. Energy production & distribution (three countries: Denmark, Latvia, Lithuania) – 3;

7. Agriculture, forestry & fishing (two countries: Denmark and Lithuania) – 2;

8. Social innovation (Lithuania) – 1;

9. Construction (Estonia) – 1.

Furthermore, all relevant S3 documents (adopted strategies) were studied both at the regional and national level (NUTS1, NUTS2, NUTS3, as applicable), to identify both the priority areas and specific domains common to the majority of the target regions. Following this analysis, an initial list of Trans-S3 priorities and domains was composed (see the next pages). The following domains were initially excluded from the list as not belonging to common priority areas although found among target regions:

■ Agriculture;

■ Construction industry and products, including smart and energy-efficient construction;

■ Innovative transport and logistics, including secure, smart transport and logistics systems;

■ Health tourism and SPA services, recreation and sustainable tourism;

■ Culture and creative industries, experience-based industries, smart creative technologies.

These analytical steps were followed by consultations (March – May 2018) in the target regions which led to the proposals to also include in the Trans-S3 list the following priority areas and domains:

■ Construction industry and products, including smart and energy efficient construction, as a sector that could bring valuable cooperation possibilities for several regions (e.g. Kouvola/Kymenlaakso, Estonia and Lithuania).

■ Innovative transport and logistics, including secure, smart transport and logistics systems as almost all regions have transport and logistic as a key domain. Especially the catch-up regions are those regions that are not well connected to the European single market and should regard the connectivity as a strategic asset.

■ Cultural and creative industries, experience-based industries, smart creative technologies as the enterprises of the cultural and creative industries are seen as cross-sectional enterprises with innovative character.

Ultimately, it was decided by the partner regions to consider these additional priority areas and domains under the further sequences of the Trans-S3 identification.

[17] http://s3platform.jrc.ec.europa.eu/ (retrieved 21.09.2018).
[18] http://s3platform.jrc.ec.europa.eu/map (retrieved 21.09.2018).

[19] http://ec.europa.eu/regional_policy/en/information/publications?title=&languageCode=en&themeId=41&tObjectiveId=1&typeId=20&countryId=0&periodId=3&fundId=0&policyId=14&search=1

Sample product

Trans-S3 priorities and specific domains under GoSmart BSR project after sequence 1

No.	Common smart specialisation priority areas	Explanations/ definitions	Specific knowledge domains, sectors/sub-sectors, technologies and themes[20]	Notes, reasons f or modifications
1	**Human health & social work activities**	– Human health activities – Residential care activities – Social work activities without accommodation	– Health, health-related services, rehabilitation, life sciences and welfare technology	
			– Innovative medicine, medical technology, biotechnology, biomedicine, new treatments and medical devices, digital applications in health and well-being, advanced diagnostics, genetic engineering and research	
2	**Key Enabling Technologies**	– Nanotechnology – Micro-/nano-electronics – Photonics – Advanced materials – Industrial biotechnology – Advanced manufacturing technologies	– Automatization and robotics, flexible technological systems for production	
			– Nanotechnology, micro- and nanoelectronics and smart, developed materials	
			– Functional, multifunctional, structural and composite materials	
			– Photonic and laser technologies	
			– Sensors (including biosensors) and smart sensor networks	
			– Smart geo-information networks and technologies	Found only in one of the national/regional S3s. Suggested to be considered under priority area 4: ICT/Digitalisation
			– Industrial biotechnology	
			– Bio-economics	
			– Other innovative technologies and industrial processes, mechatronics, etc. (horizontal applications)	
			– Qualified workforce, social inclusion – in relation to the above key enabling technologies	Specialisation 'Qualified workforce, social inclusion – in relation to the above key enabling technologies' seems not to be well justified; human resources are one of the factors constituting the basis for specialisations, however, they are not the specialisation itself.

No.	Common smart specialisation priority areas	Explanations/definitions	Specific knowledge domains, sectors/sub-sectors, technologies and themes[20]	Notes, reasons for modifications
3	**Manufacturing & industry**	– Food and beverages – Textiles, wearing apparel, leather, etc. – Wood and cork, straw, plaining products, furniture – Paper, paper products – Printing and recorded media – Food and beverages – Textiles, wearing apparel, leather, etc. – Wood and cork, straw, plaining products, furniture – Paper, paper products – Printing and recorded media – Chemicals, chemical and petroleum products, rubber, plastic, other non-metallic mineral products – Pharmaceutical products, preparations – Metals, metal products, machinery and equipment – Computer, electronic and optical products – Electrical equipment – Motor vehicles, trailers, transport equipment	– Agro-business and related sectors	
			– Innovative technologies, processes, and products of agro/food- and forestry/wood industry, including healthy, safe and functional food and beverages	
			– Metal and machinery industry, shipbuilding and related sectors	
			– Electronics industry, including opto-electronic systems and materials	
			– Biotechnological processes and products of specialised chemistry and environmental engineering	
			– Maritime industry	Found only in one national/regional S3. Questionable area of transnational cooperation.
			– Aviation industry	Found only in one national/regional S3. Questionable area of transnational cooperation.
4	**ICT**	– All technical means used to handle information and aid communication; both computer and network hardware, as well as software	– Information and communications technology infrastructure, cloud computing solutions and services, information interoperability, ICT in industry and services, science and development, software development and programming	
			– Digitalisation: cyber-security and gamification, digital applications	
			– Development of ICT education and e-skills, internet access, modern and efficient public administration, development of e-services and digital content	
			– Remote work and services	

[20] Based on national and regional S3s as applicable.

No.	Common smart specialisation priority areas	Explanations/ definitions	Specific knowledge domains, sectors/ sub-sectors, technologies and themes[20]	Notes, reasons for modifications
5	Sustainable innovation	– Climate action, environment resource efficiency and raw materials	– Sustainable, effective, low-emissions energy generation, storage, transmission, distribution and use, energy efficient solution development, renewable, clean energy, smart systems for energy diagnostics, monitoring, metering, etc.	
			– Modern technologies of extraction, processing and use of natural resources and production of their substitutes, innovative development, improvement and processing of biological raw materials, including technologies for water processing and re-use, and minimalization of water use	
			– Minimalization of waste generation, including non-processable waste and use of waste (recycling and other methods) for materials and energy, effective waste treatment, storage and disposal	Sustainable materials, packaging, to be included under priority area 5: Sustainable innovation.
			– Ecologically and economically sustainable mobility and transport, resource-effective and low-carbon circular economy	
			– Eco-innovations, environmental science and related sectors	

Source: Own elaboration

2. Analytical review and profiling of target regions (verifying priorities)

<div style="background:orange;">HOW TO DO IT?</div>

The need for an analytical review of statistical data is of paramount importance in elaborating evidence-based policies and strategies. The same applies to S3 and Trans-S3 elaboration and to their monitoring and evaluation. While the existing regional (and national) smart specialisation strategies can provide the initial common areas for any groups of regions, they demonstrate a number of weaknesses, not limited to: the changed analysis perspective (new reference points), outdated statistical base, 'wishful' policy formulation or political influences.

A review of the current statistical data and calculation of the key indicators (such as the Location Quotient) become necessary and allow contrasting them with the preliminarily identified Trans-S3 areas in the first sequence. The Trans-S3 refers to a new (conventional, physically disconnected) territory which has to be analysed using the most appropriate quantitative and qualitative methods. The palette of methods is quite wide, although as in the standard application of S3 methodology, the most popular are:[21]

- Regional profiling
- SWOT analysis

- Working groups
- Benchmarking
- Stakeholder interviews.

While calculating the LQ for the potential smart priorities and domains in the target regions, there is a great number of possible categories to be considered:

- For measuring economic potential – number of employees, number of enterprises, volume of goods produced, sold, or exported, etc.;

- For measuring innovation potential – internal R&D, external R&D, equipment innovation, education, introduction of new products or services to the market, types of innovation, intellectual property protection (inventions, industrial designs, utility models), etc.

Regardless of the initial Trans-S3 priorities and domains identified in sequence 1 on the basis of adopted different level S3s covering the target regions, all potential priorities and domains should be considered and studied, including those preliminarily rejected, as new perspectives, new reference points and new data sets are applied.

Publicly available statistical data and other information sources need to be logically combined and compared as they might produce differentiated pictures. The number of data sources and indicators to be used has to be carefully decided, considering the expected reliability against the need for efficient use of such resources as experts, budgets and time.

Furthermore, expert judgement and wider consultations should also be part of his sequence, respecting the overall participatory and inclusive character of the smart specialisation approach and also considering the need for the entrepreneurial discovery process to be activated with its culmination in the last sequence.

<div style="background:gray;">HOW DID WE DO IT?</div>

The GoSmart BSR project partners assessed the target regions (and countries) in terms of their innovation posi-

tions and concentration of employment across economic activities. Below and on the next pages, the 'Analytical review and profiling of the target regions/countries (Sequence 2)' conducted by the GoSmart BSR experts in March-April 2018 and consulted until June 2018, is presented (for illustration, only samples from annex 'Regional Priority Areas' are provided).

Sample product

Trans-S3 – Analytical review and profiling of target regions/countries (Sequence 2)

Introduction

The elaboration of the trans-smart specialisation strategies (Trans-S3) for regions is one of the main elements supporting the GoSmart BSR project idea that is to strengthen smart specialisation by fostering transnational cooperation. The GoSmart BSR project addresses low capacity for innovation in less developed BSR regions by mutual learning, translating smart specialisation strategy (S3) into practical SMEs joint actions, and employing best practices from more developed regions. The project aims to boost transnational cooperation among industry, the research & development sector, and public authorities in employing smart specialisation strategies in regions in the eastern parts of the Baltic Sea Region. At the same time, partner regions with more experience in S3 implementation shall benefit from the Trans-S3 development when it comes to the updating of their strategies.[22] The partner regions of this GoSmart BSR project are located in the NUTS2 regions of Hamburg (DE60), Syddanmark (DK03), Estonia (EE00), Lithuania (LT00), Latvia (LV00), Podlaskie (PL34), and Etelä-Suomi (FI1C).[23]

By analysing the national level S3s, it is possible to list all smart specialisation priority areas for the targeted countries. Immediately, it becomes apparent that there are priority areas which are common for the majority of countries and these should be considered the initial common smart specialisation priority areas among target regions. The analytical review and profiling of target regions/countries at hand belongs to sequence #2 of the Trans-S3 methodology developed within the Interreg Baltic Sea Region project "GoSmart BSR" and described in

[21] Grieniece et al. (2017): TOP 3 - Methodologies employed in S3 of 30 Regions.

[22] The updating of the strategies depends on the long-term EU-budget for the 2021-2027 period and its new strategic framework.
[23] GoSmart BSR (2018): About project, https://gosmartbsr.eu/ [accessed at 26.04.2018]. [24] GoSmart BSR (2018): Trans-S3 – Methodology Outline, Draft Version March 2018, Białystok.

the Trans-S3 – Methodology Outline (2018). Through the analytical review and profiling of the target territories, the initially identified Trans-S3 can be verified, so that smart specialisation priority areas and their underlying domains can be added or eliminated. The main objective for this analytical review is:

- Resetting the reference points for the selection of priority areas and domains from the ones applied in the elaboration of the individual national and/or regional S3s.

- Double-checking that the identified common smart specialisation priority areas (and their underlying domains) are statistically important currently, i.e. at the time when the Trans-S3 is being elaborated.

- Verifying that the conditions and trends in the target territories have not significantly changed between now and the time when their individual S3s had been adopted.[24]

The paper is organized as follows: At first, it introduces roughly the status quo of regional innovation performance (Section 1), secondly a general description of the approach to measure the priority areas and domains of regions is given in Section 2. Section 3 presents first statistical insights of smart specialisation areas in the partner regions. Section 4 highlights the results of the statistical implementation. The report ends with conclusions and some recommendations (Section 5).[25]

1. Regional innovation development

The ongoing structural change towards service and knowledge societies and innovations will have considerable influence on the Baltic Sea Region. The Baltic Sea countries and regions are effective in bringing up innovative cluster solutions, encouraging cooperation between science and businesses, and supporting the R&D sector from the GDP.[26] However, the differences in innovation performance are obvious. Analysing the Regional Innova-

tion Scoreboard (RIS) for the participating partner regions and countries reveals that the results for the structural innovation performance are very heterogeneous. The RIS 2017 includes various indicators from the European Innovation Scoreboard (EIS), including regional data from the Community Innovation Survey (CIS). The RIS indicators range from "Percentage population aged 30-34 having completed tertiary education", to "Non-R&D innovation expenditures in SMEs as percentage of turnover" to "Innovative SMEs collaborating with others as percentage of SMEs". In total 18 indicators are used in the RIS.[27]
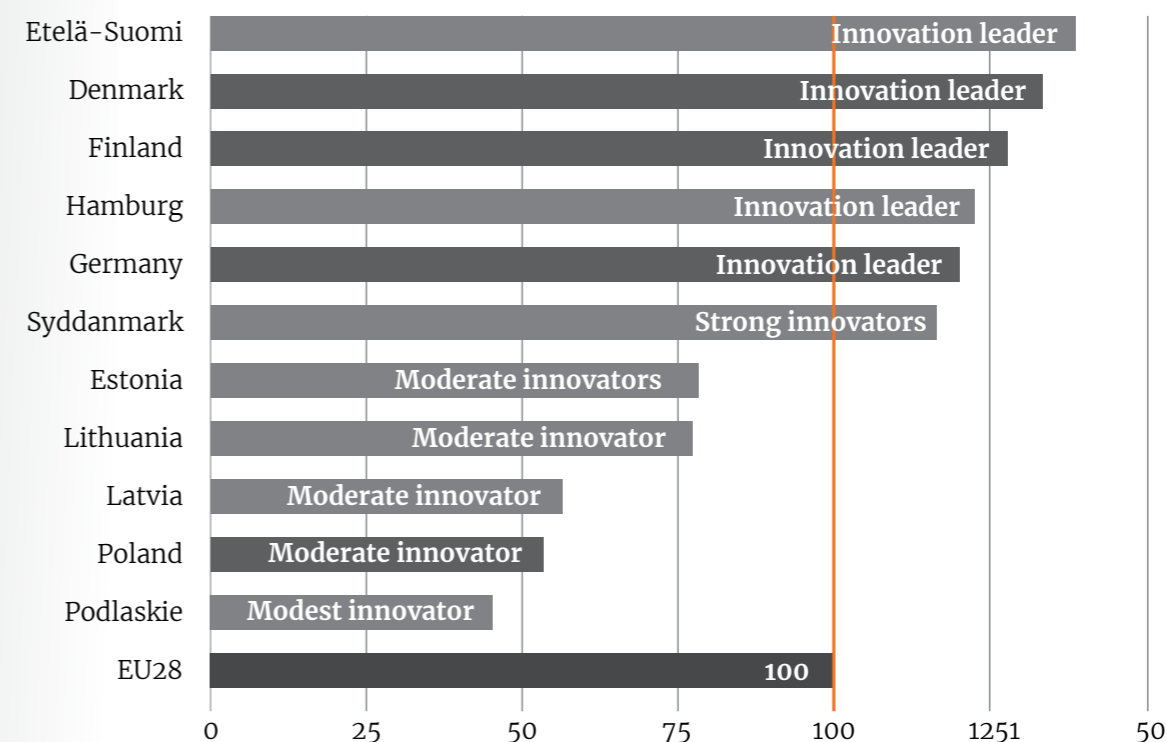
The RIS measures the innovation performance of 220 European regions and classifies them either as "innovation leaders", "strong innovators", "moderate innovators", or "modest innovators". Generally, Danish, Finnish, and German (and Swedish) regions are classified as innovation leaders or strong innovators. The Baltic States and Poland are typically moderate innovators (see figure 1).

The disparities presented indicate a need for action since one aim of the European Commission's Innovation Union – as part of the EU2020 strategy - is to foster the dissemination and realization of European wide economies of scale (and scope, i.e. knowledge spillovers) in innovation and knowledge intensive sectors.[28] A core objective of the GoSmart BSR project is to enforce interregional cooperation in regional smart specialisation strategies.

Moreover, the key concept of S3 is that innovation leader regions (in a specialisation) mostly invest in the invention of a general-purpose technology (GPT), while the moderate innovator regions (in a specialisation) follow the co-invention aspect of a technology with their investment. Smart specialisation is therefore not about to be specialised in a certain sector. Addressing the issue of specialisation in the R&D/invention and its link to sector activities is particularly crucial for the regions which are not an innovation (technology) leader. For the target regions it is more relevant to focus on what is the potential of GPT for the target economic domain by the aspect of co-invention of applications.[29]

[24] GoSmart BSR (2018): Trans-S3 – Methodology Outline, Draft Version March 2018, Białystok.
[25] The short review does not raise a claim for completeness due to the complexity and variety of changes.
[26] Wedemeier, J. (2017): Innovation capabilities of the Baltic Sea region: Meeting Europe 2020 innovation targets?, International Business and Global Economy (36)1: 47-59.
[27] Hollanders, H.; Es-Sadki, N. (2017): Regional Innovation Scoreboard 2017, Methodology Report, European Commission (eds.), Brussels.
[28] McCann, P.; Ortega-Argiés, R. (2015): Smart Specialization, Regional Growth, and Applications to European Union Cohesion Policy, Regional Studies (49)8: 1291-1302.
[29] David, P.; Foray, D.; Hall, B. (2015): Measuring Smart Specialization, The concept and the need for indicators, www.cemi.epfl.ch/.../Measuring%20 smart%20specialization [accessed at 26.01.2018].

Figure 1

Regional Innovation Scoreboard 2017

Score relative to EU 2017

2. General description

As a basis for identifying priority areas and domains, generally a Location Quotient (LQ) is applied. The LQ is a way of quantifying how concentrated a particular economic branch, industry, or sector is in a specific region compared to a larger geographic unit (e.g. country, the EU28). The LQ can reveal what makes a particular region specialised in comparison to the larger geographic unit. The LQ is computed as an industry's share of a regional total for some economic statistic (e.g. GDP, employment) divided by the industry's share of the national total. For example, an LQ of 1.0 in agriculture means that a region and the reference country are equally specialised in agriculture; while an LQ of 1.5 means that the region has a higher concentration in agriculture than the reference country.

The general formula is: $LQ_i = (e_i/e) / (E_i/E)$

Where,

LQ_i = location quotient for sector in the regional economy

e_i = employment in sector i in the regional economy

e = total employment in the local region

E_i = employment in sector i in the national economy

E = total employment in the national region

For the calculation, the authors of this paper used Eurostat data to receive a high statistical comparability, reliability, and validity of observations. Eurostat provides harmonized statistics. Moreover, the Eurostat data is said to have a reliability, since it produces similar results under consistent conditions. Also, the statistical validity of results is given to conclude and link the results accurately to the real world. However, there are statistical weaknesses given with the Eurostat statistics which are:

- actuality (last update of the source);

- gaps in reported data;

- setting the linkage between the branch of economic activities (by Statistical classification of economic activities in the European Community, NACE) and the priority areas and domains.

The used Eurostat data are Structural Business Statistics (SBS), which describe the structure, activity, competitiveness and performance of economic activities within

the business economy down to the detailed level of several hundred sectors. The SBS coverage is limited to Sections B to N, excl. A, K, O-Q, R-U of NACE in Rev. 1.1 until 2007. The actual data starts from the reference year 2008 where data is available for Sections B to N and Division S95 of NACE Rev.2. The data for Sections A (Agriculture, forestry and fishing), O-Q (Public administration, defence, education, human health and social work activities), and R-U (Arts, entertainment and recreation; other service activities; activities of household and extra-territorial organizations and bodies) are computed with data from the labour force survey.[30]

Furthermore, it is possible to apply the same Structural Business Statistics structure for the market and technology research (sequence #3 of the Trans-S3 methodology).

For the observations the authors used the NUTS (Nomenclature of territorial units for statistics) classification at NUTS 2 level (basic regions for the application of regional policies) of Eurostat. The NUTS classification is a hierarchical system for dividing up the economic territory of the EU for the purpose of (i) collection, development and harmonisation of European regional statistics, (ii) socio-economic analyses of the regions, (iii) and framing of EU regional policies.[31]

3. First patterns of employment specialisation

While some activities – such as retail trade – appear across all regions, many others exhibit a considerable variation in their level of concentration, often with only a few regions having a particularly high degree of specialisation. The LQ of a specific NACE activity gives an idea as to which regions are the most (or least) specialised. This observation is regardless of whether the region or the activity considered is large or small.

Syddanmark (DK), for instance, is highly specialised in the economic NACE activity "Wholesale of other machinery, equipment and supplies (G466)", also relative to other regions. Hamburg's employment specialisation is obviously the activity of "Water transport (H50)", and Estonia's relative specialisation is the "Manufacture of coke and refined petroleum products (C19)" (LQ of 6.4). But,

Hamburg's employment concentration is much higher in this field relative to Estonia's (LQ of 9.4). Both, Latvia and Podlaskie (PL) have their specialisation in the economic activity of the "Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials (C16)", whereas Latvia's LQ is the highest in this comparable observation. Lithuania's employment specialisation is on the NACE activity "Retail sale via stalls and markets (G478)", and Etelä-Suomi's (FI) specialisation is the "Manufacture of paper and paper products (C17)". They also have the relative comparative advantage in this field. All of these activities may impact upon the considerable disparities that exist between the observed regions and EU28 (figure 2).

All these regions have a comparative advantage – in terms of localized technological knowledge – in the above presented economic activities; the regions specialise in the production of goods and services in which their opportunity cost is the lowest.

The key characteristics are presented in figure 2.

4. Results for the priority areas

For the identification of the priority areas, the data are linked to the NACE classification. If the computed location quotient is >1.1 and <2 (light blue in the table), the region has proportionally more workers employed in a certain sector than in average of the EU28 (specialisation). If the location quotient is >2 (dark blue in the table), the region is classified to have an absolute competitive advantage (strong specialisation) (see table 1 in the Annex). The size of a domain of a priority area has to be large enough to be relevant statistically. Here, the domains of the priority areas refer to the relevant economic activities classified by the NACE classification. Those sectors could potentially benefit from the knowledge spillovers from the initial development of applications (co-invention aspect of GPT).[32] R&D domains with high connectedness to other domains will possibly create more business and market opportunities for structural change.

However, the interpretation of the results is led by that:

Figure 1

Regional specialisation, max. and min. values of the LQ

Regional max specialisation ■ Max ■ Min
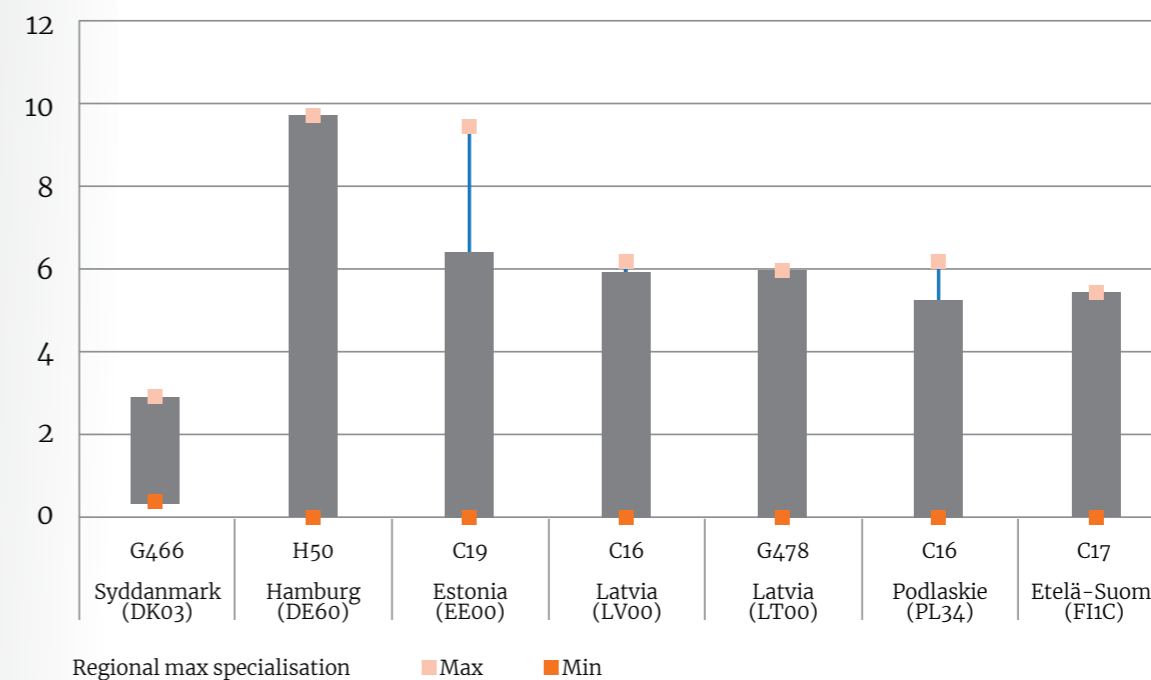
Quellen: Eurostat (2018); HWWI.

■ the priority areas and domains have changed in time in comparison to the strategy from the ones applied in the elaboration of the individual national and/or regional S3s;

■ the priority areas and domains have been formulated as political visions which might diverge from the statistical results;

■ the used statistics are too rough to explicitly link them to the domains (of the priority areas);

■ the region presents a statistical specialisation but the smart specialisation strategy has not defined a priority area for the observed region.

Moreover, if there is no computed specialisation, another interpretation could be that the economic activity is seen as a future economic activity that will generate income, employment, and wealth.

To sum up the results briefly, the authors derived the results from table 1 (see Annex) by applying two simple criteria. Criterion #1 is that at least more than three observations (four of seven) in a specific field of domain can be found in the project region (structural similarity), and criterion #2 is that at least 50% of the concerned regions/

countries share a common priority area. The results of the calculations can be briefly summarized as follows (i-v):

i. Regional employment specialisation in human health & social work activities:

■ none

ii. Regional employment specialisation in key enabling technologies:

■ none

iii. Regional employment specialisation in manufacturing & industry:

■ food related activities (production, service, wholesale) in all regions

■ wood related activities in five of seven regions

■ transport and logistic activities in all regions (excl. if rule #2 is applied)

■ agriculture related activities in all regions (excl. if rule #2 is applied)

■ construction activities in all regions (excl. if rule #2 is applied)

iv.   Regional employment specialisation in ICT

■   ICT/digitalization related activities in all regions

v.   Sustainable innovation

■   bio-economics and renewable energy activities in five of seven regions.

5. Conclusions and recommendations

Through the analytical review, the results show that the initial smart specialisation priority areas cannot all be verified by the data. This is due to (i) political reasons or (ii) statistical restrictions. (i) As mentioned above, the setting of priority areas could be motivated politically or strategically where the conditions for specialisation are not given in that region. It also seems not to be reasonable that the specialisation changed in time since the characteristics of a region cannot be easily changed in the short term. (ii) The statistics restricted to the NACE activities could possibly not cover and show the domains of the priority areas formulated in the smart specialisation strategies.

To conclude, the seven partner regions from Syddanmark (DK03), Hamburg (DE60), Estonia (EE00), Latvia (LV00), Lithuania (LT00), Podlaskie (PL34), and Etelä-Suomi (FI1C) share their regional specialisation and common priority areas mainly in the area of manufacturing and industry, and here in the agricultural/food and wood related activities such as in construction and transport activities. Further regional specialisations are seen in ICT and sustainable innovation activities. For both priority areas the most structural business similarities can be assumed.

It is recommended to focus on these regional smart specialisation priority areas since almost all regional economic sectors are based on the mentioned specialisations. It can be critical if a region is not specialised in a single domain and it shall adopt the common specialisation. This challenge has to be discussed in the further policy development of the GoSmart BSR project.

The concept of S3 is that innovation leader regions invest in the invention of a general-purpose technology (GPT), and the moderate innovation regions (follower in a spe-

cialisation) invest in the co-invention aspect of a technology. Smart specialisation is not about to be specialised in a certain sector, e.g. NACE construction activities, but to specialise in a co-invention aspect of this sector, e.g. augmented reality for NACE construction activities. Addressing the issue of specialisation in the R&D/invention and its link to sector activities is particularly crucial for the regions / countries which are not an innovation leader in the sense of the regional innovation scoreboard. This is also an argument for organizing more cross-cluster approaches and innovation projects with the character of transnational cooperation. Many regions in Europe are characterized by a weak relation between R&D and the economic activities.[33] This can also be assumed for most of the GoSmart project partner regions. There is a role for the project to improve this relationship. This also means that the moderate innovation regions (e.g. Podlaskie) need access to problem-solving expertise from the innovation leaders (e.g. Etelä-Suomi).

Moreover, policy should consider the technology and market trend review as relevant, since changes in the focus of the domain specific areas are still possible and could influence the future of the region's smart specialisation strategies, especially relevant for the upcoming update of the S3 for the period 2021+. For the process it is important to encourage entrepreneurs and other organizations to become involved in the discovery of the future's regional specialisations.

> ANNEX (excerpt)
>
> Table 1
>
> **Regional Priority Areas**
>
> **(1) Common smart specialisation priority areas [1]: Human health & social work activities**
>
> **(2) Common smart specialisation priority areas [1]: Key Enabling Technologies**

[33] McCann, P.; Ortega-Argiés, R. (2015): Smart Specialization, Regional Growth, and Applications to European Union Cohesion Policy, Regional Studies (49)8: 1291-1302.

(1) Common smart specialisation priority areas [1]: Human health & social work activities

Specific knowledge domains, sectors/sub-sectors, and themes [2]

Syddanmark (DK03)	Tartu and South-Estonia (Lõuna-Eesti E008)	Hamburg (DE60)	Southern Finland (Etelä-Suomi FI1C) and Kymenlaakso (FI1C4,)	Vidzeme (LV008)	Lithuania (LT00)	Podlaskie (PL34,)	Location quotient (example of affected NACE activities [3] [4,]
Health and welfare technology	Care and treatment in medicine (bioproducts, medical equipment, genetic engineering, researches)	Innovative medicine (the regional cluster for medical technology and biotechnology/pharma) related by the entire value chain necessary for the emergence of new treatments and medical devices: from research, development and clinical studies, to manufacturing, marketing and sales); Biotechnology, pharmaceuticals and medical technologies; Health-related services related by cluster	Digital applications	Biomedicine, medical technologies, bio pharmacy and biotechnologies; Rehabilitation and health-care services (NUTS3)	Molecular technologies for medicine and biopharmaceutics; Advanced applied technologies for individual and public health; Advanced medical engineering for early diagnostics and treatment; Modern self-development technologies and processes; Technologies and processes for the development and implementation of breakthrough innovation	Medical sector, life sciences and sectors related by value chain	**LQ-LFS O-Q:** DK03: 1.2 DE60: 1.0 EE00: 0.8 LV00: 0.9 LT00: 0.9 PL34,: 0.8 FI1C: >1.1

(2) Common smart specialisation priority areas [1]: Key Enabling Technologies

Specific knowledge domains, sectors/sub-sectors, and themes [2]

Syddanmark (DK03)	Tartu and South-Estonia (Lõuna-Eesti E008)	Hamburg (DE60)	Southern Finland (Etelä-Suomi FI1C) and Kymenlaakso (FI1C4,)	Vidzeme (LV008)	Lithuania (LT00)	Podlaskie (PL34,)	Location quotient (example of affected NACE activities [3] [4,]
Automatization, qualified workforce, social inclusion	Biotechnology; Automation and robotics		Nanotechnology, micro- and nanoelectronics and developed materials (connected with wood fibre); Industrial biotechnology	Smart materials, technologies and engineering; Knowledge-based bio-economics	Photonic and laser technologies; Functional materials and coatings; Structural and composite materials; Flexible technological systems for product creation and production	Multifunctional materials and composites of advanced properties, including nano-processes and nano-products; Sensors (including biosensors) and smart sensor networks; Smart geo-information networks and technologies; Automation and robotics of technological processes; Innovative technologies and industrial processes (horizontal applications)	**LQ-SBS M72:** DK03: 0.7 DE60: 1.7 EE00: 0.7 LV00: 0.8 LT00: 0.7 PL34,: 0.6 FI1C: 0.7 **LQ-SBS M74,:** DK03: 1.2 DE60: 1.7 EE00: <1.1 LV00: >1.1 LT00: 1.0 PL34,: 0.9 FI1C: 0.5

Note: Regions with Employment LQ > 1.0 are highlighted.

[1] Explanation: 1. Human health & social work activities: Human health activities; Residential care activities; Social work activities without accommodation; 2. Key enabling Technologies: Nanotechnology; Micro-/nano-electronics; Photonics; Advanced materials; Industrial biotechnology; Advanced manufacturing technologies; 3. Manufacturing & Industry: Food and beverage industry; Textiles, wearing apparel, leather and related products; Wood, products of wood and cork, products of straw and plaiting materials, furniture manufacturing; Paper and paper products; Printing and reproduction of recorded media; Chemicals, chemical products, refined petroleum products, rubber and plastic products, other non-metallic mineral products; Pharmaceutical products and preparations; Metals, fabricated metal products, machinery and equipment; Computer, electronic and optical products; Electrical equipment; Motor vehicles, trailers and semi-trailers, other transport equipment; 4. ICT: All technical means used to handle information and aid communication; both computer and network hardware, as well as software; 5. Sustainable Innovation: Climate action, environment resource efficiency and raw materials.

[2] Based on national and regional S3s as applicable.

[3] et al. C Manufacturing; C10 Manufacture of food products; C11 Manufacture of beverages; C20 Manufacture of chemicals and chemical products; C21.1 Manufacture of basic pharmaceutical products; C22 Manufacture of rubber and plastic products; C23 Manufacture of glass and glass products; C25 Manufacture of fabricated metal products, except machinery and equipment; C25.1 Manufacture of structural metal products; C26 Manufacture of computer, electronic and optical products; C26.1 Manufacture of electronic components; C26.3 Manufacture of communication equipment; C26.7 Manufacture of optical instruments and photographic equipment; C27 Manufacture of electrical equipment; C28 Manufacture of machinery and equipment n.e.c.; C29 Manufacture of motor vehicles; D35 Manufacture of gas; distribution of gaseous fuels through mains; E38 Waste collection, treatment and disposal activities; materials recovery; E39 Remediation activities and other waste management services; F Construction; H49 Land transport and transport via pipelines; I56 Food and beverage service activities; J Information and Communication; M71 Architectural and engineering activities; technical testing and analysis; M72 Scientific research and development; M74 Other professional, scientific and technical activities; N80 Security and investigation activities; O84.1 Regulation of and contribution to more efficient operation of businesses; Q86 Human health activities.

[4] Hamburg (DE60), Syddanmark (DK03), Estonia (EE00), Lithuania (LT00), Latvia (LV00), Podlaskie (PL34), and Etelä-Suomi (FI1C).

3. Markets and technology trends review (refining priorities)

<div style="background:#E8741E;color:#fff;padding:8px;text-align:center;font-weight:bold">HOW TO DO IT?</div>

Sequence 3 is used to take a broader and outward looking perspective on the potential transnational smart specialisations. In comparison to sequence 2 which is about historical data and trends, this sequence is more about the expected developments and foresight. Why? The simple

answer is that there needs to be a balance between what is known (about the past) and what is anticipated (about the future), to make rational decisions on selecting smart specialisation priorities and to minimize errors of these decisions. In the end, smart specialisations are about where the regions want to be in terms of international and global coopetition.

Those working to define the Trans-S3 priorities and domains can use a variety of information sources, combining statistics and publications which cover markets and technology developments. Practically, industry and technology forecasts and foresight studies, if available, are already based on and often contain key statistics and major trends. What is critical in this sequence, is to understand and assess the dominant challenges and forces shaping the global markets and major directions of technological responses to them as well as technological breakthroughs which can be expected and in turn, change markets and societies.

Thus, it is recommended to concentrate efforts on collecting the available analyses of market and technology trends and study them rather than to work with raw data in all possible thematic areas. Available market and technology intelligence should be carefully studied, compared and analysed with the purpose of identifying the major trends and expected future developments, and checking if the proposed Trans-S3 priorities and domains are not counter-positioned to these trends and developments. The suggested sources of information are multiple, some available free of charge, some fee-based:

1. https://www.czelo.cz/files/BOHEMIA-summary.pdf New Horizons: Future Scenarios for Research & Innovation Policies in Europe., EC 2017;

2. https://publications.europa.eu/en/publication-detail/-/publication/375971b3-ba8a-11e5-8d3c-01aa75ed71a1 The junction of health, environment and the bioeconomy, EC 2015;

3. https://publications.europa.eu/en/publication-detail/-/publication/878779f4-02e5-4e76-b7ce-efa527fe568b Towards the third strategic programme of Horizon 2020 – Study, EC 2016;

4. https://publications.europa.eu/en/publication-detail/-/publication/5383132e-b8f7-11e5-8d3c-01aa75ed71a1 Intelligent policy choices for Europe 2050: report by an expert group on foresight on key long-term transformations of European systems - research, innovation and higher education (KT2050);

5. https://www.vditz.de/fileadmin/media/news/documents/Band_103_Social_Changes_2030_C1.pdf Social Changes 2030 Volume 1 of results from the search phase of BMBF Foresight Cycle II, Future Technologies vol. 103;

6. https://www.unido.org/our-focus/advancing-economic-competitiveness/investing-technology-and-innovation/competitiveness-business-environment-and-upgrading/tech-

nology-foresight United Nations Industrial Development Organization (UNIDO) (2018): Technology Foresight in Europe (CEE/NIS);

7. https://www.rolandberger.com/en/Publications/pub_trend_compendium_2030_megatrend_5_dynamic_technology_innovation.html Roland Berger Trend Compendium 2030, Megatrend 5, Dynamic technology and innovation;

8. http://www.oecd.org/sti/oecd-science-technology-and-industry-scoreboard-20725345.htm OECD Science, Technology and Industry Scoreboard 2017 (for purchase);

9. http://www.oecd.org/sti/policy-challenges-facing-a-sustainable-bioeconomy-9789264292345-en.htm Meeting Policy Challenges for a Sustainable Bioeconomy, published on April 19, 2018 (for purchase).

The study of market and technology trends requires expertise, sometimes involving different thematic areas, as well as expert judgement to distinguish the prevailing trends and tendencies, and to understand the implications for the pre-selected Trans-S3 priorities and domains.

On the basis of thorough analyses and consultations, the Trans-S3 scope can be modified. The consultations should at least be carried out among the partners representing the target regions, preferably among wider circles of stakeholders representing quadruple helixes of these regions.

<div style="background:#4A4A4A;color:#fff;padding:8px;text-align:center;font-weight:bold">HOW DID WE DO IT?</div>

The GoSmart BSR project partners assessed the market and technology trends using available publications to identify the major challenges and global trends, supplemented by own analysis of the relevant areas of economic activities (NACE) matching these global developments. Nominal values and dynamics of the employment location quotient were considered.

Below and on the next pages, the 'Trans-S3 – Market and Technology Trends (Sequence 3)' conducted by the GoSmart BSR experts in April-June 2018, is presented (for illustration, only samples from annex 'Market and Technology trends 2030' are provided).

Trans–S3 – Market and Technology Trends (Sequence 3)

Introduction

The review on market and technology trends belongs to sequence #3 of the Trans-S3 methodology developed within the Interreg Baltic Sea Region project "GoSmart BSR" and covers both global trends and trends relevant for the target regions and countries.[34]

The key element of the trans-smart specialisation strategies (Trans-S3) and one of its main challenges, is to identify (which in practical terms means select) the common smart specialisation priority areas and their underlying knowledge and economic domains. In general, smart specialisation strategies are about allowing regions to turn their needs, strengths and competitive advantages into marketable goods and services. This development towards regional smart specialisation strategies are already making a difference by improving the quality of cohesion policy, and is becoming more and more an integral part of Europe's innovation system.

The elaboration of the Trans-S3 for regions is one of the main elements supporting the GoSmart BSR project idea which is to strengthen smart specialisation by fostering transnational cooperation. The GoSmart BSR project addresses low capacity for innovation in less developed BSR regions by mutual learning, translating smart specialisation strategy (S3) into practical SME's joint actions, and employing best practices from more developed regions. The project aims to boost transnational cooperation among industry, the research & development sector, and authorities in employing smart specialisation strategies in regions in the eastern parts of the Baltic Sea Region.[35]

The immediate objectives of this report include:

■ raising awareness of the critical importance of market and technology and foresight for improving the competitiveness of industry by ex-

ploiting emerging and future trends in science and technology;

■ the development and adaptation of methodologies and tools for market and technology foresight in the region;

■ the establishment such as strengthening of national and regional knowledge as well as the capacity of using market and technology foresight for designing policies and strategies that focus on innovation;

■ undertaking regional projects on the future of specific sectors or themes; and

■ providing solutions to relevant problems in the region that can be addressed through the appropriate application of technology.

The paper is organized as follows: At first, it roughly introduces the topic and gives a general description (Section 1), secondly, some results for the regional development in market and technology trends are described in Section 2. Section 3 presents statistical findings for the trend research and its link to the smart specialisation strategies of the partner regions. The report is closed with a conclusion and various recommendations (Section 4). However, this review does not raise a claim for completeness due to the complexity and variety of trends as well as the uncertainty of future developments. Still, the review presents the most challenging trends, derived from the market and technological progress and foresight studies from different ranking sources.

1. General description

The derivation of global trends and the specific fields of application follows a deductive approach.[36] At first, a variety of global trends is identified (see table 1). Thereunder fields such as health and provision of food, ecological issues such as climate change and energy, as well as major trends such as globalisation, demographic change and urbanisation. On the basis of these trends, potential challenges are presented which show a high level of connection to the major trends. For instance, the ecological trend of climate change implies the risk of global

warming and high energy use as well as urbanisation potentially giving rise to agglomeration downsides such as rural exodus, the emergence of megacities and increased urban problems such as criminalisation. To close the circle in favour of regional priority areas, the corresponding domains connected to each trend and challenge are listed in order to underline which trends might be relevant for each domain. For instance, health and nutrition (market and technology trend) is not only affected by the trend of health (and food) but also by issues of climate change directly affecting agricultural activities. To give another example: The trend towards entomophagy (insect food) is related to resource reduction positively affecting climate change issues and health affecting diets (both are market trends).

To identify market and technology trends, in addition to global trends, a second approach to identify future fields of interest is applied (see Annex table 1). Here, not global trends form the basis of the derived analysis but the domains. Thereby, each domain is divided into several sub-domains / specific knowledge domains unfolding the larger topic. For instance, the domain of energy consists of the sub-domains energy supply, efficient energy use, energy systems and enablers. In the next step, each sub-domain is linked to examples of solutions for the specific problem or to domains of application. In the case of energy, these include renewable energy such as photovoltaics, zero energy homes, smart grids, energy storage or electrochemistry as specific solutions. Moreover, the cross-sectoral nature of the domains of application is reflected by a list of other domains also being affected by the market or technology trends in a specific domain. The list, of course, does not raise a claim for completeness; it gives more a first evidence of the deductive reasoning. At the end, these sub-domains are linked to economic activities (by NACE classification). [37]

Table 1
Global trends 2030

Examples of manifestations	Examples of problems / challenges	Examples of domains
Global political transition / Globalization	Increasing global markets, stabilization of market regimes, monopolism, tax evasion, destabilization of political systems, failing states	(9) Security, (11) Production
Climate (change) and energy	Global warming and high energy use; cope with increasing energy and transportation demand	(3) Energy, (4) Health and nutrition / food, (8) Photonics
Environment and (scarcity of) resources	Rising consumption of raw materials, freshwater shortages, collapsing oceans, soil degradation, increased toxic pollution	(1) Biotechnology, (8) Photonics, (10) Circular economy
Health (and food)	Growing demand for health services/needs and food	(1) Biotechnology, (4) Health and nutrition / food, (7) Nanotechnology, (8) Photonics
Security and resilience	Geopolitical conflicts, terrorism, cyber-attacks, lone-wolf attacks, organized crime	(5) Information and communication technology / digital transformation
People and tech-convergence / Dynamic technology	(Highly) Dynamic tech-convergence, adaptation and acceptance of new technology, law changes	(5) Information and communication technology / digital transformation, (6) Mobility, (7) Nanotechnology, (11) Production
Urbanization: Towards a world of cities	Increasing urbanization, socialization, criminalization, upcoming of megacities, rural exodus	(5) Information and communication technology / digital transformation, (6) Mobility, (9) Security, (10) Circular economy
Demographic change / dynamics	Aging, chronic and age-related diseases, globally raising numbers of population	(2) Services, (4) Health and nutrition / food, (9) Security

Sources: The Association of German Engineers (VDI) and Federal Ministry of Education and Research (BMBF) (eds.) (2015): Foresight studies 2030, Results from the search phase of BMBF Foresight Cycle, Duesseldorf; European Commission (eds.) (2015): New Horizons: Future Scenarios for Research & Innovation Policies in Europe, A report from project BOHEMIA, Brussels; HWWI.

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[36] The role applies to arguments that have as first a conditional statement (P → Q) and as second an antecedent (P) of the conditional statement. It obtains the consequent (Q) of the conditional statement as its conclusion.
[37] NACE; French Nomenclature statistique des activités économiques dans la Communauté européenne.

For the further application and transfer of the findings, we applied the following decision rule: We link the results of the future fields of trends and their examples of possibly affected sectors/sub-sectors to the 'real' calculated results of the location quotient of the NACE economic activities in each region.[38] The decision rules to decide on the relevance of specific economic sectors are divided into three steps: (i) Is the LQ above 1.1 for the affected trend's sector/subsector and the smart specialisation strategy priority area, and (ii) is the LQ above 1.1 for the affected trend's sector/subsector and any economic activity which is not mentioned in the S3 priority areas. (iii) Thirdly, the authors check if the growth rates of the Structural Business Statistics (SBS) are positive and affect the trend's sector/subsector.

Following from the decision rules, smart specialisation strategies' priority areas and domains are considered as highly relevant if both (i) and (iii) or (ii) and (iii) are given. It is of inferior relevance if only one of three decision rules is given by the calculations.

To give an example: Biotechnology is a market trend and effects many cross-sectors, for instance "C10 Manufacture of food products" – which is part of the overall S3 priority areas – and "C21 Manufacture of basic pharmaceutical products and pharmaceutical preparations" – which is not part of the overall S3 priority area. The location quotient of the economic activity C10 is relatively high in Syddanmark (DK03) (LQ of 1.8), Estonia (EE) (LQ of 1.2), Lithuania (LT00) (LQ of 1.5), and Podlaskie (PL34) (LQ of 3.0). The growth rates from 2010 to 2015 are relatively high (min. 0.7% p.a. to max. 2.2% p.a.), with the exception of Podlaskie (-0.9% p.a.) and Etelä-Suomi (-0.5% p.a.) (decision rule i and iii apply). For C21.1 a relatively high LQ can be reported for Etelä-Suomi (LQ 2.1), and the growth rates are relatively high (min. 2.8% p.a. to max. 4.6% p.a.) with the exception of Syddanmark, Lithuania, and Podlaskie (decision rule ii and iii apply). For the first example, the economic activity "C10 Manufacture of food products" seems to be highly relevant for the further smart specialisation strategy, whereas the second example should be excluded by the analysis, since the LQ are

not substantially high and regional specialisation is not fulfilled although the growth rates are positive and relevant.

2. Results for the market and technological trends part

The main results of this combination of trends could be positively found for the following smart specialisation priority areas:[39]

   i.   Regional employment specialisation in manufacturing & industry:

■   food related activities (production, service, wholesale) in all regions

■   wood related activities in five of seven regions[40]

■   transport and logistic activities in all regions

■   agriculture related activities in all regions

■   construction activities in all regions

   ii.   Regional employment specialisation in ICT

■   ICT/digitalization related activities in all regions

   iii.   Sustainable innovation

■   bio-economics and renewable energy activities in five of seven regions.[41]

It is noticeable that the economic activities "J Information and communication", "M71 Architectural and engineering activities; technical testing and analysis", and "M72 Scientific research and development" do not present high LQ in the regions, but their overall annual growth rates are tremendously high with the exception of Etelä-Suomi. This is one of the economic activities where the transnational aspect could be realized in a cross-sectional approach.

To sum up for the market and technology trends, a common interest and specialisation can be found in the foresighted domains: (1) biotechnology, (4) health and nutrition; (5) information and communication technology /

digital transformation; (6) mobility, (7) nanotechnology and (10) circular economy.

The domains (8) photonics, (9) security, and (11) production appear not to be qualified for a regional smart specialisation, although specialised enterprises and 'hidden champions' may be identified in the regions by the stakeholders. Some of the economic activities of the domains (2) services, and (3) energy show high growth rates giving rise to the recommendation to question if these might be future smart specialisation priority areas.

3. Conclusions and recommendations

After the analysis above, we can, again, delete or add priority areas and domains or expand or narrow some of them, exactly due to what we observe in markets and technology trends. This way we can arrive to Trans-S3 priorities and domains refined (output of sequence 3).

The concept of S3 is that innovation leader regions invest in the invention of a general-purpose technology (GPT), and the moderate innovation regions (follower in a specialisation) invest in the co-invention aspect of a technology. Smart specialisation is not about to be specialised in a certain sector, e.g. NACE construction activities, but to specialise in a co-invention aspect of this sector, e.g. augmented reality for NACE construction activities. Addressing the issue of specialisation in the R&D/invention and its link to sector activities is particularly crucial for the regions / countries which are not an innovation leader in the sense of the regional innovation scoreboard. This is also an argument for organizing more cross-cluster

approaches and innovation projects with the character of transnational cooperation.

The analysis reveals that a wide range of sectors affected by market and technology trends are also sectors that play a major role in the partner regions / countries of Syddanmark (DK03), Hamburg (DE60), Estonia (EE00), Latvia (LV00), Lithuania (LT00), Podlaskie (PL34), and Etelä-Suomi (FI1C). Moreover, it is noticeable that some sectors (such as J – ICT, Q – Human Health or M72 – R&D on biotechnology) are not only shared by numerous partner regions / countries but are also affected strongly by the identified market and technology trends.

It can be concluded that those sectors identified as being strongly affected by market and technology trends, supplemented by high location quotients in the partner regions / countries reflect a strong basis of sustainable specialisation for the future. Another indicator of significance is the trend of the NACE activities, pointing towards a positive development in the past years. The combination of high LQ, positive economic activity trend and the specific sector being reflected in the market and technology trends indicates a significant relevance for the partner regions / countries and their future economic performance.

A specific focus on these identified cross-cutting sectors is recommended in order to ensure not to lose touch with exogenous market and technology trends and instead make use of new business potentials. The actual mode of implementation and further recommendations on the basis of this report's findings are to be discussed within the GoSmart BSR project.

ANNEX (excerpt) Table 1

Market and Technology trends 2030

[1] et al. A01 Growing of non-perennial crops; A02.2 Logging; C Manufacturing; C10 Manufacture of food products; C11 Manufacture of beverages; C20 Manufacture of chemicals and chemical products; C21.1 Manufacture of basic pharmaceutical products; C22 Manufacture of rubber and plastic products; C23 Manufacture of glass and glass products; C24.5 Casting of light metals; C25 Manufacture of fabricated metal products, except machinery and equipment; C25.1 Manufacture of structural metal products; C26 Manufacture of computer, electronic and optical products; C26.1 Manufacture of electronic components; C26.3 Manufacture of communication equipment; C26.7 Manufacture of optical instruments and photographic equipment; C27 Manufacture of electrical equipment; C27.4 Manufacture of electric lighting equipment; C27.9 Manufacture of other electrical equipment; C28 Manufacture of machinery and equipment n.e.c.; C29 Manufacture of motor vehicles; D35 Manufacture of gas; distribution of gaseous fuels through mains; D35.1 Electric power generation, transmission and distribution; E38 Waste collection, treatment and disposal activities; materials recovery; E39 Remediation activities and other waste management services; F Construction; F43.2 Electrical installation; H49 Land transport and transport via pipelines; I56 Food and beverage service activities; J Information and Communication; M71.1 Engineering activities and related technical consultancy; M72.1 Research and experimental development on biotechnology; M74.9 Other professional, scientific and technical activities n.e.c.; N80 Security and investigation activities; O84.1 Regulation of and contribution to more efficient operation of businesses; Q86 Human health activities.

[2] Hamburg (DE60), Syddanmark (DK03), Estonia (EE00), Lithuania (LT00), Latvia (LV00), Podlaskie (PL34), and Etelä-Suomi (FI1C).

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[38] Kruse, M.; Wedemeier, J. (2018): Trans-S3 - Analytical review and profiling of target regions/countries (Sequence 2), Preliminary results, Hamburg/Bremen. There are no further employment specialisations in human health and social work activities such as in key enabling technologies.
[39] cf. also Kruse, M.; Wedemeier, J. (2018): Trans-S3 - Analytical review and profiling of target regions/countries (Sequence 2), Preliminary results, Hamburg/Bremen.
[40] No regional employment specialisation in Hamburg (DE60) and Syddanmark (DK03).
[41] No regional employment specialisation in: Hamburg (DE60) and Etelä-Suomi (FI1C).

ANNEX (excerpt) Table 1
Market and Technology trends 2030

Example of domain	Example of sub-domain/specific knowledge domain	Example of solutions / of domains of application	Examples of affected sector/sub-sector (NACE Rev. 2) [1]	Example of cross-sector relations [1]	(i) Location quotient: Example of affected NACE activities with a matching in S3 priority areas [1]	(ii) Location quotient: Example of affected NACE activities with a non-matching in S3 priority areas [1]	(iii) Growth rate p.a. (2010–15): Example of affected NACE activities [2]
(1) Biotechnology	(Sustainable) biotechnological production	Biofuels, synthetic biology, Forward Engineering / Metabolic Engineering	M72.1 Research and experimental development on biotechnology	A01 Growing of non-perennial crops; C10 Manufacture of food products; C11 Manufacture of beverages; C21.1 Manufacture of basic pharmaceutical products; C25 Manufacture of fabricated metal products, except machinery and equipment; Manufacture of electric lighting equipment; C27.9 Manufacture of other electrical equipment; M74.9 Other professional, scientific and technical activities n.e.c.	**LQ-LFS A:** DK03: 0.9, DE60: 0.0, EE00: 0.9, LV00: 1.8, LT00: 1.9, PL34: 5.4, FI1C: 1.0 **LQ-SBS C10:** DK03: 1.8, DE60: 0.0, EE00: 1.2, LV00: 1.2, LT00: 1.5, PL34: 3.0, FI1C: <1.1 **LQ-SBS C11:** DK03: 2.1, DE60: 0.2, EE00: 1.2, LV00: 1.3, LT00: 1.2, PL34: 1.7, FI1C: <1.1 **LQ-SBS C25:** DK03: 1.5, DE60: 0.1, EE00: 1.2, LV00: 0.7, LT00: 0.6, PL34: 0.9, FI1C: 1.5 **LQ-SBS C28:** DK03: 2.8, DE60: 0.8, EE00: 0.4, LV00: 0.3, LT00: 0.3, PL34: 1.4, FI1C: 1.9	**LQ-LFS O-Q:** DK03: 1.2, DE60: 1.0, EE00: 0.8, LV00: 0.9, LT00: 0.9, PL34: 0.8, FI1C: >1.1	**LQ-LFS A:** DK03: –0.9, DE60: –, EE00: –0.5, LV00: –2.5, LT00: –0.6, PL34: –2.0, FI1C: –2.8 **LQ-SBS C10:** DK03: +1.7, DE60: –, EE00: +2.2, LV00: –1.4, LT00: +0.7, PL34: –0.9, FI1C: –0.5 **LQ-SBS C11:** DK03: +5.7, DE60: –4.0, EE00: +0.1, LV00: +0.4, LT00: –1.2, PL34: –1.8, FI1C: – **LQ-SBS C21:** DK03: –, DE60: +4.6, EE00: +2.8, LV00: +3.0, LT00: –0.5, PL34: –, FI1C: +3.3 **LQ-SBS C25:** DK03: +3.7, DE60: –0.4, EE00: +3.0, LV00: +4.9, LT00: +4.9, PL34: +4.3, FI1C: –2.0
(2) Services	Biological principles with cross-sectional character	Biological energy carriers; epigenetics	M72.1 Research and experimental development on biotechnology	J Information and Communication	**LQ-SBS C28:** DK03: 2.8, DE60: 0.8, EE00: 0.4, LV00: 0.3, LT00: 0.3, PL34: 1.4, FI1C: 1.9 **LQ-SBS M72:** DK03: 0.7, DE60: 1.7, EE00: 0.7, LV00: 0.8, LT00: 0.7 **LQ-SBS M74:** DK03: 1.2, DE60: 1.7, EE00: <1.1, LV00: >1.1, LT00: 1.0, PL34: 0.9, FI1C: 0.5 **LQ-SBS C:** DK03: 1.3, DE60: 0.0, EE00: 1.2, LV00: 0.9, LT00: 1.0, PL34: 1.5, FI1C: 1.4 **LQ-SBS C28:** DK03: 2.8, DE60: 0.8, EE00: 0.4, LV00: 0.3, LT00: 0.3, PL34: 1.4, FI1C: 1.4 **LQ-SBS J:** DK03: 0.7, DE60: 1.8, EE00: <1.1, LV00: 1.0, LT00: 0.7, PL34: 0.5, FI1C: 0.7		**LQ-SBS C28:** DK03: +4.3, DE60: –0.8, EE00: +4.1, LV00: +4.5, LT00: +4.5, PL34: +3.7, FI1C: 0.0 **LQ-SBS M72:** DK03: +5.8, DE60: +5.5, EE00: +1.1, LV00: +7.1, LT00: +6.6, PL34: +9.6, FI1C: +3.0 **LQ-SBS M74:** DK03: +2.4, DE60: +7.5, EE00: +7.5, LV00: +6.9, LT00: +7.1, PL34: +3.3, FI1C: –28.2
	Principles of molecularly biology	Microenergy Harvesting	M72.1 Research and experimental development on biotechnology				
	Technology platform	Genomics, Proteomics, Metabolomics	M72.1 Research and experimental development on biotechnology				
	Hybrid forms of service organizations and production	Systematic development and design of services	C Manufacturing				
	Integration of services in technology platforms	Individualization, automatization and rationalization of services	O84.1 Regulation of and contribution to more efficient operation of businesses				
	Service Engineering	Systematic development and design of services	O84.1 Regulation of and contribution to more efficient operation of businesses				
	Cross-sectoral services	Creative industries and automotive, tourism and health/ICT	C26 Manufacture of computer, electronic and optical products; J Information and Communication; Q86 Human health activities				

Example of domain	Example of sub-domain/ specific knowledge domain	Example of solutions / of domains of application	Examples of affected sector/sub-sector (NACE Rev. 2) [1]	Example of cross-sector relations [1]	(i) Location quotient: Example of affected NACE activities with a matching in S3 priority areas [1]	(ii) Location quotient: Example of affected NACE activities with a non-matching in S3 priority areas [1]	(iii) Growth rate p.a. (2010-15): Example of affected NACE activities [2]
(3) Energy	Energy supply	Renewables, conventional power supply, concentrating photovoltaic, SOFC (Solid Oxid Fuel Cell), MCFC (Molten Carbonate Fuel Cell) und PEMFC (Proton Exchange Membrane Fuel Cell)	A02.2 Logging; D35 Manufacture of gas; distribution of gaseous fuels through mains; C27.9 Manufacture of other electrical equipment; D35.1 Electric power generation, transmission and distribution	J Information and Communication	**LQ-LFS A:** DK03: 0.9 DE60: 0.0 EE00: 0.9 LV00: 1.8 LT00: 1.9 PL34: 5.4 FI1C: 1.0 **LQ-SBS C27:** DK03: 1.5 DE60: 0.2 EE00: 1.3 LV00: 0.4 LT00: 0.5 PL34: 0.6 FI1C: 1.0 **LQ-SBS F43:** DK03: 1.5 DE60: 0.6 EE00: 0.9 LV00: 0.8 LT00: 0.9 PL34: <1.1 FI1C: 1.2 **LQ-SBS J:** DK03: 0.7 DE60: 1.8 EE00: <1.1 LV00: 1.0 LT00: 0.7 PL34: 0.5 FI1C: 0.7	**LQ-SBS D35:** DK03: 1.5 DE60: 0.0 EE00: 1.4 LV00: 2.1 LT00: 1.7 PL34: 1.9 FI1C: 0.7	**LQ-LFS A:** DK03: −0.9 DE60: − EE00: −0.5 LV00: −2.5 LT00: −0.6 PL34: −2.0 FI1C: −2.8 **LQ-SBS C27:** DK03: +3.6 DE60: −5.6 EE00: +4.1 LV00: +3.8 LT00: +5.3 PL34: −17.4 FI1C: +0.7 **LQ-SBS C28:** DK03: +4.3 DE60: −0.8 EE00: +4.1 LV00: +4.5 LT00: +4.5 PL34: +3.7 FI1C: 0.0 **LQ-SBS D35:** DK03: +4.3 DE60: − EE00: −2.5 LV00: 0.8 LT00: −3.1 PL34: −12.4 FI1C: −2.0 **LQ-SBS F43:** DK03: +2.2 DE60: +2.6 EE00: +4.5 LV00: +3.4 LT00: +5.9 PL34: +1.9 FI1C: −15.3
	Efficient energy use	Sectoral demand, households, zero energy home, decarbonizing industry	D35.1 Electric power generation, transmission and distribution				
	Energy systems	Smart grid, Flexible AC Transmission System, energy storage, Power-to-Liquid	D35 Manufacture of gas; distribution of gaseous fuels through mains				
	Enabler	ICT, electrochemistry, building/construction sector, new materials	F43.2 Electrical installation; D35 Manufacture of gas; distribution of gaseous fuels through mains				

4. Internationalisation potential assessment (assessing priorities)

HOW TO DO IT?

As stated earlier, the internationalisation aspect of smart specialisation is especially important from the Trans-S3 perspective. Transnational groups of regions are naturally interested in building connections of international character, aimed at global markets. From this point of view, the assessment of internationalisation potential of the pre-selected Trans-S3 scope is critical. It helps identify priorities and domains which are prone to internationalisation (highly specialised across distant territories) and those which can be pursued with less intensive international collaboration and competition. The former ones can be further prioritised within the Trans-S3 set and the latter ones developed with a more intraregional focus. However, it is worth noting that the long-term tendency is such that more and more economic and innovation activities gain a highly international character, which implies and confirms growing specialisation across the globe.

Internationalisation intensity is to a high degree illustrative of a region (regions) being involved and integrated into the Global Value Chains which should be considered an important goal of smart specialisations, secondary to the ultimate goal of leading the GVCs. Highly internationalised and internationalising groups of regions can therefore be considered well-advanced in pursing their smart specialisations. The same is true for transregional/transnational smart specialisations (in this context, Trans-S3).

The internationalisation potential of the pre-selected Trans-S3 can be looked at from multiple perspectives and in most cases, produce differentiated results. It is thus reasonable to employ a number of methods, however again, these should be selected on the basis of known or expected effectiveness and efficiency. While internationalisation statistics such as multi-regional exports-imports, FDIs, franchising networks intensity, etc. are definitely useful, their collection and analysis will be resource-consuming and of limited benefit as they only consider past trends. If in sequence no. 2 (analytical review and profiling of target regions), certain work was carried out in assessing the concentration of sectors/sub-sectors in terms of international trade and investments, the results of this work can be further explored.

Other methods, such as the review of publications and analytic papers, and expert judgement, should be considered, especially that internationalisation is a multifaceted phenomenon. Interesting results and insights can be obtained by directly surveying regional enterprises or groups of enterprises (e.g. clusters), those relevant to the pre-selected Trans-S3 scope but also beyond. This is however time and effort consuming.

Whatever methods are applied, the end result of this sequence should be a good understanding of which Trans-S3 priorities and domains are or can be the subject of intensive or increased internationalisation. The ones with very little need or chances for international coopetition, can be eliminated from the Trans-S3 scope while others with a high internationalisation potential, which were not identified in earlier stages, can be re-considered and re-analysed.

Again, this sequence, regardless of the analytical methods applied, requires consultations of interregional character which will allow partner regions to develop consensus on which Trans-S3 priorities and domains should be retained and which ones not.

HOW DID WE DO IT?

The GoSmart BSR project partners assessed internationalisation potential of the pre-selected Trans-S3 priorities and domains on the basis of a survey carried out among the target regions' representatives of the project implementing partners and regional/national external experts, considering the main forms of internationalisation. The level of analysis was each specific knowledge domain, sector/sub-sector, technology and theme. While the survey tool had its limitations, it provided a good overview of which smart domains are and can be developed in the interregional/international dimension.

Below and on the next pages, the 'Assessment of Internationalisation Potential of Smart Specialisation Domains under Trans-S3 Methodology (Sequence 4)' conducted by the GoSmart BSR partners' representatives and experts in May-July 2018, is presented.

Sample product

Assessment of Internationalisation Potential of Smart Specialisation Domains under Trans–S3 Methodology (Sequence 4)

1. Introduction

The internationalisation potential of all below listed Trans-S3 priority areas and domains was carried out at the level of each specific knowledge domain, sector/ sub-sector, technology and theme (column 4). The assessment was based on local experts' knowledge of the regional economy and its current level of internationalisation or opportunities and ease/potential for internationalization. The minimum score (0 points) was given when internationalisation is very weak with low potential. The maximum score (5 points) was given when internationalisation is very strong and with high potential. The intermediate scores (1–4 points) were assigned on the basis of the knowledge of each domain and comparison among all assessed domains, e.g. if exports were relatively high and/or their technology/knowledge contents were high, the given domain was given a higher score. The internationalisation of small and medium-size enterprises was of main interest.

The aggregated results from the regions fell between 1.6 and 3.0 points. Therefore, underlined relative descriptive levels of the internationalisation potential were established (averages of all regions ratings):

- Below 2.0 points – Low potential

- Between 2.1 and 2.5 points – Medium potential

- Above 2.5 points – High potential.

Main spheres and forms of internationalisation assessed and scores assigned:

Main spheres and forms of internationalization	Minimum score on internationalization potential (0) - the below characteristics are present or very likely	Maximum score on internationalization potential (5) - the below characteristics are present or very likely
A. Export - exports and cooperation in distribution/ marketing	Exports are almost absent; existing exports pertain mostly to low value-added products/services and cost is the dominant competitive factor; international marketing and distribution are not developed; exports are within limited number of countries	Products/services are mostly exported; exports show high value added and quality, design, technology content are main sources of advantage; international marketing and distribution are advanced; exports are EU-wide/global
B. Sourcing – sourcing, imports and participation in international supply networks, also **outsourcing**	Imports are almost absent, basic and low value-added products/services are imported; sourcing can be easily substituted from other directions; knowledge-intensive inputs are not outsourced	Imports are intensive, sophisticated and high value-added products/services are imported; sourcing cannot be easily substituted from other directions; knowledge-intensive inputs are outsourced including core business processes
C. Models - subsidiaries, franchising, licensing abroad, FDIs, other forms of business model expansion	International subsidiaries or franchises, FDIs or business licensing is almost absent; international mergers and acquisitions are rare; branching by global firms is practically absent	International subsidiaries or franchises, FDIs or business licensing are very popular; international mergers and acquisitions are frequent; branching by global firms is present
D. Clustering – participation in complex international sectoral networks/clusters focused on **group** strategies and activities related to all forms of internationalization	Existing networks/clusters are not internationalized; very few regional companies belong to international clusters; involved clusters are not key players in EU/global markets; neither intensive nor complex joint actions are present	Existing networks/clusters are well internationalized; many regional companies belong to international clusters; involved clusters are key players in EU/ global markets; intensive and complex joint actions are present
E. Innovation - internationalizing innovation by collaboration in R&D&I with foreign partners, selling/ acquiring intellectual property abroad, sending/hiring R&D staff from abroad	International R&D&I is almost absent; innovative products or services are not tailormade to target markets/customers; selling/acquiring intellectual property is mostly domestic; international R&D staff is practically not present and not sent	International R&D&I is intensive and frequent; innovative products or services are tailormade to target markets/ customers; selling/acquiring intellectual property is very often on international scale; international R&D staff is often attracted or sent

Source: Own elaboration.

Assessment of Internationalization Potential of Smart Specialisation Domains under Trans–S3 Methodology (Sequence 4)

No.	Common smart specialisation priority areas	Explanations/ definitions	Specific knowledge domains, sectors/ sub-sectors, technologies and themes[42]	A. Export	B. Sourcing	C. Models	D. Clustering	E. Innovation	TOTAL SCORE	Justification
1	**Human health and nutrition**	– Human health activities – Nutrition	– Health, health-related services, rehabilitation, life sciences and welfare technology, nutrition	3.3	2.3	1.9	2.1	2.7	2.5	**Medium Potential.** Country/region scores: Lithuania (3.8), Germany – Hamburg (3.6), Denmark – Region Syddanmark (3.0), Latvia (3.0), Estonia – South Estonia (1.8), Poland – Podlaskie (1.2), Finland – Kymenlaakso (0.8).
			– Innovative medicine, medical technology, biotechnology, biomedicine, new treatments and medical devices, digital applications in health and well-being, advanced diagnostics, genetic engineering and research	3.0	2.3	1.9	2.4	2.9	2.5	**Medium Potential.** Country/region scores: Lithuania (4.4), Germany – Hamburg (3.8), Latvia (3.2), Denmark – Region Syddanmark (3.0), Poland – Podlaskie (2.6), Finland – Kymenlaakso (0.4), Estonia – South Estonia (0.0).
2	**Key Enabling Technologies**	– Nanotechnology – Micro-/nano-electronics – Photonics – Advanced materials – Industrial biotechnology – Advanced manufacturing technologies	– Bio-economics (interactions between economics and biological systems; commonly concerned with optimization of biological and economic productivity of living resources)	2.1	1.9	2.0	2.0	2.3	2.1	**Medium Potential.** Country/region scores: Lithuania (4.6), Denmark – Region Syddanmark (3.6), Latvia (3.0), Germany – Hamburg (2.0), Poland – Podlaskie (1.2), Estonia – South Estonia (0.0), Finland – Kymenlaakso (0.0).

Scoring of internationalisation potential (0–5 points in each sphere)

[42]Based on national and regional S3s as applicable.

No.	Common smart specialisation priority areas	Explanations/ definitions	Specific knowledge domains, sectors/ sub-sectors, technologies and themes[42]	Scoring of internationalisation potential (0 – 5 points in each sphere)						Justification
				A. Export	B. Sourcing	C. Models	D. Clustering	E. Innovation	TOTAL SCORE	
3	Manufacturing & industry	- Food and beverages - Textiles, wearing apparel, leather, etc. - Wood and cork, straw, plaining products, furniture - Paper, paper products - Printing and recorded media - Chemicals, chemical and petroleum products, rubber, plastic, other non-metallic mineral products - Pharmaceutical products, preparations - Metals, metal products, machinery and equipment - Computer, electronic and optical products - Electrical equipment - Motor vehicles, trailers, transport equipment	- Agro-business and related sectors	2.9	2.1	2.0	2.4	2.4	2.4	**Medium Potential.** Country/region scores: Denmark – Region Syddanmark (3.2), Poland – Podlaskie (3.2), Latvia (3.0), Lithuania (2.4), Estonia – South Estonia (1.8), Germany – Hamburg (1.6), Finland – Kymenlaakso (1.4).
			- Innovative technologies, processes, and products of agro/food- and forestry/wood industry, including healthy, safe and functional food and beverages	3.6	2.4	2.7	3.1	2.9	2.9	**High Potential.** Country/region scores: Finland – Kymenlaakso (4.4), Latvia (4.2), Denmark – Region Syddanmark (3.2), Poland – Podlaskie (3.2), Lithuania (2.4), Estonia - South Estonia (1.8), Germany – Hamburg (1.4).
			- Biotechnological processes and products of specialised chemistry and environmental engineering	2.6	2.3	2.0	2.7	2.7	2.5	**Medium Potential.** Country/region scores: Lithuania (4.6), Finland – Kymenlaakso (4.4), Denmark – Region Syddanmark (3.2), Germany – Hamburg (2.0), Latvia (2.0), Poland – Podlaskie (1.0), Estonia – South Estonia (0.0).

No.	Common smart specialisation priority areas	Explanations/ definitions	Specific knowledge domains, sectors/ sub-sectors, technologies and themes[42]	Scoring of internationalisation potential (0 – 5 points in each sphere)						Justification
				A. Export	B. Sourcing	C. Models	D. Clustering	E. Innovation	TOTAL SCORE	
4	ICT	- All technical means used to handle information and aid communication; both computer and network hardware, as well as software	- Information and communications technology infrastructure, cloud computing solutions and services, information interoperability, ICT in industry and services, science and development, software development and programming	3.3	2.9	3.0	2.4	3.1	2.9	**High Potential.** Country/region scores: Latvia (4.4), Germany – Hamburg (3.4), Estonia - South Estonia (3.0), Lithuania (3.0), Denmark – Region Syddanmark (2.6), Poland – Podlaskie (2.4), Finland – Kymenlaakso (1.8).
			- Digitalisation: cyber-security and gamification, digital applications	3.3	3.0	2.9	2.6	2.9	2.9	**High Potential.** Country/region scores: Germany – Hamburg (4.4), Latvia (3.4), Estonia - South Estonia (3.0), Lithuania (3.0), Denmark – Region Syddanmark (2.6), Poland – Podlaskie (2.2), Finland – Kymenlaakso (1.8).
			- Development of ICT education and e-skills, internet access, modern and efficient public administration, development of e-services and digital content	2.3	2.3	2.0	1.9	2.6	2.2	**Medium Potential.** Country/region scores: Germany – Hamburg (3.0), Latvia (3.0), Lithuania (3.0), Denmark – Region Syddanmark (2.4), Poland – Podlaskie (2.0), Estonia - South Estonia (1.8), Finland – Kymenlaakso (0.2).
			- Remote work and services	2.1	1.7	1.6	1.3	1.4	1.6	**Low potential.** Country/region scores: Germany – Hamburg (3.0), Denmark – Region Syddanmark (2.4), Lithuania (2.2), Poland – Podlaskie (2.2), Latvia (1.6), Finland – Kymenlaakso (0.0), Estonia - South Estonia (0.0). **Suggested elimination of this domain.**

No.	Common smart specialisation priority areas	Explanations/ definitions	Specific knowledge domains, sectors/ sub-sectors, technologies and themes[42]	Scoring of internationalisation potential (0–5 points in each sphere)						Justification
				A. Export	B. Sourcing	C. Models	D. Clustering	E. Innovation	TOTAL SCORE	
5	Sustainable innovation	– Climate action, environment resource efficiency and raw materials	– Sustainable, effective, low-emissions energy generation, storage, transmission, distribution and use, energy efficient solution development, renewable, clean energy, smart systems for energy diagnostics, monitoring, metering, etc.	2.3	2.1	2.3	3.0	3.0	2.5	**High Potential.** Country/region scores: Denmark – Region Syddanmark (3.8), Germany – Hamburg (3.2), Lithuania (3.0), Finland – Kymenlaakso (3.0), Latvia (2.6), Poland – Podlaskie (2.2), Estonia – South Estonia (0.0).
			– Minimalization of waste generation, including non-processable waste and use of waste (recycling and other methods) for materials and energy, effective waste treatment, storage and disposal	2.1	2.3	1.7	2.1	2.7	2.2	**Medium Potential.** Country/region scores: Latvia (3.8), Denmark – Region Syddanmark (3.8), Lithuania (2.6), Poland – Podlaskie (2.0), Estonia – South Estonia (1.6), Germany – Hamburg (1.2), Finland – Kymenlaakso (0.4).
			– Ecologically and economically sustainable mobility and transport, resource-effective and low-carbon circular economy	2.6	2.0	2.0	2.1	2.4	2.2	**Medium Potential.** Country/region scores: Lithuania (3.0), Germany – Hamburg (2.8), Denmark – Region Syddanmark (2.8), Finland – Kymenlaakso (2.6), Latvia (2.2), Poland – Podlaskie (2.2), Estonia – South Estonia (0.0).
			– Eco-innovations, environmental science and related sectors	2.0	1.7	1.6	2.0	2.4	1.9	**Low potential.** Country/region scores: Latvia (3.4), Denmark – Region Syddanmark (2.8), Lithuania (2.0), Germany – Hamburg (2.0), Poland – Podlaskie (1.8), Finland – Kymenlaakso (1.6), Estonia – South Estonia (0.0). **Suggested elimination of this domain.**
6	Construction	– Construction industry	– Construction industry and products, including smart and energy efficient construction	2.4	2.7	2.4	2.6	2.3	2.5	**Medium Potential.** Country/region scores: Latvia (3.6), Poland – Podlaskie (3.2), Denmark – Region Syddanmark (3.0), Lithuania (2.8), Finland – Kymenlaakso (2.0), Estonia – South Estonia (1.8), Germany – Hamburg (1.0).
7	Transportation and storage	– Transport, logistics, storage	– Innovative transport and logistics, including secure, smart transport and logistics systems, including last-mile logistic, material handling engineering, etc.	3.4	3.1	2.6	2.9	3.0	3.0	**High Potential.** Country/region scores: Germany – Hamburg (4.0), Denmark – Region Syddanmark (3.8), Lithuania (3.6), Finland – Kymenlaakso (3.2), Poland – Podlaskie (2.6), Estonia – South Estonia (2.0), Latvia (1.8).

Source: Own elaboration

5. Stakeholder consultations and entrepreneurial discovery (finalising priorities)

HOW TO DO IT?

The entrepreneurial discovery process (EDP), involving and consulting all actors of the quadruple helix (entrepreneurs, researchers/academia, public authorities, and non-governmental organisations), is and should be considered the necessary component of all previous sequences of the Trans-S3 identification. The same applies to the Trans-S3 general component (described in the next chapter). Participation, exchange of perspectives, peer discussions and reviews, multiple consultative methods, need to be integrated from the onset to the end of all Trans-S3 processes. Yet, consultations and entrepreneurial discovery culminate in this sequence for two important reasons:

■ To welcome any additional information, views and positions before the Trans-S3 priorities and domains are ultimately defined;

■ To help agree and take joint conclusive decisions regarding the Trans-S3 priorities and domains, in other words, to define the Trans-S3 thematic scope.

In sequence 5, wide participation and review of a wide spectrum of ideas should be encouraged and ensured, by conventional and non-conventional consultative and inclusive methods. Without going into details, some of the most popular methods are:

■ Consultative workshops and conferences, expanded or 'open' working groups sessions;

■ Stakeholder interviews and other surveying methods;

■ Communication platforms, networking, etc.

These methods create the conditions and environments which welcome open discussion and questioning of the proposed smart specialisations and the ways of selecting them, allow different participants to share and test their positions with others, help identify and address the non-obvious opportunities and threats, and finally, help build consensus among the various stakeholders involved

in Trans-S3 work. A special value of intensive and broad consultations and joint discovery is the increased ownership and awareness of all actors of the Trans-S3 scope which will make future progress much easier, among others by activating joint and individual efforts in the agreed directions.

When applying the above-mentioned or similar methods of participation and entrepreneurial discovery, the important motivation is to make the Trans-S3 identification process not only highly inclusive but also open to discovering new connections, new formats, and new ideas, which capitalise on the known facts but non-obvious associations and dependencies. For example, new cross-thematic areas of transnational specialisations may be identified by the participants in the EDP.

This sequence, dedicated to consultations and entrepreneurial discovery, ends the Trans-S3 technical elaboration (the specific component) by establishing the ultimate Trans-S3 priority areas and domains. Of course, some formal (or less-formal) decisions should be made by the representatives of the target regions which will reflect this ultimate selection. As smart specialisations have to be considered a non-constant but somehow flexible choices, these 'ultimate' selection should be then properly monitored and periodically evaluated, and adopted as needed within the dynamics of the global systems.

HOW DID WE DO IT?

The GoSmart BRS project partners considered this phase of Trans-S3 identification critically important for the whole process as advanced proposals could be widely consulted and joint discoveries made agreeing on what was appropriate and important for the target regions in terms of 'smart internationalisation'.

The consultations took form of consultative workshops, one-to-one meetings and surveys in August – November 2018, using presentations, interactive discussion panels, interviews and short questionnaires, to discuss the Trans-S3 domains thus far defined in the earlier sequences (1-4), and to receive feedback and engage the defined stakeholders, representing the regional/national actors, in entrepreneurial discovery. This way, inclusive and interactive bottom-up involvement of participants repre-

senting all quadruple-helix environments was encouraged and ensured, through which the proposed smart domains could be assessed and new potential ones identified, mostly based on market and/or technological opportunities identified in the process. Also, is this format, the entrepreneurial knowledge and insights from many environments and institutions were shared and connections and partnerships made stronger. In practical terms, the process was organised as a series of:

■ Workshops or conferences in each target region/country with the following sessions: an innovation policy discussion table "What is there for the regional/national innovation actors in the Transnational Smart Specialisation Strategy?"; a consultative session with innovation actors, specifically business organizations, business support organizations, relevant clusters "What are the potentials within the Transnational Smart Specialisation Strategy for the regional/national business internationalization and innovation?"; focus group discussions with leading businesses "What particular business innovation projects can be the subject of internationalization (joint specialisation strategy)?"

■ Combined with these workshops (or in parallel), a short questionnaire among the leading businesses was conducted, covering the following questions/issues: associating business with the proposed Trans-S3 domains, indicating the type of internationalization option which is considered most interesting to the business, indicating the spheres where international joint innovation is seen as potentially most interesting to the business (main value creation components).

■ Collecting feedback from the GoSmart BSR project Associated Organisations (policy-setting institutions) through face to face sessions, covering the following topics: the assessment of fit between the national/regional S3 and the Trans-S3 under GoSmart BSR project; possibilities of integrating internationalization and international innovation projects under the existing support instruments for innovation.

Sample product

Summary Report on Stakeholder Consultations and Entrepreneurial Discovery (Sequence 5)

Introduction

Intensive stakeholder consultations and entrepreneurial discovery process culminated in June–November 2018, at different dates, according to individual project partners plans and schedules. The main purpose of the consultations was two-fold:

1. To discuss and verify the proposed Trans-S3 priorities and domains (after the completion of sequences 1-4).

2. To engage quadruple helix stakeholders in the dialogue on: transnational innovation conditions, challenges and opportunities in respect to innovation policy and instruments and the needs for support especially among SMEs in undertaking international innovation projects.

General information

Consultations were conducted in all partner regions with the involvement of the organizers, innovation policy decision makers (national/regional/local authorities, managing authorities of programmes supporting innovation, SMEs, R&D), research and higher education institutes, business organizations, business support organizations, relevant clusters, leading businesses in the selected Trans-S3 domains. In total, over 200 participants engaged in consultative workshops, individual meetings and/or short surveys.

The consultations followed agreed formats of information and working sessions, with the use of specific presentations, structured topics and discussion questions, and questionnaires. Reports were drafted by project partners covering all aspects discussed with stakeholders. Summary information was collected (see annex 1), interpreted and presented in the form of conclusions below.

Conclusions

Innovation policy

1. In terms of the possibilities and ways to increase regions international competitiveness in the selected Trans-S3 domains, the following key opportunities were identified:

■ Provision of information for entrepreneurs and promotion of possibilities to internationalize in Trans S3 domains;

■ Participation in industry 4.0 agenda (automation, digitalisation, big data, etc.) by SMEs;

■ Development of competences and upskilling labour force within and across the domains;

■ Strengthening existing and forming new clusters in the selected domains;

■ Comprehensive (rather than fragmented) support systems for SMEs internationalisation and (international) innovation, considering their extensive and changing needs;

■ Idiosyncratic opportunities by individual regions as per annex 1.

2. The fit of the proposed Trans-S3 to regional situation and internationalisation potentials was considered high in general, with some region-specific differences. Additionally, it was stressed that the selected Trans-S3 priorities and domains should be considered pragmatically, including cross-sectoral links and networks benefits and horizontal/ bridging aspects of specialisations along value creating processes. Building on the most competitive and most internationalised domains was proposed and those related to global trends such as ageing society, healthy lifestyles, communication, connectivity.

Some regions proposed additional Trans-S3 domains to be included while some other regions recommended focusing on a smaller number of most developed, competitive and 'promising' domains. Since these proposals were not convergent, it was concluded to retain the Trans-S3 priorities and domains without further changes.

3. Multiple barriers to greater internationalisation and international innovation were identified, among them many related to the situation of regional SMEs: low or difficult access to finance, limited competences both at the high-end and mid-range skills, low understanding of benefits of internationalisation and capacity to enter into international activities, difficulties in accessing and high administrative burdens of support programmes, especially at the EU level.

4. The existing innovation strategies, support programmes and funding instruments were considered useful for on innovation, internationalization and business development; however, several shortcomings were identified:

■ Complexity and low integration of support systems and programmes as well as high administrative burdens creating low understanding and low participation among innovation actors, especially SMEs;

■ Lack of systems built on the premise of assisting SMEs in internationalisation/ international innovation in a comprehensive way, from the initial idea and information to commercialisation of R&D effects, especially for microenterprises;

■ Insufficient attention to supporting competence development and skilled workforce for internationalisation/ international innovation;

■ In some national and regional programmes, limitations on projects involving foreign partners.

Potentials for regional business internationalisation and innovation

1. Trans-S3 domains which are well established and already quite 'internationalised' were considered the best suited for further internationalisation and international innovation. The dominant simple forms of internationalisation such as export/ import or sourcing were considered insufficient and promotion of more advanced forms was recommended (clusters, joint R&D).

2. Support instruments for internationalization and international innovation were considered useful but not sufficiently effective:

■ Combination of financial and non-financial support should be more typical;

■ Using dedicated and full-scale assistance along company/SME progress to internationalization and international innovation would be more effective, e.g. brokerage, mentoring, individual support expertise, as the way between researching new markets and initial presentations (e.g. at fairs and sectoral exhibitions) and consolidating international positions takes several years;

■ Internationally composed clusters, incubators and networks, are not in focus of assistance;

■ Competence programmes for internationalisation are limited.

Interest in internationalisation and innovation, potentials for joint innovation projects

1. In general, the Trans-S3 stakeholders indicated high demand for internationalisation and international innovation in the target regions, however this interest among SMEs in not matched by their competences and resources which are rather limited. Therefore, these enterprises should be in the focus of support in 'smart internationalisation'.

2. Leading regional businesses and representatives of business associations as well as business support organisations (BSOs) in the Trans-S3 domains, indicated the following key obstacles to internationalisation and international innovation in the target regions: lack of sufficient background research of the target markets, difficulties in finding right partners, lack of financing, strong competition on the foreign markets, insufficient finance and regulatory restrictions, peripheral locations (for some) and logistical difficulties, and finally – conservative attitudes and risk minimization preventing entry into new markets.

Feedback from project Associated Organisations (public authorities)

1. Two opinions were sought (from Development Council of South Jutland (Denmark) and Ministry of Economy of Lithuania) and indicated that:

■ There was a relatively good fit between the Trans-S3 domains from the perspective of existing national, regional or local strategies and innovation actors can find their ways through the network of existing specialisations;

■ Strengthening SME innovation, internationalization should correspond to their´ needs;

■ There are many options for internationalization and international innovation available under existing programmes, support tools and instruments both at the EU and national/ regional levels, many of them supporting cooperation between local and foreign entities (though this could be further expanded).

Annex 1

Summary table on Stakeholder Consultations and Entrepreneurial Discovery

No.:	Items	Region 1 Denmark – Syddanmark (NUTS2 – DK03)	Region 2 – South Estonia Estonia (NUTS3 – EE008)	Region 3 Finland – Kymenlaakso (NUTS3 – FI1C4)	Region 4 Germany – Hamburg (NUTS 2 – DE600)	Region 5 Latvia – Vidzeme (NUTS3/NUTS2– LV008/LV00)	Region 6 Lithuania – Lithuania (NUTS2 – LT01)	Region 7 Poland – Podlaskie (NUTS2 – PL34)
1	Partner responsible	Business Aabenraa	Valga Town Government	Kouvola Innovation Ltd.	Hamburg Institute of International Economics	Vidzeme Planning Region	Public Institution Lithuanian Innovation Centre	Podlaska Regional Development Foundation; Bialystok University of Technology
2	Consultation event(s) date(s)	22,27.06.2018 13,17.07.2018 27.08.2018 1,2,5,10.2018	31.08.2018 14.09.2018 1.10.2018	18.09.2018	05.12.2018	14.09.2018	25.09.2018	25.09.2018
3	Consultation event(s) place	Padborg, Copenhagen, Aabenraa Tønder – Denmark	Valga – Estonia	Valga – Estonia Kouvola – Finland	Hamburg – Germany	Valmiera – Latvia	Vilnius – Lithuania	Bialystok – Poland
4	Number of participants[43]	64 (12, 9, 3, 40)	55 (2, 40, 1, 12)	12 (4, 1, 3, 4)	14 (3,7,2,2)	31 (7,15, 2, 7)	28 (4, 18, 2, 4)	38 (13, 5,10, 10)

[43]In brackets each consecutive number stands for number of representatives of: Organizers; Innovation policy makers (national/regional/local authorities, managing authorities of programmes supporting innovation, SMEs, R&D); Research and higher education institutes; Business organizations, business support organizations, relevant clusters, leading businesses in the selected Trans–S3 domains.

No.:	Items	Region 1 – Syddanmark (NUTS2 – DK03)	Region 2 – South Estonia Estonia (NUTS3 – EE008)	Region 3 Finland – Kymenlaakso (NUTS3 – FI1C4)	Region 4 – Germany – Hamburg (NUTS 2 – DE600)	Region 5 Latvia – Vidzeme (NUTS3/NUTS2– LV008/LV00)	Region 6 Lithuania – Lithuania (NUTS2 – LT01)	Region 7 Poland – Podlaskie (NUTS2 – PL34)
Innovation policy discussion tables								
5	How can our region/ country become more competitive?	- Market development, quality in partner search, partnering and cooperation - Industry 4.0 Automation, Digitalization, Big Data, etc. to be promoted especially among SMEs - Innovation – both product and business models - New competences and competence boost are needed among SMEs - Efficient financial instruments combined with non–financial support	- Strong cooperation between different stakeholders (local municipality, business organizations, business support organizations, educational organizations) - Strategy, action planning, joint marketing (area, business opportunities, cooperation = trust) - Bringing in new investors in selected domains	- Kymenlaakso region needs most of all skilled workforce and resources (see barriers) - The blockchain technology should be considered in transport domain, since Kouvola has strong knowledge in it - Based on circular (zero waste) economy of wood industry has developed new innovative products	- Focus on clusters when planning marketing activities for the location abroad - Marketing needs to be adapted to the specific target location - Linkage of sectors as cross-cutting issues; generation of complementarities (also at the European level) - Important transnational focus – how are processes organised elsewhere?	- Necessary to provide more information for entrepreneurs about possibilities to internationalize in Trans S3 domains. - Companies need support in search of foreign partners, create critical mass, e.g. by forming local clusters (low concentration makes it difficult with exception of bio-economics cluster) - Cooperation in issues related to logistics, product/ service delivery possibilities in BSR countries	- Regional/ national competitiveness in some Trans–S3 domains is quite high, global (e.g. photonics) - Other companies should increase their productivity and R&D to escape from moderate competitiveness - Support in improving competences, upskilling labour force is much needed - Branding is another important area	- Need for much improved transport/ logistics infrastructure – roads, railways, border crossings - A research institute for agro/food processing (or only dairy) – national/ European profile - Human capital - further investments in competences -Support of more intensive collaboration, esp. in areas with high internationalisation potential (transport, ICT, agribusiness) - Full spectrum of support in internationalisation of SMEs (from 'A to Z') is needed.
6	Do we see other economic/ knowledge domains which have a strong internationalization potential but are not included in the Trans–S3? Conversely, which of the proposed domains are not suitable for internationalization?	- Tourism / Experience economy - Horizontal dimensions are not explicitly in Trans–S3 focus but might have vast internationalization potential on all domains, e.g. Industry 4.0, Venture Capital.	- Strong internationalization potential: agricultural sector, creative industries, silver economy, tourism - In the regional context ICT seems to be little suitable	- Proposed Trans–S3 fits well with the regional RIS3 - Trans–S3 should be rather an enabler than exclusive, but with the notion that it should not be all–inclusive either. - No important knowledge–based domain seems to be left out by this Trans–S3.	- Other themes (some already at least partially included in Trans–S3): Fintech, 3–D–printing of metal, Industry 4.0, Light/laser/photonics, Biotechnologies, Life Science, Health, Energy systems	-Very strong domains to be further developed in the region: creative industries, bioeconomy (incl. circular economy), eco–innovations, tourism (incl. medical tourism), smart cities, smart technologies - Most of companies in the region operate in bio–economy relevant sectors e.g. wood, food, agriculture. All manufacturing SMEs are already exporters as Latvia has limited internal market.	– Most of Lithuanian S3 domains were included in the Trans–S3 strategy - Biggest potential is considered for industry and manufacturing, Logistics, ICT, where international connections already exist - Not all domains can be easily explored by national companies, e.g. KET, human health and nutrition	-Proposed Trans–S3 domains reflect well the strengths of the region - Other domains can be considered: social services, esp. for ageing people, shipbuilding, specialised forms of tourism: business, health - Attention to specialisations in mega trends: ageing society, healthy lifestyles, communication, connectivity - Smart domains are 'open' areas, value is created in cross-sectoral networks

Innovation policy discussion tables

No.:	Items	Region 1 Denmark – Syddanmark (NUTS2 – DK03)	Region 2 Estonia – South Estonia (NUTS3 – EE008)	Region 3 Finland – Kymenlaakso (NUTS3 – FI1C4)	Region 4 Germany – Hamburg (NUTS 2 – DE600)	Region 5 Latvia – Vidzeme (NUTS3/NUTS2- LV008/LV00)	Region 6 Lithuania – Lithuania (NUTS2 – LT01)	Region 7 Poland – Podlaskie (NUTS2 – PL34)
7	What are the main barriers for the regional/ national innovation actors to get involved in deeper international cooperation, especially through joint innovation/ specialisation projects?	- Resources: time, competences and funding (SMEs) - Willingness to risk and investment – pressure on costs (reduction) and narrow margins - Focus, commitment and experience. Too random choice of markets and partners – Access to competence (highly educated and VET graduates, upskilled, etc.) - Little barriers to academia, clusters, R&D and Advanced Technology Groups	- Insufficient financial capacities - Lack of competencies - Lack of strategies, joint activities, cooperation	- Needed is clear added value from international cooperation. - Companies need support in identifying international potential for their products and services and in formulating convincing content. - Lack of skilled workforce seems critical. - Information, know-how, IPR sharing is sensitive	- Lack of skills, but access to qualified human capital through a European network can become a large benefit (fostering mobility between regions) - In some sectors (such as aviation) the market environment becomes increasingly difficult for SMEs (shifting to niches, high entry barriers, long lead times etc.)	- Insufficient knowledge about internationalization, possibilities of cooperation, not ready to. - Insufficient financial resources. - High level of risks - Low SMEs innovativeness. - Limited search for external funding (EU innovation funds) due to limitations and ridged regulations, high administrative burden.	- Internal: lack of clear vision, low openness to risk, lack of financial and human resources - External: low participation in innovative value-chains, national innovation projects are simpler and more easily accessed than international ones like Horizon 2020, that is why the latter ones are not so popular	- Know-how, best practice, knowledge transfer important for SMEs, not only finance - There is demand for skills and competences for internationalisation - Many regional firms are short of developing global ambitions - The region would benefit from more trade infrastructure, e.g. large exhibition and economic fairs facilities
8	Do the existing innovation strategies, support programmes and funding help the regional/ national innovation actors to get involved in deeper international cooperation? If not, which ones and how should be changed	- In general, assessed as helpful on innovation, internationalization and business development. - Support system includes too many actors, funding, tools and programmes; opaque, overwhelming, overlapping; with high administrative burdens; streamlining under discussion. - Direct support (1om) is considered more effective, e.g. broker functions. - Enhancing SME cooperation with clusters, academia and R&D institutions - Enhancing access to qualified work force and upgrading of competences in SMEs´	- The strategies are not widely communicated, not in use, support programmes and funding are usually not effective as they only tackle issues 'half-way'. - Cooperation should be better coordinated - Key limiting factor for strategies and plans is lacking finance	- Large number of supporting programmes and tools, but not effectively utilized, especially the instruments for R&D - SMEs especially suffer from lack of resources for formal application and administrative management of their participation in support programmes.	- Open question whether to use the same marketing strategy for all target countries or to adapt it to specific local specialities (recent tendency to follow the latter approach). - Targeted capacity building measures for local public authorities would make sense in order to sensitise them for the potential of transnational cooperation and the needs of SMEs. - Specific focus should be put on S3 policy owners in the regions (a proposal was made to organize a dedicated seminar at the end of the project lifetime).	- Current innovation support programmes / strategies not very successful (except Competence Centre programme, but limited number of companies). - More flexibility needed, especially support at national level. - Involving foreign partners is difficult, mainly for administrative reasons	- National support programmes are requesting public–private partnership between national entities, not encouraging international cooperation - Support seems to focus on finding new clients for distribution and export, R&D activities are not among the main priorities among companies	- Many examples of projects in internationalisation, including mobility, business incubation/acceleration, business promotion, etc. - High interest noted for financial support in R&D projects by SMEs in collaboration with research sphere - More support needed for regional enterprises to use international programmes such as Horizon 2020 - Additional support to micro enterprises as they usually struggle to manage their business with little scope and resources for innovations

Consultations of Trans-S3 potentials for regional/national business internationalization and innovation

No.:	Items	Region 1 Denmark – Syddanmark (NUTS2 – DK03)	Region 2 Estonia – South Estonia (NUTS3 – EE008)	Region 3 Finland – Kymenlaakso (NUTS3 – FI1C4)	Region 4 Germany – Hamburg (NUTS 2 – DE600)	Region 5 Latvia – Vidzeme (NUTS3/ NUTS2- LV008/LV00)	Region 6 Lithuania – Lithuania (NUTS2 – LT01)	Region 7 Poland – Podlaskie (NUTS2 – PL34)
9	Which internationalization options have proven to be successful within the regional/national Trans-S3 domains and why, and which can be further explored?	N/A	- Successful: metal industry, textile industry, transportation - Worth further exploring: agriculture, silver economy	- Forest/ wood industry in South-Eastern Finland has formed the biggest cluster of this sector in the world using all internationalization models (export, sourcing, R&D, FDIs, etc.). - Structural change, technology change has forced the above-mentioned sector to innovate - Internationalization is probably too narrowly considered (as a synonym to export)	- Transnational cluster cooperation in specialisations - Good practice of aviation cluster – cross-border cooperation (42 clusters) is used for joint lobbying and fundraising for cluster members, in particular SMEs - Tailored partnering activities for regional businesses in selected markets considering specific conditions - Finding suitable influencers on site is crucial! (Need for skilled innovation brokers)	- Internet trade which allows to find customers abroad, especially if language and product meet market requirements - In most domains, participation in specialised exhibitions, trade fairs	- Small national market forces export orientation as the most popular option of internationalization - Cost competition is still important so sourcing is also a common option - In ICT sector where companies create high-tech products more complex solutions are present - Companies in KET, human health, nutrition, manufacturing are weak in international coop.	- So far export orientation is the dominant form - New, more advanced forms should be more actively promoted - Focus on making products of global quality
10	What support instruments for internationalization and international innovation were the most successful and useful for the regional/national business in the Trans-S3 domains and why?	- Combination of financial and non-financial support - Combination of several tools and actors, incl. assistance on finding partners for innovation and market entry. - Adding a broker / mentor / advisory board	- Many companies manage process of internationalization independently - Some business support organizations provide consultations, etc. but final results are achieved by the businesses or research institutions	- Joint participation to trade/ B2B fairs, business missions, have been successful - International chambers of commerce could be further explored and utilized - A national tool to go international that was in use several years ago, a certain export network, could be revived	- Moderation is key! Stimulating discussions and instructing processes has proven to be successful in international cooperation (such as an accelerator but on a larger scale) - Road mapping, haptic elements for more stimulation, creativity techniques, etc. - Pilot projects as exemplary regional formats - Workshops for policy owners - Educating employees in terms of innovation	- Support in accessing external market (programme) for presentation of products in foreign fairs – fastest learning about markets, but still takes 2–4 years before new customers decide to trust newcomers to the market - Personal contacts of young and active people in person and via social networks play significant role in new international deals - Talent attraction programme which recently started	- SMEs lack resources for travel expenses, business missions and do not have contact points, they start by participating in B2B meetings, etc. - Competence programmes are important (internships, professional education, exchanges and job placements)	- More support is needed in opening regional business to the external partners and markets by participation in trade missions, trade fairs, etc. - Support of networks, clusters with international scope - Engaging education sector more in business development – visits, joint projects, small R&D, etc.

Annex 1
Summary table on Stakeholder Consultations and Entrepreneurial Discovery

Consultations of Trans–S3 potentials for regional/national business internationalization and innovation

No.:	Items	Region 1 Denmark – Syddanmark (NUTS2 – DK03)	Region 2 Estonia – South Estonia (NUTS3 – EE008)	Region 3 Finland – Kymenlaakso (NUTS3 – FI1C4)	Region 4 Germany – Hamburg (NUTS 2 – DE600)	Region 5 Latvia – Vidzeme (NUTS3/NUTS2– LV00)	Region 6 Lithuania – Lithuania (NUTS2 – LT01)	Region 7 Poland – Podlaskie (NUTS2 – PL34)
11	Is there interest in more international innovation, joint R&D projects with international partners? Where? Why?	– International innovation highly relevant in digitalization of transport/ logistics, e.g., University of Aalborg shared experience with partners from Tartu, Estonia, for digitalisation. – SMEs in transport, logistics, ask for improved border framework conditions – R&D institutions, Universities, Dev. Councils supporting municipalities and enterprises in transnational cooperation, play an important role. – Policy on transport infra-structure (e.g. Denmark –Germany), transport corridors, energy and sustainability.	– Generally, interest is detected in any sphere.	– There is interest, but projects must clearly show benefit for the regional actors – There are no specific areas of preference	– Yes, there is significant interest – E.g. for joint fundraising on the EU level including SMEs and interdisciplinary research activities – The Baltic Sea Region is seen as a suitable test bed and good starting point for the respective activities.	– Matching partners from W. Europe in construction (wood modular houses) – Food producers in export markets (e.g. raw materials and expertise in acorn processing) – Cooperation possibilities in ICT – Collaborations in niche food/ beverage production. – Need for market research (possibility to attract students) – Cooperation with research institutes in bioeconomy, in food, beverages, Latvian High Added Value and Healthy food cluster, wood construction, ICT, environmental solutions, mobile applications with test labs, research, etc	– The biggest interest in innovation projects is from SMEs, but they expect that these activities would not have minimal administrative burden, because their resources are very limited. Also, they are more interested to develop innovation projects with Denmark, Finland and German regions rather than neighbouring countries.	– There is a rising interest in international innovations, joint research and development projects with foreign partners. – Regional companies are more open to explore external markets, by trade missions, incubation support, promotion support, etc.

Focus group discussions with leading businesses on potential joint international innovation projects

No.:	Items	Region 1 Denmark – Syddanmark (NUTS2 – DK03)	Region 2 Estonia – South Estonia (NUTS3 – EE008)	Region 3 Finland – Kymenlaakso (NUTS3 – FI1C4)	Region 4 Germany – Hamburg (NUTS 2 – DE600)	Region 5 Latvia – Vidzeme (NUTS3/NUTS2– LV00/LV00)	Region 6 Lithuania – Lithuania (NUTS2 – LT01)	Region 7 Poland – Podlaskie (NUTS2 – PL34)
12	Internationalization/ international innovation prospects and barriers by the leading businesses	– Four SMEs were asked about joint international innovation potential and barriers – all see vast international innovation potential on sourcing and on existing products/ adjusted products and concepts, and on market development; all unable to take further action due to limited resources/ capacity (time, competences and capital) – In ICT, transport and logistics most significant barriers are risks and lack of confidence in investments in digitalization, insufficient competences	N/A	– Companies, especially SME find it challenging to find time and people to invest into the strategic long–term planning internationalization demands. – Comprehensive and specialised assistance is needed; example is the concept of "Runway of Growth" by University of Jyväskylä (FI) – experts in law, finance, marketing, etc., volunteer to help companies aiming to grow but lacking finance and knowledge. – Key barriers: lack of sufficient background research of the target markets, difficulties in finding right partners, lack of financing, strong competition on the foreign market	– Establishing transnational innovation networks in certain fields of specialisation for joint EU fundraising activities including SMEs. – For the successful internationalization of SMEs it is necessary to find local "influencers" for the individual target markets (to foster partnering activities)	– Insufficient finance and regulatory restrictions – Lack of knowledge how to internationalise	– For mature innovators: lack of knowledge about new markets – legal, certificates, trends issues, finding research partner with a very specific knowledge – For beginner innovators: risk averse, first of all they want to enter foreign markets with the products they already have, seeking financial help as they face high cost competition	– Distances (peripheral location) and logistical difficulties – Cultural and customary differences – Lack of knowledge of legal regulations abroad – Economic barriers linked to small markets for sales, instable economic situation in the country, limited social capital for cooperation – Conservative attitudes and risk minimization preventing entry into new markets
13	Ideas by participants after they filled in the questionnaires – reflections, common points, general observations	– Assistance on partner search and programmes will be helpful via contact points, brokers, etc. (instruments from clusters, EEN, Trade Council, private counsellors mentioned as valuable support).	N/A	N/A (covered by the in-depth market research under project activity 3.3)	N/A	– In some industries market regulations prevent internationalization – Innovations are mostly done internally by individual companies, few 'open' innovations connections are noted	– Companies have noticed that successful internationalization requires good preparation of marketing strategy. – Expertise, coaching, etc. would be needed before initiating new projects in foreign markets or with international partners.	– Highest potential was considered in industrial sectors, transport and logistics – Most popular internationalisation options are: exports, clusters, and business models (franchising, licencing), focused in marketing and sales, operations/ production, R&D, logistics

No.:	Items	Region 1 Denmark –Syddanmark (NUTS2 – DK03)	Region 2 Estonia – South Estonia (NUTS3 – EE008)	Region 3 Finland – Kymenlaakso (NUTS3 – F1C4)	Region 4 Germany – Hamburg (NUTS 2 – DE600)	Region 5 Latvia – Vidzeme (NUTS3/NUTS2 – LV008/LV00)	Region 6 Lithuania – Lithuania (NUTS2 – LT01)	Region 7 Poland – Podlaskie (NUTS2 – PL34.)
Feedback from Associated Organizations								
14	Assessment of fit between the national/regional S3 and the Trans–S3 under GoSmart BSR project	– GoSmart Trans–S3 domains are relevant, though not have a 100% fit with national, regional or local strategies. – Sectorial and local strongholds are mirrored in strategies at different levels. – Actors from different branches and locations are used to operate with overlapping not overlapping EU, national, regional, local S3 domains. – NOT important to adapt S3 just to unify strategies. – Strengthening SME innovation, internationalization must correspond to their needs. – Horizontal focus areas are of most importance and interest to SMEs and other actors.	N/A	N/A	– S3 should include a "third" dimension – defining common transnational challenges derived from megatrends such as climate change or digitization rather than only looking at certain sectors or even cross–cluster initiatives. – However, cross–innovation activities should also receive more attention using the full technology transfer potential (e.g. through gamification). The new Hamburg initiative might be interesting: 'Sektoren-kopplung' (coupling sectors).	N/A	– The fit is good but it would be difficult to develop all Trans–S3 domains and concentration on a smaller number is suggested (from national perspective) such as manufacturing & industry, ICT and transport	N/A
15	Possibilities of integrating internationalization and international innovation projects under existing support instruments for innovation – which ones, how?	– Many options for internationalization and international innovation available under existing programmes, tools – EU and national (EU RD and structural IFs, Horizon 2020, Erasmus, Interreg, EEN, etc.; Export Credit Agency, Danish Growth Fund, Innovation Fund Denmark, Trade Council) – SMEs tend to hesitate joining international projects and – specially EU, due to administrative burdens. – Universities, Advanced Technology Groups and innovation networks are good at funding international innovation projects	N/A	N/A	– The local EEN as well as the IKS (Innovation Agency) offered their interest in linking project activities to their daily work and to support the TIBS implementation. – They consider to include certain elements in their portfolio (depending on the results and functioning of the TIBS).	N/A	– Almost all innovation projects supported by public funds allow cooperation between local and foreign entities. A few support measures have such restriction, however, there is a plan to make these measures more internationalized from the next budget period.	N/A

No.:	Items	Region 1 Denmark – Syddanmark (NUTS2 – DK03)	Region 2 Estonia – South Estonia (NUTS3 – EE008)	Region 3 Finland – Kymenlaakso (NUTS3 – F1C4)	Region 4 Germany – Hamburg (NUTS 2 – DE600)	Region 5 Latvia – Vidzeme (NUTS3/NUTS2 – LV008/LV00)	Region 6 Lithuania – Lithuania (NUTS2 – LT01)	Region 7 Poland – Podlaskie (NUTS2 – PL34.)
Feedback from Associated Organizations								
16	Other observations	N/A	N/A	Existing networks TII (Technology Innovation International), ISPIM (Int'l Society for Professional Innovation Management) can be useful while developing TIBS.	Do not exclude classic industries from project activities. They do have a considerable innovation potential worth exploiting.	Many companies identify themselves in several domains and do not specify a particular challenge for a particular domain.	N/A	N/A

Source: Own elaboration based on summarised partners' reports.

B. General component − Trans–S3 management

As indicated earlier, the general component – 'Trans–S3 management', ensures that the selection of thematic priorities (in the proposed methodology coined as the specific component), the formulation of Trans–S3 objectives, and implementation of an agreed action plan, monitoring and evaluation, are carried out in a rational and coordinated effort.

The general component receives less attention in this Trans–S3 methodology as it is essentially reflective of the corresponding standard S3 steps[44] (set–up of a sound and inclusive governance structure, production of a shared vision about the future, establishment of coherent policy mixes, integration of monitoring and evaluation mechanisms).

As pertains to the question 'how did we do it' in this chapter, a short clarification is required. The Trans–S3 for the partner regions of the GoSmart BSR project, was developed under project-specific conditions and thus most of the general component elements were foreseen, consulted and planned by the partners prior to engaging in the identification of Trans–S3 priorities and domains. In other words, the relations and responsibilities of the partners were established a priori. The fact that this component description is less developed in this publication does not mean that these general management tasks of Trans–S3 are in any way of lesser importance than the process of identification of common thematic priorities and domains. Under the GoSmart BSR project, the former ones were to a large extent predefined in the project planning phase and thus requiring less effort while implementing the project.

1. Governance

<div style="background:#E8740C;color:#fff;text-align:center;padding:8px;">HOW TO DO IT?</div>

In the transnational context, the governance systems under non-compulsory arrangements for Trans–S3 cannot be overly rigid nor easily formalised. They are usually worked out in a consultative and consensual man-

ner, taking into consideration the different possibilities, positions and preferences of the partner regions. Extensive negotiations and consultations might be required to reach workable agreements among the partners and some issues cannot be directly or ultimately regulated, sometimes for the simple reason of a partner region not holding enough formal power to make a particular decision or commitment. At the same time, 'imposing' solutions on equal partners will never work.

Therefore, the power of Trans–S3 governance should primarily come from trust, transparency, intensive and equal participation by all partners. If these are ensured, such governance mechanisms, appearing 'soft' at the first glance, will prove to be strong and lasting. This however, requires greater than the usual efforts in communication and consensus seeking.

In practical terms, governance solutions for Trans–S3 will often take the form of memoranda of understanding, and if developed within projects, consortia agreements, specifying the common goals, responsibilities and ways of coordination among the partner regions.

<div style="background:#4D4D4D;color:#fff;text-align:center;padding:8px;">HOW DID WE DO IT?</div>

Under the GoSmart BSR project, the governance system for Trans–S3 was developed as a part of the overall project governance system, in accordance with the Interreg BSR Programme regulations, and based on the following principles:

- Clear structure of responsibilities and strong coordination at different management levels (steering, work packages, groups of activities, individual activities);

- Consensus building in general and specifically in relation to issues arising unexpectedly;

- Intensive communication among the partners both at the strategic and operational levels.

In large partnerships, such as in the case of the GoSmart BSR project − seven regions and eight partner institu-

tions, it is necessary to work out effective and integrative governance mechanisms which allow delivering of agreed outputs within the critical dimensions of content (substance), time, budget, and quality. The establishment of such mechanisms will take much effort and dedication by the partners, and will undergo a learning process. Sufficient resources were made available for the governance system to function: partnership coordinator(s), regular meetings in person or using modern communication technologies, management structures such as: the steering committee, working groups, task groups, etc.

As an example of the governance mechanisms and tools which can be used in the transnational context, the rules of the GoSmart BSR project steering committee are presented below.

Sample product

Rules of procedures for Steering Committee for GoSmart BSR project

Composition

1. The Project Steering Committee (PCS) is composed of management level representatives of all partners. All members of PSC should be professionals, with strong PM experience.

2. PSC cannot be composed of project staff with the exception of Coordinator positions.

3. One person from each PP (Project Partner) is delegated to PSC by PP authorities.

4. Associated Organizations may be invited to take part in PSC meetings on need basis.

Chairmanship and co-chairmanship

1. Chairmanship of the PSC belongs to the Lead Partner (LP).

2. Co-chairman is chosen in open voting with the majority of votes among the candidates proposed by the members of PSC. Co-chairman should come from a different country than LP.

3. The Chairman, and in his/her absence the Co-chairman, chairs the meeting.

Tasks and competencies

1. Making strategic decisions with respect for project purposes, implementation effectiveness and efficiency.

2. Review and evaluation of the progress in implementation of the project, and providing guidance for improvement to the Project Coordinating Unit (LP) when necessary.

3. The PSC must ensure that the PPs collaborate towards common goals throughout the project period, and if appropriate figure out the necessary adjustment of the Project.

Plan and/or the Project's organisation

1. The PSC can decide to set up task forces in order to support the work of the PSC and facilitate the implementation of the project.

2. In case of a dispute arose between the LP and the PPs or between the PPs, the PSC resolves disputes.

Frequency of meetings

1. Chairman of the PSC shall convene regular annual meetings of the PSC. Each regular meeting of the PSC shall be held at a date and location fixed by the Chairman of the PSC, with at least two weeks' notice if possible.

2. Ad hoc meetings shall be convened by the Chairman or Co-Chairman of the PSC:

a. when the majority of members of PSC make a request for such a meeting,

b. at the request of the Project Coordinating Unit when circumstances demand it.

3. PSC meetings are held in PP/LP facilities, or other indicated places. In justified cases PSC meetings can take place via Internet/teleconference.

4. If a PSC member cannot take part in PSC meeting another person can represent him/her submitting a written power of attorney.

[44] European Commission: Guide to Research and Innovation Strategies for Smart Specialisations (RIS 3) , 2012, http://ec.europa.eu/regional_policy/sources/docgener/presenta/smart_specialisation/smart_ris3_2012.pdf (retrieved 1.02.2018)

Decision making procedures

1. A quorum is formed when 50% of the members of the PSC are present.

2. The decisions concerning ordinary management of the project including resolving disputes shall be made with the majority of votes of present members of PSC.

3. Strategic decisions of PSC are considering by consensus in the presence of all members of PSC.

4. In addition, to balance out any national dominance, the Polish partners will be given one vote at the PSC (at the disagreement, this shared vote will not count).

Meeting minutes

1. The Chairman, and in his/her absence the Co-chairman, indicates a person responsible for preparing the minutes, usually from a hosting PP.

2. Minutes shall be taken of the PSC's negotiations and decisions.

3. If a PP does not agree with a PSC decision, they have the right to have their opinion reported in the minutes.

4. The minutes must contain clear definitions of actions and clearly state who are responsible for the actions.

Authorization and change of Rules of procedures
1. The present Rules of procedure have been agreed on by the PP by voting during the first PSC meeting.

2. Rules of procedures can only be done by the PSC at ordinary meetings.

2. Shared vision

HOW TO DO IT?

Working out a shared vision for Trans-S3 will normally call for moving to a more abstract (and common) agreement on the future of the involved regions with respect to innovation. This comes with the high level of heterogeneity of regions representing different national contexts. Of course, a lot will depend on the composition of regions formulating the joint Trans-S3 and the similarities or dissimilarities among them.

The key of finding a common ground here is again, a highly participatory and consensual approach which invites all partner regions to express their concerns, propose solutions, and helps understand their different positions and preferences.

As Trans-S3 is usually somehow 'artificial', being detached from the existing regional and national governance systems of individual participating regions, greater effort should be directed to building wide support to the ideas coined as the Trans-S3 vision. Additionally, a broad promotion of the Trans-S3 concept itself and of the benefits it can bring to the regions, will usually be necessary to create enough positive attitudes and consensus around the questions 'where do we all want to be in the future' and 'what do we want to achieve together'.

HOW DID WE DO IT?

The GoSmart BSR project was constructed based on a shared initial understanding that internationalisation of innovation activities in enterprises, especially SMEs, is one of the critical areas and in fact critical success factors of regional specialisations. This conviction was further confirmed by research carried out in the initial project phase (literature review, consultations and joint learning by project partners) which showed that regions, by designing and implementing S3s, can become globally competitive in the sense of forming and belonging to global value chains (networks).

The vision of the GoSmart BSR project was expressed in the action design by the following statement agreed among the partners:

> **Effective cooperation in transnational approach between industry, R&D sector, NGOs and authorities, with the main expected results of:**
>
> ■ **Functioning and sustainable Transnational Innovation Brokerage System, and**
>
> ■ **SMEs Joint Smart Strategies implemented across partner regions.**

It is clear that this vision is a rather narrow and specific expression of a potential smart strategy end-result, thus also serving as an 'objectives statement'.

As already mentioned, the Trans-S3 of GoSmart BSR project was bound by the project scope and focus, and consequently, the Trans-S3 was largely predetermined. Dedicated efforts were made towards the identification and agreement of the Trans-S3 priorities and domains (specific component described earlier) while other strategy components were shaped before entering into the project implementation.

It is worth noting that the GoSmart BSR Trans-S3 was not intended to substitute or overlap with the existing regional (and national) level S3s of the involved regions but rather to complement them and create a synergetic, transregional scope in which some of the key challenges of making regions more innovative and competitive, would be addressed more effectively. These key challenges were identified in relation to the need to turn enterprises, especially SMEs, into actual innovation leaders and to help them internationalise and innovate in an international coopetition format.

3. Action plan

HOW TO DO IT?

In the Trans-S3 context it is extremely difficult to develop a single comprehensive policy mix, a highly specific roadmap or a detailed action plan, or for that matter, to design and implement a joint budget. The reasons behind these difficulties were discussed earlier but effectively they boil down to the incompatibilities among the different regional (and national) systems brought together under the Trans-S3.

Consequently, Trans-S3 action plans should be pragmatic and easily implementable. A simple, crude format of 'what, who, how, when' can be applied to such action plans to identify and share the tasks leading to achieving Trans-S3 objectives. It is critical not to be overly ambitious but to get the partner regions committed to implementation of the agreed tasks, and to make sure there are monitored (the last element of the general component) and responsibility mechanisms are installed into the plan, for example by integrating them into the governance system for Trans-S3.

If moving forward to implementation of Trans-S3 proves difficult, the partner regions should consider pilot actions, narrow in scope and time, to 'play' with selected elements of the action plan (instruments, funding, evaluations, etc.). Such an approach will allow to take small steps and based on them, to build more conviction and support to other ideas captured by the Trans-S3 and its action plan.

HOW DID WE DO IT?

The GoSmart BSR project worked out a preliminary action plan related to Trans-S3 by broadly predefining in the project design phase what needs to be done to internationalize innovation activities of regional enterprises, especially SMEs. This initial plan contained the following main activities (work packages):

■ Project management and administration;

■ Identification of specialisations, sectors, and supply chains with high transnational potentials & Developing transnational smart specialisations (Trans-S3);

■ Developing Transnational Innovation Brokerage System (TIBS);

■ Developing Joint Transnational Smart Strategies (JTSS) for innovation and internationalization & Testing TIBS services;

■ Advancing Joint Transnational Smart Strategies for innovation and internationalization & Making TIBS services sustainable;

■ Dissemination and proliferation of results & Building ground for expanding TIBS.

These main activities were translated into specific plans for groups of and for individual activities with detailed responsibilities among partners, timeframes, resources and budgets, and planned outputs and results. Again, the action plan was preconceived before the GoSmart BSR project was put into action and thus this particular Trans-S3 had been largely predetermined before its thematic domains were identified.

The Trans-S3 action plan of the GoSmart BSR target regions is presented in more detail in the next chapter ('Final Trans-S3 priorities and domains, way forward').

4. Monitoring and evaluation

<div style="background:orange">HOW TO DO IT?</div>

Again, simple but workable monitoring and evaluation solutions should be sought for Trans-S3. Overly ambitious M&E systems will be ineffective if not counterproductive. A short list of monitoring indicators should be sufficient, reflecting the key goals and milestones to be achieved, leaving minor, operational items out.

It might not sound impressive, but even simple progress on key issues by the involved regions (as opposed to deterioration or no progress) can be considered a valid indicator which encourages and motivates these regions to contribute to achieving or coming closer to Trans-S3 goals. It is better to set realistic indicators in the complex Trans-S3 setting and to note success than to set unrealistic indicators and to fail. One has to remember that multiple regions will come with different strengths and weaknesses in relation to Trans-S3. Another workable solution, is to set monitoring indicators on the basis of voluntary commitments by the participating regions.

A key challenge for Trans-S3 is to make the monitoring and evaluation system work. By declaration, M&E are usually perfect, by implementation, not so great. It has to be remembered that Trans-S3 are usually positioned outside of the existing, standard M&E systems applied by the partner regions and this makes them rather difficult to execute. Periodic monitoring and evaluations are feasible; using peer reviews and peer comparisons helps motivate the partners to make visible progress.

<div style="background:gray">HOW DID WE DO IT?</div>

The GoSmart BSR partners developed a project-based monitoring plan which contained all control elements of any effective project M&E (content descriptions, timing, budget, outcomes, reporting points, etc.).

The project output indicators (effectively Trans-S3 outputs) under the M&E plan were the following:

■ Number of local/regional public authorities/institutions involved - 7 BSR regions involved in the project (8 partners). Of the 8 partners, 2 are considered local/regional public authorities/institutions.

■ Number of enterprises receiving non-financial support - 50 selected SMEs (their groups working towards own Joint Transnational Smart Strategies) will be pre-treated by: Value chain analysis, including innovation potentials, Innovation assessment, Possible innovation driven internationalization models which can substantially add value to companies, Calculator of financial benefits of innovation driven internationalization, Elaboration of potential JTSS partner profiles. After that SMEs are matched with innovation partners (other enterprises, R&D houses, etc.) and eventually receive support (as groups) in choosing innovation driven internationalization model, planning their Joint Transnational Smart Strategies and implementation of these strategies.

■ Number of enterprises cooperating with research institutions - It is estimated that about 50% of the SMEs treated will develop direct cooperation with research institutions, so 25 SMEs in the project lifetime, to implement their groups Joint Transnational Smart Strategies.

■ Amount of private investments matching public support in innovation or R&D projects - SMEs benefiting from the project will be required to cover their own costs related to travels to meetings with (potential) partners, catering and premises costs of workshops/meetings/seminars in transnational groups, thus contributing to the costs of this innovation project. Amounts are estimated at 1,000-3,000 euros, thus averaging at 2,000 euros per SMEs, estimated total – 100,000 euros. SMEs will fully finance or co-finance their innovation projects.

The below items were developed under the GoSmart BSR project and since there are many publications, general and dedicated guidance on methods for SWOT, action planning and M&E, they are not presented further under the question 'HOW TO DO IT?'. Consequently, the below title ''HOW DID WE DO IT?' covers all elements presented in this chapter.

<div style="background:gray">HOW DID WE DO IT?</div>

1. Final Trans-S3 priorities and domains

Reaching agreement on the final Trans-S3 priorities and domains was a complex process, involving multiple analyses and intensive consultations among partners and other stakeholders as described earlier under the specific component of this methodology. The final list of the Trans-S3 priorities and domains for the GoSmart BSR project is presented below.

Table 2: Final Trans-S3 – common smart specialisation priority areas and their underlying common knowledge domains, sectors/sub-sectors, technologies and themes

October 2018

Highlighted domains are considered the CORE of the Trans-S3 of GoSmart BSR regions

No.	Common smart specialisation priority areas	Explanations/definitions	Specific knowledge domains, sectors/sub-sectors, technologies and themes	Internationalization potential
1	Human health and nutrition	- Human health activities - Nutrition	- Health, health-related services, rehabilitation, life sciences and welfare technology, nutrition	Medium
			- Innovative medicine, medical technology, biotechnology, biomedicine, new treatments and medical devices, digital applications in health and well-being, advanced diagnostics, genetic engineering and research	Medium
2	Key Enabling Technologies	-Nanotechnology -Micro-/nano-electronics -Photonics -Advanced materials -Industrial biotechnology -Advanced manufacturing technologies	- Bio-economics	Medium
3	Manufacturing & industry	-Food and beverages -Textiles, wearing apparel, leather, etc. -Wood and cork, straw, plaining products, furniture -Paper, paper products -Printing and recorded media -Chemicals, chemical and petroleum products, rubber, plastic, other non-metallic mineral products -Pharmaceutical products, preparations -Metals, metal products, machinery and equipment -Computer, electronic and optical products -Electrical equipment -Motor vehicles, trailers, transport equipment	-Agro-business and related sectors	
			-Innovative technologies, processes, and products of agro/food- and forestry/wood industry, including healthy, safe and functional food and beverages	**High**
			-Biotechnological processes and products of specialised chemistry and environmental engineering	Medium

No.	Common smart specialisation priority areas	Explanations/definitions	Specific knowledge domains, sectors/sub-sectors, technologies and themes	Internationalization potential
4	ICT	–All technical means used to handle information and aid communication; both computer and network hardware, as well as software	**–Information and communications technology infrastructure, cloud computing solutions and services, information interoperability, ICT in industry and services, science and development, software development and programming**	**High**
			–Digitalisation: cyber-security and gamification, digital applications	**High**
			–Development of ICT education and e-skills, internet access, modern and efficient public administration, development of e-services and digital content	Medium
5	Sustainable (eco) innovation	–Climate action, environment resource efficiency and raw materials, eco-innovations	–Sustainable, effective, low-emissions energy generation, storage, transmission, distribution and use, energy efficient solution development, renewable, clean energy, smart systems for energy diagnostics, monitoring, metering, etc.	Medium
			–Minimalization of waste generation, including non-processable waste and use of waste (recycling and other methods) for materials and energy, effective waste treatment, storage and disposal	Medium
			–Ecologically and economically sustainable mobility and transport, resource-effective and low-carbon circular economy	Medium
6	Construction	–Construction industry	–Construction industry and products, including smart and energy efficient construction	Medium
7	Transportation and storage	–Transport, logistics, storage	**–Innovative transport and logistics, including secure, smart transport and logistics systems, including last-mile logistic, material handling engineering, etc.**	**High**

Source: Own elaboration.

2. SWOT

The Strengths, Weaknesses, Opportunities and Threats analysis was elaborated on the basis of pre-project research and during implementation, more specifically when developing and applying the Trans-S3 methodology. The SWOT is constructed with consideration of the need and feasibility of achieving the Trans-S3 GoSmart BSR vision and main objectives of establishing the Transnational Innovation Brokerage System for SMEs and of SMEs Joint Smart Strategies being implemented across partner regions. The analysis is divided along the key dimensions describing the most important characteristics and current situation of the target regions. The analysis provides a strategic perspective for the Trans-S3, critically important for the 'way forward' elements.

Table 3: Trans-S3 GoSmart BSR SWOT

Concentration of economic activities	
Strengths - High level of concentration of some sectors/sub-sectors at least of sub-groups of target regions indicates strong competitive positions in the EU context (e.g. manufacturing and industry, agricultural/food and wood related activities, construction, transport); - Further regional specialisations in ICT and sustainable innovation; - Some structural business similarities can be detected.	**Weaknesses** - Heterogeneity of economic profiles and many specialisations among target regions - Different levels of development of regional business in terms of: productivity, exports intensity and directions, FDIs intensity, comparative advantages, competitive models (e.g. cost vs. quality driven); – In some cases, concentration is not associated with intensive collaboration, clusters are not fully developed.
Opportunities - Increasing productive capacities by transnational cooperation/ coopetition in concentrated sectors; - Joint exploitation of new markets on the basis of shared costs of innovation.	**Threats** - Increasing competitive pressures from large global players from less regulated environments (China, etc.).
Innovation levels and relations to mega trends	
Strengths - Some regions as innovation leaders; - Selected specialisations broadly consistent with markets and technology global trends.	**Weaknesses** - Some regions as modest/weak innovators; - Some regions weak on basic economic infrastructure (transport networks, etc.).
Opportunities - Development on the basis of combing innovation breakthroughs by leading firms and research institutions and co-innovation activities by others.	**Threats** - Limited numbers of innovation partners, especially in the less developed regions.
Internationalisation potentials	
Strengths - High internationalisation levels and potentials in core specialisations (specialisations considered internationally competitive: agro/food, ICT, transport/logistics).	**Weaknesses** - Basic forms of internationalisation dominating (export/import, sourcing); - SMEs facing many barriers to internationalisation.
Opportunities - Growing global demand for specialised production of selected domains.	**Threats** - Increase in international trade protectionism by some governments curtailing market opportunities, e.g. USA

Table 3: Trans-S3 GoSmart BSR SWOT

Innovation policy and support instruments	
Strengths - Existing and supportive innovation policy – regional and national smart specialisations in all regions.	**Weaknesses** - Little coordination of innovation policy instruments among target regions; - Insufficient support to internationalisation, international research and innovation under national and regional programmes (some focused on intraregional/national beneficiaries).
Opportunities - Learning and improvements of smart specialisation policy mixes, exploration of new instruments; - Development of transnational support systems such as EEN, introduction of new systems and services, e.g. proposed TIBS; - Activating SMEs internationalisation by relatively simple incentives (introduction to new markets, meeting new partners, etc.); - Opportunity to complement existing instruments by transnational systems.	**Threats** - Major financial crisis impacting development spending by enterprises, especially SMEs; - Rigidity of some innovation support instruments and high administrative burdens.
Joint transnational innovation projects by SMEs	
Strengths - Existing successes and good practices among some SMEs in target regions of joint research and innovation activitie	**Weaknesses** - Multiple barriers to internationalisation and innovation by SMEs: financial, administrative, skills and competences, etc.
Opportunities - Reduction of key barriers by establishment of comprehensive support system for SMEs internationalisation and international innovation (the proposed TIBS); - Dissemination of information on successful pilots under TIBS for multiplication and expansion effect; - Integration of such services under existing business support networks, e.g. EEN.	**Threats** - Failures of pilot projects affecting overall interest and enthusiasm; - Lack of funding for additional support to SMEs in the long-run.

Source: Own elaboration.

3. Action plan

The summary action plan underlying the Trans-S3 for GoSmart BSR regions is presented below, providing key information on main activities planned and results expected after the Trans-S3 priorities and domains had been identified. Responsibilities of the partners and deadlines are omitted from the presentation as they pertain to the project partners and this specific project only and do not need to be published here, however, in any action plan, such information should be contained.

Table 4: Trans-S3 GoSmart BSR Action Plan (excerpt)

Activity	Sub-activities	Outputs
1.Management	Content management Financial management (and procurement) Coordination Communication and visibility.	Effectively managed Trans-S3 action plan
2.Developing Transnational Innovation Brokerage System (TIBS)	Design of TIBS methods and tools, including 'calculator of benefits'	TIBS methods and tools
	Staffing and skills development for TIBS	TIBS staffed and skilled
	Working out TIBS structures and coordination mechanisms	TIBS concept: - Applicable methodology and tools, developed on the basis of extensive market mechanisms and market actors' behaviours - Competent staff equipped with skills commensurate with the job demands and undergoing capacity building plans - Institutional support and network coordination mechanisms in place.
	Making target groups aware of TIBS value proposition and preparations for first delivery cycle	Information on TIBS proposition disseminated

4. Monitoring and evaluation

The monitoring and evaluation system for the GoSmart BSR project applies to the Trans-S3 described in this publication. Some details were already provided in the previous chapter.

The M&E system will be further elaborated at the final stages of the project within the Transnational Innovation Brokerage System sustainability plan as TIBS is effectively the key policy instrument under the Trans-S3 for the GoSmart BSR regions.

Table 4: Trans-S3 GoSmart BSR Action Plan (excerpt)

Activity	Sub-activities	Outputs
3. Developing Joint Transnational Smart Strategies (JTSS) for innovation and internationalization & Testing TIBS services	Recruitment, selection and intake of first groups of SMEs and their innovation partners for joint smart strategies Assistance to groups of SMEs in their work towards Joint Transnational Smart Strategies step 1 - pre-treatment	Data base of potential beneficiaries/SMEs and relations for TIBS 1st pilot TIBS services step 1: pre-treatment
	Assistance to groups of SMEs in their work towards Joint Transnational Smart Strategies step 2 - matching partners	1st pilot of TIBS services step 2: partners matched
	Assistance to groups of SMEs in their work towards Joint Transnational Smart Strategies step 3 – defining and supporting innovation and internationalization business model	1st pilot TIBS services step 3: innovation driven internationalization business models
	Assessment and learning from assistance provided under 1st Pilot Cycle, adjustments to TIBS	Assessment of 1st pilot cycle of TIBS services
	Delivery of assistance under 2nd Pilot Cycle (repetition of steps 1-3 of TIBS services delivery)	Transnational groups of SMEs with progressed practical Smart Strategies
	Assessment and learning from assistance provided under 2nd Pilot Cycle, final adjustments to TIBS	Assessment of 2nd pilot cycle of TIBS
4. Advancing Joint Transnational Smart Strategies for innovation and internationalization & Making TIBS services sustainable	Monitoring and evaluation of initiated Joint Transnational Smart Strategies	All SMEs Smart Specialisations under implementation, resources for continuation of JTSS identified TIBS service packs ready
	Conducting TIBS continuation feasibility study	Feasibility study for TIBS continuation
	Negotiations on TIBS sustainable future	Agreements on TIBS future
	Initiation of implementation of TIBS sustainability plan	TIBS sustainability plan under implementation
5. Dissemination and proliferation of results & Building ground for expanding TIBS.	Online presence and information engagement of target groups; Publications production; Advertisements	Online and other communications
	Organization of international conference on Trans-S3	International conference on Trans-S3
	Organization of international conference on TIBS	International conference on TIBS
	Organization of project closing conferences in all target regions	Closing conferences in all target regions

Source: Own elaboration.

The presented Trans-S3 methodology was developed to apply the smart specialisation concept and to document how transnational smart specialisations can be established in a multi-region, multi-country setting. The goal of Trans-S3 priorities and domains identification for multiple regions was to see how the S3 methods can be adapted and tailored to promote innovation-intensive internationalisation of SMEs. So far, smart specialisations of transnational character have been sporadic and developed on the basis of less structured approaches considering mainly shared (global) challenges and only general characteristics of the territories involved.

It is hoped that the presented Trans-S3 methodology will be useful to key S3 players, especially policy decision-makers and support organisations, serving as a usable policy product (policy paper). It can be utilized at the supra-national, the national and regional levels to enrich, adjust and reshape approaches to innovation promotion.

This publication contains and explains the steps and tools which can be successfully applied in devising Trans-S3s for any group of regions and as such it will be the subject of dissemination among other BSR regions, and in the European Union, primarily via online portals and communication channels related to S3 and internationalization of enterprises, to make policy recommendations accompanying the Trans-S3 methodology widely available. It is expected that the impacts of S3 approach will be enhanced using the Trans-S3 methodology and consequently support deeper integration and increased competitiveness of the BSR and any other European transnational regions.

Conclusions and lessons learned

Based on the experiences from the elaboration of Trans-S3 for the GoSmart BSR regions (Denmark – Syddanmark, Estonia - South Estonia, Finland – Kymenlaakso, Germany – Hamburg, Latvia – Vidzeme, Lithuania – Lithuania, Poland – Podlaskie), the following general conclusions were drawn:

■ The standard S3 methodology is applicable and adaptable to any geographical setting, including the transnational level, provided that the key elements are maintained while detailed solutions added and adaptations made;

■ Working out a Trans-S3 brings a number of challenges which are mostly related to the fact that heterogenous regions enter the scene with much differentiated socio-economic realities, unique governance systems and structures, and other characteristics;

■ Trans-S3 should not substitute the basic level of smart strategies which is the region but rather inform, complement, and improve the overall innovation framework conditions in which innovation actors develop and market their ideas;

■ Embedding Trans-S3 into the regional (national) governance systems is rather difficult given their heterogeneity, however there are ways to integrate Trans-S3 perspectives and solutions to regional (national) policy mixes, for example by giving more attention and greater support to internationalisation of innovation activities;

■ Transparent and participatory governance systems work well in the Trans-S3 context, if trust is built it makes ensuring sustainability relatively easy.

Policy recommendations

The development of Trans-S3 methodology and its application by the GoSmart BSR partners was an interesting policy exercise which will eventually translate into an actual support mechanism (Transnational Innovation Brokerage System). From this perspective, some internationalisation and innovation policy recommendations are worth considering:

■ **At the EU level:**

■ Putting more emphasis on making regional (and national) S3s better focused on internationalisation and making R&D&I more open to internationalisation. It appears that some regional (and national) S3 are somewhat hermetic and concentrated on intraregional cooperation while the greatest benefits are locked in highly internationalised specialisations. The EU S3 guidance could be further expanded to accommodate the methods for Trans-S3 elaboration and promote smart specialisations spanning across national borders.

■ Some territories of the EU covered by the transnational cooperation programmes could be suitable candidates for developing their own Trans-S3s and relevant innovation policy systems and instruments, complementing the existing regional and national ones. The following European macro-regions could be considered: North Sea, North West Europe, Northern Periphery and Arctic, Baltic Sea, Danube Area, Atlantic Area, Alpine Space, Central Europe, Adriatic-Ionian, Balkan-Mediterranean, South West Europe, Mediterranean Area.[46] It is recommended to cover the Trans-S3 development in relation to the macro-regional strategies of the EU. The already existing macro-regional strategies (Baltic Sea Region, Danube Region, Adriatic and Ionian Region, and Alpine Region) can be the initial candidates. Support of such initiatives could come directly from within the mentioned cooperation programmes by introduction of new dedicated priorities and/or measures.

■ Exchanging experiences, lessons learned on internationalisation-innovation policy instruments, mainstreaming the successful ones and promoting a general effort to making regions more open and more integrated into international (global) value networks.

■ **At the regional/ national level:**

■ Regions, while building their competitiveness and innovativeness, should consider the limitations of taking only internal assets and taking formal administrative perspectives (as opposed to functional and market orientations). Many EU regions stand little chances of developing globally competitive economic systems (or domains) due to their sheer size vis-à-vis global demands. Seeking cross-regional cooperation and building value networks spanning several regions should be considered a recommended policy position.

■ Identifying other regions with similar interests and thematic strengths and supporting transregional (transnational) collaboration with them in internationalisation-innovation spheres

by explicit adjustments of available innovation and smart specialisation related instruments and funding. Such enhanced matching of regions and their capacities will tend to break the inward-looking perspective, sometimes erroneously dominating the regional (national) S3s. In this respect many EU regions can be provided with incentives to do so by the funding provided by the European Structural and Investment Funds.

■ Further refocusing the internationalisation and innovation policies on the most critical and the most disadvantaged innovation actors which are the small and medium-sized enterprises. They need to be considered the leading innovation agents and promoters as their links with markets are indisputable and today the key to success is to bring research, development and innovation to the markets and customers, i.e. create usable value and benefits. SMEs can make it happen if adequate framework conditions are put in place and their needs well-addressed.

[46] http://ec.europa.eu/regional_policy/en/policy/cooperation/european-territorial/trans-national/

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Note from GoSmart BSR Policy Dialogue in Brussels on Transnational Dimensions of Smart Specialisation Strategies (S3), Brussels, 20 February 2019

Host:
Free and Hanseatic City of Hamburg & Hamburg Institute of International Economics (HWWI)
Venue: Joint Representation of the Free and Hanseatic City of Hamburg and the State of Schleswig-Holstein to the EU, Avenue Palmerston 20, B - 1000 Brussels
Date: Wednesday 20. February 2019, 10:00 − 14:30

To strengthen smart specialisation by fostering interregional cooperation is one of the main goals of the Interreg Baltic Sea Region (BSR) project "GoSmart BSR". In order to discuss how S3 strategies could be put on a macro-regional level, the Hamburg Institute of International Economics (HWWI) organized a Policy Dialogue in Brussels in cooperation with the City of Hamburg. More than 30 stakeholders from politics, industry and science gathered on Feb 20th, 2019 at the Hanse-Office. A key focus of the debate was addressing the question how interregional collaboration in S3 can open up new business opportunities for small and medium enterprises (SMEs).

The opening keynotes addressed problems in SME internationalisation and potentials for transnational cooperation in S3. In his speech, Janos Schmied from the European Commission (DG Internal Market, Industry, Entrepreneurship and SMEs, Enterprise Europe Network and Internationalisation of SMEs Unit) spoke about the necessity of assisting small and medium enterprises in the EU. He pointed out that the SMEs benefit from financial, advisory, innovation support but also from facilitated collaboration thanks to international partnerships. Beside of programs like the COSME and the Enterprise Europe Network, the European Commission helps and encourages SMEs to go abroad by providing coaching and specific knowledge through the Ready2Go or the IPR Helpdesk initiatives.

The second key note speaker, Esa Kokkonen, Director of the Baltic Institute of Finland. Coordinator of Priority Area Innovation of the EUBSR, showed the importance of policy area innovation. He suggested that by enabling shared learning, expanding network activities and aligning resources, the Baltic Sea Region could count on stronger collaboration for the future; such as joint funding and decision-making or increased stakeholder and institu-

tional capacity. Therefore, this strategy will consolidate or even strengthen the competitive position of the Baltic Sea Region for research and innovation.

During the following panel discussion Thomas Jensen (South Denmark European Office), Jerker Johnson (Regional Council of Ostrobothnia), Tanja Woronowicz (Innovation Capability Center - TZI University Bremen) and Isabel Sünner (HWWI) gave some insights into their current S3 projects.

Isabel Sünner introduced the methodological tool developed by the GoSmart project. The tool allows to analyse regional S3s in a comparative perspective and to identify common priorities for interregional collaboration based on solid statistical analyses. After a successful pilot phase, it is basically ready to be applied in any group of regions. The BSR could be a good test bed for further validating the tool. Subsequently, the panellists exchanged experience on how entrepreneurial discovery processes can be best organized in the regions as well as on a macro-regional level. The aim is to establish a frequent bottom-up stakeholder dialogue on S3 implementation.

Thomas Jensen acquiesced in the importance of the transregional dimension of these strategies and highlighted the fact that S3 should especially be developed in medium sized cities and regions within the BSR. By transmitting expertise and reinforcing collaboration between the different actors, the mentioned regions could tap their full potential.

Following this idea, Jerker Johnson elaborated the case of smart specialisation for the Ostrobothnian economy. He also emphasized the importance of the learning process among the different actors in the region. For example, Triple-Helix dialogue between universities, public authorities and companies can reduce strategy gaps by finding adequate solutions.

As well as her preceding speakers, Tanja Woronowicz from the Innovation Capability Centre of the University of Bremen showed the advantages of interregional and inter-sectoral collaboration. She indicated that the cooperation should go beyond regional boundaries and showed how the Public Policy Living Lab aims at optimizing teamwork within the Triple-Helix construct.

A second "political" panel concluded by addressing needs for further actions. Panellists were Wioletta Dąbrowska

(Director of Regional Development Department, Podlaskie Marshal Office), Thomas Jacob (Senate Chancellery, Free and Hanseatic City of Hamburg), Krista Taipale (Region of Kymenlaakso, Finland and Head of Brussels Office), Esa Kokkonen (Director of the Baltic Institute of Finland and Coordinator of PA Innovation of the EUBSR), Marta Marin (ERRIN and Smart Specialisation Working Group Leader), Wieslaw Urban, (Bialystok University of Technology - Lead Partner of the "GoSmart BSR" project). They exchanged thoughts regarding the EU's post 2020 multiannual financial framework and what they see as key challenges to manage S3 strategies at the macro-regional level. It was controversially discussed whether there is a need for more financial instruments, or first and foremost for better integration of S3 into the daily work of the regional innovation actors.

The lively debate among all participants once again made clear that transnational cooperation among industry, the research & development sector and authorities is a key driver in smart specialisation strategies. In the run-up to the post-2020 period the regional policy owners should take up the chance to integrate transnational aspects in their S3 and agree upon concrete areas of cooperation. The acceptance for that can be increased by applying scientifically validated analysis tools like the GoSmart methodology. This can especially be of benefit for regional SMEs by opening up new business opportunities in high potential sectors.

Results of Panel 1 Discussion (project panel):
Panelists:

- GoSmart BSR- Strengthening smart specialisation by fostering transnational cooperation, Isabel Sünner, HWWI

- EmpInno - Getting Regional Smart Specialisation Strategies closer to business, Thomas Jensen, South Denmark European Office

- LARS − Learning among Regions on Smart Specialisation, Jerker Johnson, Regional Council of Ostrobothnia.

- PUBLIC POLICY LIVING LAB (P2L2). Tanja Woronowicz, TZI University Bremen.

How have main stakeholder groups been identified? How was the EDP (Entrepreneurial Discovery Process) im-

plemented? (LARS, GoSmart) EDP is an interactive bottom-up approach in which participants from different backgrounds (policy, business, science) jointly identify new business opportunities that emerge from economic activities. This approach shall foster an efficient transfer of knowledge and help to set up an ongoing regional dialogue particularly ensuring the participation of SMEs in regional S3 development.

The concept suggests that entrepreneurs and public stakeholders are exploring, experimenting and learning what an industry or even better players in a market niche should do in the field of R&D+I and non-technological innovation in order to build unique competitive advantage.

This concept can be applied in all regions. For instance, traditional regions can modernize their agro-food or tourism sectors by investing in ICT, design, marketing, new distribution channels, ... whilst regions in industrial transition can stimulate cooperation on the frontiers of two sectors/clusters, such as health and ICT, design and furniture, optronics in machinery and equipment, or can support the diversification of SMEs, i.e. from automotive to mobility.

- It is a critical question how the 'selection' process of involved regional stakeholders is being undertaken. Because this can for sure influence the outcome. There can be sensitivities regarding the process, who is involved, transparency, criteria etc.

- Before determining concrete areas for interregional S3 cooperation, a broad stakeholder involvement process took place in all PP regions.

- The involved stakeholders in most cases were public authorities (policy owners), business and science representatives as well as the NGOs. More concretely, in GoSmart workshops with two types of stakeholders were conducted

  - Innovation policy makers; Business support organizations, relevant clusters

  - Business community with special focus on SMEs, but also leading businesses from certain areas

- Guidelines whom to choose were provided, but as PPs know their regional innovation eco-system best, they were also giving some flexibility whom to

involve and how to organize the process. Potential source of error.

■ Regarding the internationalization potential of the priority areas, selected experts were consulted

■ through Interviews (business support organisations) and

■ through a survey among companies based on structured questionnaire

■ Challenge: even if the results are scientifically consolidated, it remains a political question to really agree upon concrete sectors of collaboration.

Through transnational S3: How can regional innovation actors and SMEs be better supported in becoming more innovative and competitive? (EmpInno, GoSmart)

(a) Regional innovation actors

■ The regional governments have the challenging task of organizing a broad stakeholder involvement related to S3 implementation (regional innovation actors such as innovation intermediaries, clusters, SMEs, science)

■ The acceptance can be increased by scientifically validated analysis tools like the GoSmart method.

■ Also, a structured approach like can help them to establish a bottom-up and frequent dialogue with their regional stakeholders.

■ This can also help to narrow down and specify the identified S3 priorities because in many cases the existing ones are too generic, the thematic focus is too broad. As a consequence, public investments are often not precise and cannot encourage private investments effectively

■ In order to improve the situation, the regional policy makers should receive more guidance in the governance process to implement their RIS3 from the EU superior / macro-regional level. It is high time as the updating of RIS3 for post 2020 is in full swing.

■ Their strategic capacities need to be increased and the influence of lobby groups needs to be lim-

ited. EU funds could put incentives to support this process.

■ Also, a bigger emphasis should be put on interregional S3 implementation that could ideally be organized along value chains (as proposed by the Vanguard initiative). The BSR macro-region could be a good test bed.

■ Most existing S3 have yet a limited (or even no) transnational dimension. It is necessary to raise awareness for the potentials of interregional S3 implementation and motivate regional policy owners to cooperate.

■ Taking up and further testing the GoSmart methodology on a macro-regional level could effectively support this process.

■ In the best case, innovation roadmaps across sectors and territories should be jointly elaborated, and should direct the regional and national policy makers.

■ Another idea would be to set up a network of S3 innovation managers to facilitate the strategical coordination of S3 implementation throughout the BSR

(b) SMEs

■ When updating the strategies for Post-2020 the regional policy owners should take up the chance to integrate aspects of interregional cooperation in their S3. This can for example be of benefit for regional SMEs by opening up new business opportunities in high potential sectors.

■ S3 can contribute to cohesion policy objectives due to positive spill-over effects and mutual learning - especially if put on a macro-regional level.

■ If backed up by solid analyses, it can also help to avoid that resources are being spread too thinly. This will at the end be of benefit to a macro-region as a whole.

Results of Panel 2 Discussion (policy panel):

Panelists:

■ Wioletta Dąbrowska, Director of Regional Development Department, Podlaskie Marshal Office (PL).

■ Thomas Jacob, Senate Chancellery, Free and Hanseatic City of Hamburg (DE).

■ Krista Taipale, Region of Kymenlaakso (FI), Head of Brussels office.

■ Esa Kokkonen, Director The Baltic Institute of Finland. Coordinator of Priority Area Innovation of the EUBSR.

■ Marta Marin, ERRIN, Smart Specialisation Working Group Leader.

■ Wieslaw Urban, BUT, Lead Partner GoSmart BSR.

(a) Thoughts regarding the EU's post 2020 multi-annual financial framework and (b) what you see as key challenges to manage S3 strategies at the macro-regional level

(a) Post 2020 …

■ The S3 concept will become more and more important on EU level since the initial goal is to improve the competitiveness of regions and SMEs.

■ An efficient allocation of resources will be even more crucial in the future due to rising competitive pressure from other regions in the world.

■ Also, "homemade" European challenges such as growing EU-criticism and the upcoming Brexit will increase the need for targeted and efficient investments.

■ In the ongoing discussion about the multiannual framework, voices have become louder emphasizing the need for allocating more resources to innovative regional growth cores and high potential sectors (rather than looking at cohesion aspects only)

■ Of course, S3 can contribute to cohesion policy objectives due to positive spill-over effects and mutual learning - especially if put on a macro-regional level.

■ But if backed up by solid analyses, it can also help to avoid that resources are being spread too thinly. This will at the end be of benefit to a macro-region as a whole.

(b) Challenges:

■ Interregional collaboration must be increased. When updating the strategies for Post-2020 the regional policy owners should take up the chance to integrate aspects of interregional cooperation in their S3. This can for example be of benefit for regional SMEs by opening up new business opportunities in high potential sectors.

■ S3 development needs measurable goals. Putting S3 on a solid statistical foundation can positively influence the process of finding political commitments within regions, but also between regions that are basically willing to collaborate on S3. This willingness to collaborate has often been confined to those regions with best structures, vision and ability to work in partnership. How will a better evidence base support less developed regions, who are also part of the Baltic Sea Region? Does S3 have a role to play in how the macro-region can address disparities? Think here of the proposed Component 5 and the proposed 2nd strand which will focus on less developed regions.

■ Need to develop methods and routines for broad and frequent stakeholder dialogues on S3. S3 should be living documents.

■ Cross-sectoral interaction in S3 processes must be increased as areas with cross-innovation potential match the need of efficient resource allocation

■ S3 should be more well-known and accepted (the acceptance can be increased by scientifically validated analysis tools like the GoSmart method).