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Creating Growth by Connecting Place-Based Development Strategies

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Abstract

In the past years, the European Commission launched three thematic Smart Specialisation platforms to support interregional collaborations and to support European Union regions committed to co-invest jointly in strategic growth areas. The bottom up component in this process has resulted in a wide variety of industry-scientific partnerships at regional and transnational levels. These networks include regions, which are very different in terms of innovation ecosystems, but nevertheless connected through shared thematic focus enabling transnational processes of innovation.

This paper explains how interregional partnerships build on the efforts and results achieved in national and regional research and innovation strategies for Smart Specialisation and how, as a result of this, new European innovation ecosystems are emerging. With reference to existing literature and experiences so far, the paper outlines a conceptual framework of how transnational cooperation may strengthen regional place-based development strategies and improve regional innovation capabilities. Key analytical concepts are proximity, knowledge complexity, entrepreneurial discovery processes, stakeholder analysis and cluster emergence.

1 Institutional arrangement of innovation eco-systems

Regions and countries with advanced industrial structures combined with developed innovation eco-systems enable innovation through combinations of skills and science-based research. While a significant number of European regions and countries may have well-advanced industries, they still lack knowledge-driven components in their innovation eco-systems resulting in their core industries competing against locations offering radically lower costs, resulting in ongoing and increasing gaps of innovation and competitiveness between countries and regions in Europe (European Innovation Scoreboard, 2019).

The differences in innovation capabilities between regions are maintained by several mutually reinforcing factors. Innovation leading regions have prominent universities, which are well connected to the industry and to universities of other regions. Moreover, they are well positioned in markets and in value chains resulting in growth through high levels of investments in research and development within their region. This results in highly skilled regional labour markets and flows of highly skilled employment from other leading regions. Regions with strong innovation capabilities have grown institutional arrangements, where universities, firms and public sector institutions contribute jointly to global market success. Here, "successful invention, innovation and diffusion of new technologies require the co-evolution of relevant institutions. (….) At the same time, the rigidity of the pre-existing formal institutional arrangements impacts on whether agents can stimulate their co-evolution with the introduction of new technologies" (Chlebn et al., 2018). These research and development inputs enable and enhance the fundamental principles of research and innovation strategies for Smart Specialization strategy (S3), including entrepreneurial processes of discovery (EDP). While many regions in different European countries have chosen S3 priorities in related domains, these priorities range significantly in terms of levels of innovation, value creation and research and development investments. By helping regions connect their innovation eco-system with other regions' innovation eco-system, the thematic Smart Specialisation partnerships have set in motion a new transnational and interregional entrepreneurial discovery through a process of multi-level co-creation of transnational networks.

The bottom up component in this process has resulted in a wide variety of thematic Smart Specialisation partnerships, driven by a broad range of actors and supported by numerous stakeholders. These emerging networks include diverse regions in terms of innovation ecosystems, nevertheless connected through a shared S3 priority area, in which they wish to realise joint investment projects.

Based on the ongoing experiences as well as existing literature, the paper suggests a conceptual approach, which demonstrates how the thematic S3 methodology of linking interregional innovation eco-systems is expected to enable new entrepreneurial discovery processes (EDP), as well as long term impacts driving institutional change and improving regional innovation capabilities. Combining spatial / geographic proximity inside regions with complimentary forms of trans-national proximity, such as cognitive, temporal, and organizational proximity, the process enables transnational synergies across different regions with related knowledge domains. These synergies may create knowledge complexity, new knowledge combinations, which open up for new locus of innovation, where different forms of proximity are combined in different phases of the entrepreneurial discovery process. Stakeholder analysis provides insight into the motivating factors and tensions that stakeholders with different resources and scope of action bring to interregional collaborative actions, possibly resulting in new, emerging European clusters, whilst cluster emergence having the power to remove institutional barriers of innovation resulting in improved place-based innovation capabilities of regions.

2 Thematic Smart Specialisation approach as an outcome of policy learning

In his 2003 review of the existing literature on innovation and innovation systems, Jan Fagerberg concludes that:

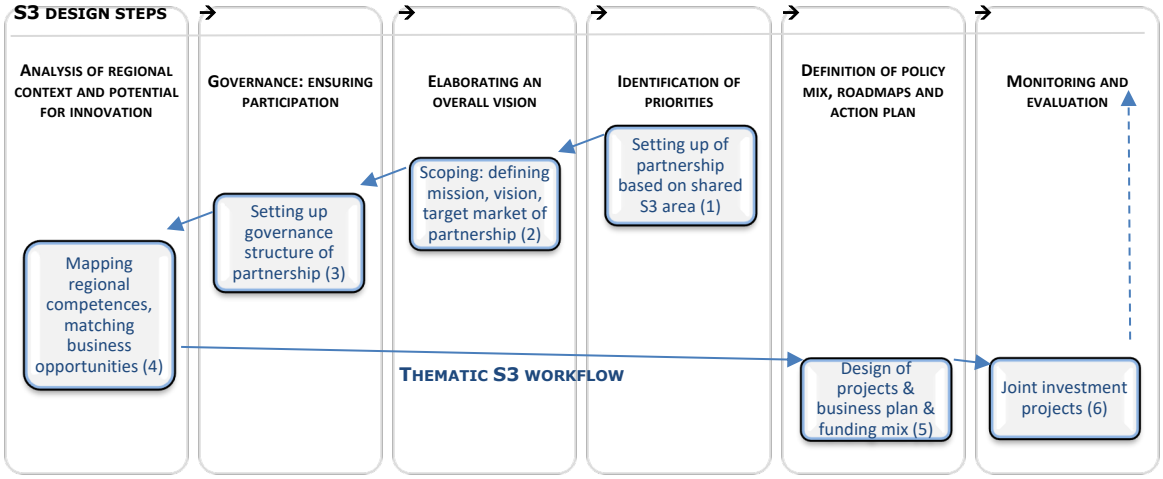
> *One problem making it difficult to improve our understanding is that innovation has been studied by different communities of researchers with different backgrounds. The failure of these communities to communicate more effectively with one another has impeded progress in this field. One consequence of these communication difficulties has been a certain degree of "fuzziness" with respect to basic concepts. This can only by improved by bringing these different communities together in a constructive dialogue (Fagerberg, 2003).*

Innovation is a complex phenomenon that is often studied through diverse conceptual optics. The 'fuzziness' concept referred to by Fagerberg presents a challenge to regional policy-makers. Policy design and implementation in the field of research and innovation should be seen as an experimental process of learning; recognising the possibility that any policy that initially seemed to be adequate and straightforward may later turn out to be more challenging and complex than anticipated. Good policies need regular review and adjustment, requiring an ability to learn through experiences and to adjust policies in more appropriate directions. The thematic approach to S3 can be considered as an effort to reinforce place based S3 strategies through new synergies across borders.

The concept of entrepreneurial discovery process (EDP) refers to an exploratory process, where an initial discovery of new business opportunities is expected to bring about new economic opportunities and become self-reinforcing. Each such discovery could have its followers and shape new value chains, which may also result in a new cluster or may revitalise existing ones. To analyse the dynamics of the EDP process, one could benefit from a concept that would build on real-life networks of innovation instead of one network's institutionalised borders. Such a concept would also need to consider consequential and continuous relations between universities, regional institutions and the economy. In this respect, the concept and experience of the – linked - innovation eco-systems of thematic S3 partnerships offer a good fit.

Starting in 2015, the European Commission launched three thematic Smart Specialisation platforms (TSSP) to support interregional collaborations and activities in strategic areas linked to Agri-food, Energy and Industrial modernisation (Commission Communication, 2012, 2014, 2017). Regions involved are working together in the so-called thematic S3 partnerships in a number of strategic areas of investment defined in their regional and national S3 strategies. The aim of these interregional collaborations is multi-fold. While representing joint transnational network of knowledge, regional stakeholders work together to develop and enhance European value chains in specific areas linked to their S3 priority areas. The areas in which they collaborate aim to exploit complementing research and innovation capabilities, while building up necessary capacities and overcoming interregional fragmentation and lack of critical mass across the EU. Furthermore, their work is expected to improve the existing business environment by identifying barriers to innovation, new investments or skills. Consequently, the thematic S3 partnerships connect regional knowledge spaces with the aim to realise joint investment projects. The reinforcement of S3 strategies occur throughout the work performed by the thematic S3 partnerships, depicted on Figure 1.

Figure 1 Feedback link of thematic S3 activity to the monitoring and evaluation of Smart specialisation strategies

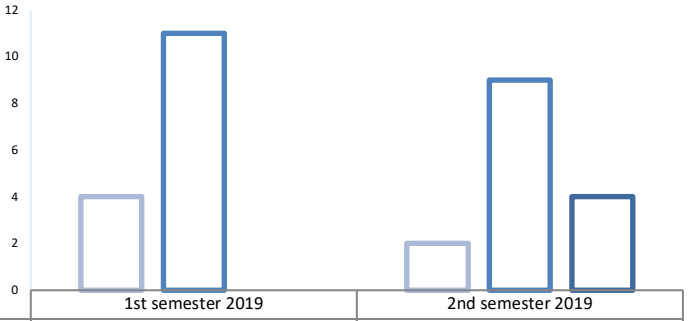


Source: Mariussen, Hegyi and Rakhmatullin, 2019

The workflow of thematic S3 partnerships are presented under each related S3 design step (horizontal upper line) on Figure 1. After having defined their mission and vision in their respective S3 priority area (indicated with 2), thematic S3 partnerships set up their governance structure involving regions with similar S3 area (indicated with 3), then they map stakeholders with relevant competences (indicated with 4), which activity strongly supports the EDP process within each region's S3 process. Moreover, the whole process and its results are to be followed and evaluated in a way that it feeds back to the overall monitoring and evaluation of S3 strategies (dashed arrow). Thus, such investment projects can serve as a validation, verification, assessment and evaluation of the policy logic and associated decisions related to specific S3 areas and strategic areas of investments (Hegyi and Rakhmatullin, 2020). The advancement of partnerships is being assessed bi-annually by the evaluation framework defined with the objective to integrate the results of the thematic S3 activity into the monitoring and evaluation of S3 strategies. Therefore, throughout the thematic S3 process, thematic S3 partnerships provide a framework that enable to improve new and better-connected innovation ecologies, while the thematic S3 platforms offer a structure to monitor and assess the progress of the thematic S3 approach and to maximise the benefits of learning from peers. For this purpose, an evaluation framework has been developed to monitor and evaluate the progress in a way that it feeds back into the overall monitoring and evaluation framework of S3 strategies, as shown on Figure 1 that is presenting the correlation between the S3 and the thematic approach (ibid). The workflow process is designed in a way that it provides a structure within which participating regions and stakeholders are able re-visit their decisions that allows a regular assessment of advancement and effectiveness of their collaboration.

Figure 2 depicts that out of the 19 assessed partnerships, throughout the two reporting period of 2019 (first and second semester of 2019), there have been four and two partnerships (respectively) that have started implementing the feedback process to the S3 implementation, while 11 and 9 partnerships have been in the progress of setting up the feedback mechanism. By the second semester of /2019, four partnerships have completed the phase.

Figure 2 Feedback of thematic S3 partnership results into the monitoring and evaluation of S3 strategies



	1st semester 2019	2nd semester 2019
Currently planned	4	2
In progress	11	9
Completed (& regularly monitored)	0	4

Source: Monitoring reports of Thematic S3 partnerships, June and December, 2019

As of 2020, over 30 partnerships have been working under the thematic S3 platforms on Agri-food, Energy and Industrial modernisation along the workflow defined to create these synergies among interregional investments. The high number of partnerships verifies the existence of the thematic S3 approach and signals the will and need of regions working together to align innovation roadmaps across European policies and territories.

3 Conceptual framework for synergies between place-based development and transnational networks

The relation between place-based learning and global networks is referred to as synergies between 'global pipelines' and 'local buzz':

> *A distinction is made between, on the one hand, the learning processes taking place among actors embedded in a community by just being there - dubbed buzz - and, on the other, the knowledge attained by investing in building channels of communication - called pipelines - to selected providers located outside the local milieu. It is argued that the co-existence of high levels of buzz and many pipelines may provide firms located in outward looking and lively clusters with a string of particular advantages not available to outsiders* (Bathelt et. al, 2004).

More recently, concepts such as "open regions" are used as a way to understand this synergy. "Open region" is a heuristic way of thinking about proactive policy measures for redesigning the dialectic interplay between territorial openness and closure (Schmidt et al, pp. 187). Furthermore, opening up and connecting the regional innovation ecosystem to European knowledge networks and systems of innovation has been identified as the second challenges as regards to smart vertical regional strategies, following the first challenge of improvement of internal regional connectivity between industrial and knowledge provision strengths (Mariussen et al, 2016). The same publication identifies the creation of economic growth through cross-broader innovation as the third challenge that enables new entrepreneurial discovery processes. The three identified challenges are presented in Table 1.

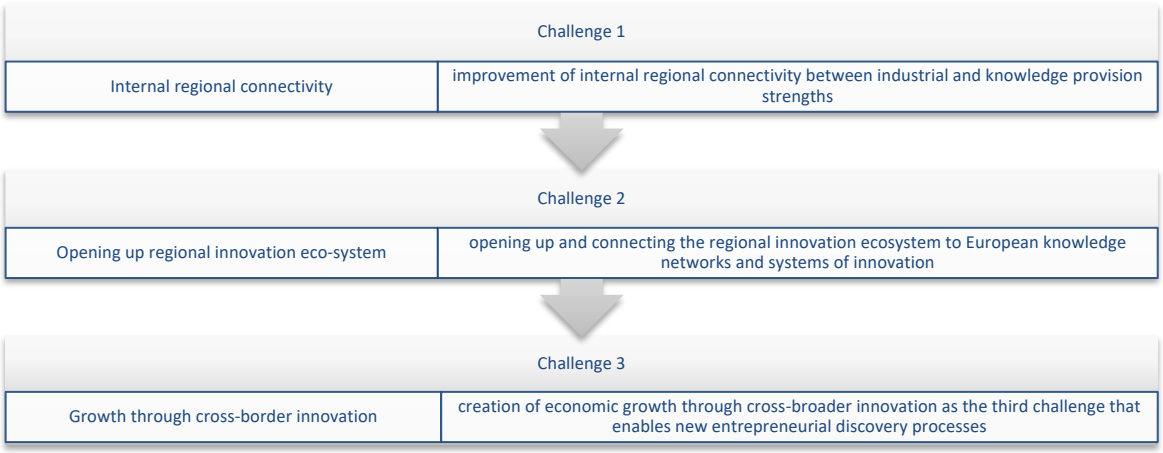


Table 1 Challenges of transnational collaboration

Source: Mariussen et al, 2016

According to this literature, the scope for policy action in making this balance to enable opportunities for innovation; one that cannot be fully planned, directly controlled or harnessed by policy makers. 'What policy makers can do, however, is to shape opportunities for innovation within their sphere of influence' (Schmidt et al., pp. 193), an indispensable phenomenon of opening up of participating regions within the thematic S3 partnerships.

3.1 Distance and proximity

The motivation to overcome distance and go outside the region is influenced by structural and institutional factors. Rutten summarises this in the following way:

> Distance is more accurately expressed in terms of the effort required to bridge it, which explains why knowledge creation between (international) transport hubs is fairly uncomplicated. (...) Knowledge creation is related to preference and personal choice: individuals, who have developed a bond are more likely to bridge distance. (...) Dependency on and the spatial distribution of important contacts also affects individuals' willingness to bridge distance. (...) Geographical distance is thus more accurately seen as a dynamic trade-off between effort, preference and dependency (Rutten, 2019, pp. 1211-1232).

The preferences and dependencies, which encourage formation of transnational networks may be seen as combinations of different forms of proximity. Thematic platforms combine different forms of proximity in the following way as shown in Table 2. *Table 2 Typologies of proximities*

Typology of proximities		Thematic platforms
Spatial	Interaction within a place, such as "buzz" in a region	Smart regional development strategy
Temporary	Interaction in conferences, workshops, meetings, or other ways of connecting people from different places	Organize regular meetings and exchanges between regions, clusters and other stakeholders
Organizational	Interaction within an organization or an organized network which is located in several places.	Set up governance mechanisms for the partnerships, ensuring regular dialogue
Cognitive	Interaction between specialists, who share the same knowledge.	Learn and connect regions within a shared S3 theme towards the objective of realising joint investment projects

Table 2 Typologies of proximities

Source: own adaptation based on Boschma, 2005, pp. 61-74

As presented previously on Figure 1, the starting point of each thematic S3 partnership is the priority areas defined in the existing regional development strategies, which relates to spatial proximity. These developments strategies are the basis that allow regions to discover common interest along shared domains creating cognitive proximity.

3.1.1 Creating cognitive proximity along shared domains

The starting point of each S3 partnership is a shared S3 priority area. Regions or Member States participate in any S3 partnerships because they wish to synchronise interregional investments along specific S3 areas based on complementing competencies, expertise and skills within their regional innovation eco-systems. Thus, the joint work of interregional partnerships working under the S3 platforms are driven by the common interest of realising joint investment projects across borders. This requires an organisation set up

that is based on agreed methods and principles guided by a shared vision and mission of the partnership. The scoping phase (phase indicated with number 2 on Figure 1) of the workflow is focusing on discovering common domains and on defining a mission and a vision for the partnerships).

As an example, the main driver behind setting up the Photonics partnership is PhotonDelta, which is a Dutch public-private partnership responsible for developing a global end-to-end ecosystem in the field of photonics.[1] The partnership builds on an already existing powerful eco-system, meaning they possess a consistent and high quality commercial capability to offer and manufacture products and services with a clear international positioning and with a clear vision on the customer, market and value added. Behind the partnership, there is a strongly rooted knowledge base in universities and RTO-s aligned with industry demands and needs. The network on which the partnership is built is able to connect, attract new and relevant knowledge and has strong links to local, regional and national governments. The main idea behind setting up the partnership was to leverage the already existing knowledge base, to strengthen the position of the European photonics industry, to accelerate the development of research outcomes and to scale up to meet global industrial demands. The mission of the partnership is to focus on ecosystems, in which Europe can make a difference in the world and to combine the strengths of alike ecosystems in Europe to have even stronger strong supply chains (European Commission, 2018).

Partnerships come together based on this initial vision of mutual benefits of collaboration, improving utilisation of capacities and the possibility of spreading innovation throughout regional and national economies. Through interregional collaboration, regional eco-systems open up and simultaneously link with other innovation networks that are relevant and complementary. Building on the ambitions of the photonics partnership, the partnership operates along the vision to leverage complementary assets across the network that accelerates the deployment of Photonics bringing benefit to the European economic leadership in photonic technologies as well as of regional spill overs (ibid, 2018). This partnership aims to accelerate the time-to-market, uptake and deployment of photonics technologies by SMEs and corporates in view of addressing societal challenges.

Besides the definition of the vision and mission, the scoping phase should address opportunities and challenges arising from market opportunities and from the collaboration itself. It should elaborate on each participating regions' value added, competences, skills, key stakeholders in the field. The scoping phase should always lead to the identification of pilot areas for co-investment with identified leading and participating regions.

It is important to ensure that the scoping phase is continuously reviewed in order to verify whether certain policy decisions should be reviewed as a result of any changing market conditions. The scoping note should be a living document, thus its review contributes to aligning policy and technical instruments among partner regions and to improving the overall efficiency of the established governance structure.

The scoping phase is followed by the mapping phase (indicated with number 4 on Figure 1), which focuses on taking stock of any existing (or missing) competencies and capabilities in the selected domain, thus further deepening the cognitive proximity of the partnership. Mapping competences and capabilities allows participating regions to verify any tentative pilot areas defined during the scoping phase. During the mapping phase, partnerships are encouraged to perform regional capability analysis, connectivity analysis, global value chain analysis, analysis of economic scientific and research potential. Additionally, there is an emphasis of continuous involvement of stakeholders throughout the process. The mapping phase results in preliminary project ideas validated by partner regions followed by detailed mapping of stakeholders along the specific value chains defined (Rakhmatullin, Hegyi and Ciampi-Stankova, 2020)

During the mapping phase, regions learn about every partner region's assets and potential linking of assets located elsewhere. For example, in case of the High-performance production through 3D printing partnership, the mapping exercise has resulted in a dataset mapping competencies of over 1,300 actors including 900 companies.[2] This partnership collected further data on the existing training gaps across partner regions which allowed the partnership to start developing a joint training course.

1 For more information, please visit partnership page: https://s3platform.jrc.ec.europa.eu/photonics
2 For more information, the partnership page can be found here: https://s3platform.jrc.ec.europa.eu/high-performance-production-through-3d-printing

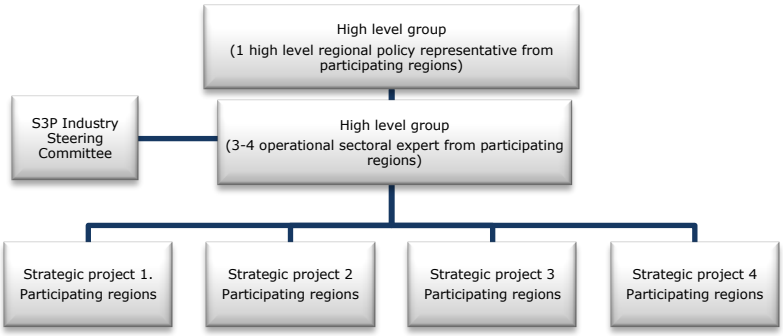
3.1.2 Diverse forms of governance structure creating organisational proximities

Once partnerships have been set up, they follow a structured process defined by the workflow (presented on Figure 1) defined to guide the partnerships towards bankable projects. This process requires a tailor-made governance structure that facilitates the advancement of the partnerships. Each partnership agrees on its own structure that reflects the regional, national and transnational context. The governance structure needs a process that involves a broad range of actors and a sound monitoring and evaluation framework. The power is shared among actors, as partnerships are led by one or several regions, while the pilot areas / sub themes also have their own governance structure with their assigned leaders. Thematic S3 partnerships agree on setting up diverse form of governance structures. Some of them have permanent leads, some have rotating leadership, some form legal entities, some have cooperation agreement and others – as the previous example shows – build on existing consortia or network. One aspect they share is that they connect regional eco-systems of innovation in their respective fields.

As an example of a governance structure, the textile innovation partnership builds on a strong sectoral, trans-regional initiative involving a wide range of stakeholders supporting regional authorities and stakeholders across Europe.[3] The agreed governance structure allows formal commitment from regional governments to become part of the process as active partners or observers. Each active partner region can delegate one high level regional policy representative to the high-level group, which is responsible for the strategic direction and political backing of the initiative and approves the operational action plans and strategic projects. The support group has various functions ranging from mapping stakeholders to preparing actions plans and is made up of three to four operational sectoral experts from all active, participant and observer regions. As of January 2020, the partnership has 14 participating regions and is led by two regions, thus is connecting the innovation eco-systems of 16 regions with specialisation in textile innovation across Europe.

Figure 3 provides an overview of the governance structure of the textile innovation partnership enabling the organisational proximity of the partnership (described in Table 2).

Figure 3 Governance structure of textile innovation partnership



Source: Mariussen, Hegyi and Rakhmatullin, 2019

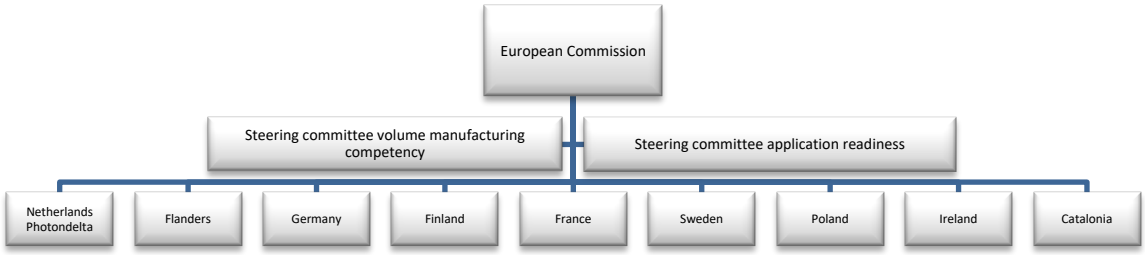
Strategic projects are inspired by regional, national and European sectoral strategies and are defined by sectoral experts led by regions. This structure allows for a continuous engagement and dialogue between stakeholders.

Other partnerships have more flat governance structures, like the Photonics partnership.[4] The governance structure of the photonics partnership is composed of two steering committees made up of partners

3 For more information, the partnership page can be found here: https://s3platform.jrc.ec.europa.eu/textile-innovation
4 For more information, please visit partnership page: https://s3platform.jrc.ec.europa.eu/photonics

proposed by the partnership's participating member states. The governance structure of the Photonics partnership is presented on Figure 4.

Figure 4 Governance structure of the photonics partnership



Source: Mariussen, Hegyi and Rakhmatullin, 2019

The two committees are steering the network and their projects. As of January 2020, the partnership is led by one region and connects the innovation eco-system of other 16 regions with relevant competences in the field of photonics. Temporary proximities are created by the regular interaction between stakeholders of the thematic S3 partnerships.

3.1.3 Temporary proximity by regular exchanges at diverse levels

Under the thematic S3 platform for Industrial Modernisation, lead regions and/or their institutions together with European Commission directorates form the platform's steering committee. The steering committee serves as a forum that meets every six months to assess each partnership's progress, discusses any ongoing and new challenges, explores solutions to these challenges and provides strategic guidance on strategic issues such as synergies with various EU funding programs, regulatory obstacles for investment, and skills.

At partnership level, each partnership meets regularly, following the decisions taken by their governing structures. Depending on the purpose of the meeting, they can be regular meetings at partnership level, matchmaking events for stakeholders of the partnerships, stakeholder events focusing on mapping of actors, expert meetings, etc. Matchmaking events happen after the mapping phase has been completed (phase number 4 on Figure 1).

Consequently, building on the results collected throughout the mapping phase, this phase is focusing on matching of business opportunities, which allows to identify complementary innovation activities along which the investment projects can be defined. This step also involves the mobilisation of the industry. Consequently, thematic S3 partnerships may be perceived as combinations of different forms of proximity that lead to access – among others - new knowledge presented in the following section.

3.2 Knowledge complexities

In the process of entrepreneurial discovery, knowledge has to be translated through different stages from search, through problem solving to industrial upscaling. Different forms of knowledge; tacit, codified, industrial engineering and science-based knowledge have to be combined, which is often based on trial and error and on dialogues involving actors, who decide to share trust and cooperate for sustained periods of time. Within a region, a combination of several sources of knowledge can enhance the innovation capacity of place-based development strategies, referred to among the challenges highlighted in Table 1. In successful regions, this creates a *'local buzz'* characterised by '*living knowledge'* as described in the section on Conceptual framework for synergies between place-based development and transnational networks.

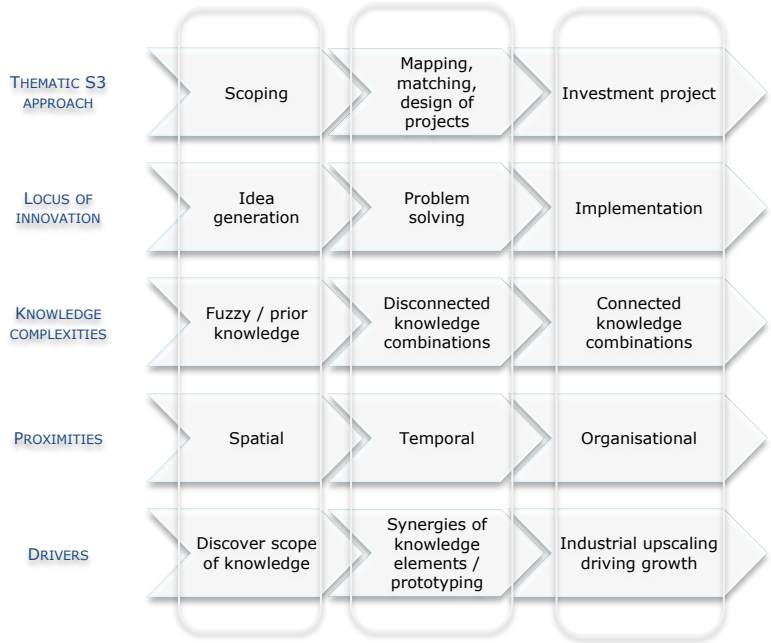
'Living knowledge' means knowledge used in practice that is shared and communicated. It can be seen as an eco-system, where entrepreneurial discoveries of new (business) opportunities may emerge. Knowledge and innovation (and biological) eco-systems share some of the same properties that can be explained by complexity theory (Byrne and Callaghan, 2014, pp. 17-38).

Complex systems, such as entrepreneurial ecosystems are able to create something new by increasing the system scale. To be able to mobilise more stakeholders, dynamic ecosystems should be open without rigid borders. Openness is an essential feature of complex systems. By opening the borders between the knowledge domains of European regions, the thematic S3 partnerships increase knowledge complexity by involving different stakeholders. The advantages of complex knowledge domains, as compared to more simple, non-complex structures may be illustrated with the discussion of the advantages of scale (critical mass) and scope in corporate organizations. It is well known that large companies with a wide variety of knowledge domains have an ability to diversify and adapt to changes better than small, narrowly specialized companies.

3.2.1 The locus of innovation

Transnational innovation processes differentiated along spatial proximity constitute the buzz of place-based innovation, while temporal proximity organized across distances and organizational proximity lead to learning process inside organizations located in different regions (Tanner, 2018). Besides these three forms of proximities, knowledge complexities play different roles in the workflow phases of the thematic S3 partnerships. Figure 5 depicts the connection between the concepts of locus of innovation, proximities and the thematic S3 approach. Idea generation happens during the scoping and mapping phase (phases 2 and 4 on Figure 1), when regions define the mission, the vision and the target market of their collaboration, representing fuzzy prior knowledge and reliance on spatial proximities. Problem solving happens during the mapping and matching phase (phases 4 on Figure 1), when regions identify stakeholders with relevant competences and they bring them together in order to design joint investment projects, reflecting combinations of disconnected knowledge and embodied in temporal proximities. Implementation occurs during realising the joint investment project resulting from connected knowledge combinations.

Figure 5 Connection among phases of locus of innovation, proximities and the thematic S3 approach



Source: own compilation, based on Tanner 2018

In each phase different combinations of proximity becomes important, also reflecting the prominence of diverse stakeholders. Leading partners search for and map relevant forms of knowledge of specific stakeholders, therefore, it is essential to introduce the typology of the stakeholders into the analysis.

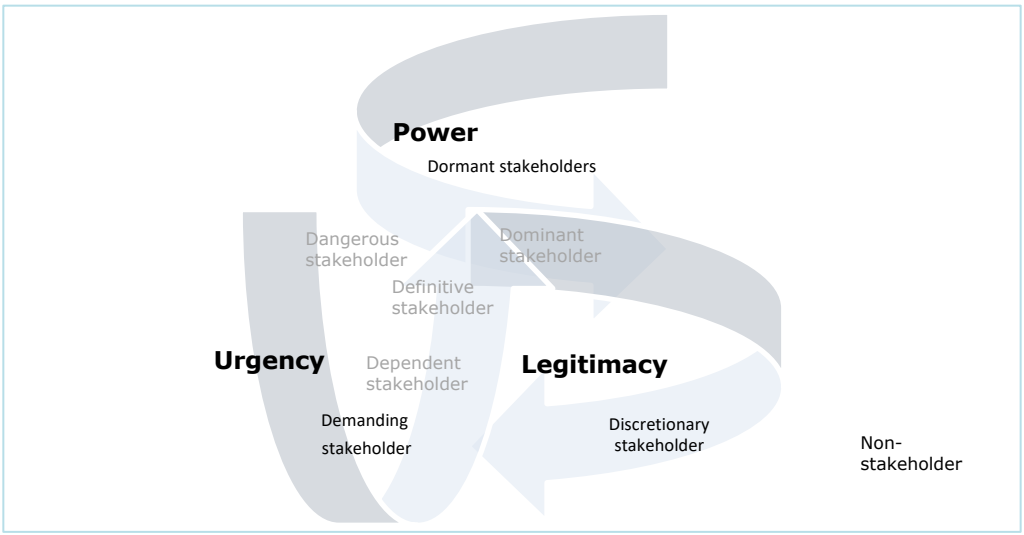
3.3 Stakeholder analysis

The theory of stakeholder involvement was originally developed from the perspective of a firm. The point of departure is that firms should consider their stakeholders as important as its strategy or salience (Mitchell et al, 1997, pp. 853-86). The potential role of stakeholders in developing thematic S3 partnerships may be viewed along the following dimensions:

- **Stakeholders with the power to influence the development of the value chain.** *Power* is a relationship among social actors, in which social actor A can get another actor B to do something that B would not have otherwise done. Powerful stakeholders may be companies or institutions which control money, knowledge, rules, decisions, or other crucial resources.
- **Stakeholders with the control over legitimacy**. *Legitimacy* is "a generalised perception that the actions of an entity are desirable, proper, or appropriate within the socially constructed system of norms, values, beliefs and definitions" (Mitchell et al, 1997, pp. 866). For example, successful industries may have high legitimacy, because they provide growth and employment.
- **Stakeholders feeling urgency.** *Urgency* is the stakeholder's claim on the thematic network and its innovation processes. Urgency calls for immediate attention or action. For instance, the dynamics of a value chain may be challenged by the need to enhance productivity through search for optimal allocation of resources. This urgency is creating a power game between powerful and less powerful and dependent actors.

Actors in different positions in the value chain may be exploring new opportunities or innovations that can satisfy the definitive stakeholders. This can be done through collaboration and exploration for new common opportunities. Through exploration, actors may grow unique forms of knowledge and create domains that are more competitive together. They may be able to grow more powerful and diversify their markets. These three main dimensions make it possible to define seven types of stakeholders as shown on Figure 6, which typology helps us to classify stakeholders as latent, expectant.

Figure 6 Stakeholder analysis classification model



Source: Mitchell, R.K. et al, 1997

The dormant, discretionary and demanding stakeholders are latent stakeholders with low salience. Dominant, dangerous and dependent stakeholders are expectant stakeholders representing two attributes according to the classification and might show a high level of engagement. Definite stakeholders are the ones with all three attributes, representing high salience, therefore there is an immediate priority of

involving them (Mitchell et al, 2007). Definitive stakeholders are the initiators and leaders of the thematic S3 partnerships, consists of different institutions, such as regional authorities, universities, or clusters. The composition of stakeholders, their engagement and their agility vary considerably. According to Morgan, barriers to interregional collaboration lead to lack of access to knowledge, lack of political support and / or lack of synergies between policy sectors (Morgan, 2018).

Thematic S3 partnerships have dissimilar scope of time. Regions, universities, large companies and venture capital investors may have long-term strategies, whereas small firms may be looking for fast profits. These differences create different forms of urgency and motivation for stakeholders to participate. There are partnerships that aim to take the lead in developing new European value chains, such as the thematic S3 partnerships on Photonics and 3D printing. These partnerships consist of leading stakeholders with specific competences in the area and they are only open to new members with proved competences in specific pilot activities of the partnership. In such cases, competitors are seen as potentially dangerous stakeholders. The semi-openness of the partnership facilitates the development of knowledge commons through efficient systems and governance structure for knowledge sharing. For firms and regions, which are at the core of these partnerships, a strong motivating factor of participation is to maintain the leading position in an emerging value chain and experience growth in the upscaling phase. For other regions, the idea of investing in other regions is seen as a non-desirable strategy that can lead to dangerous competition.

Horizontal platforms are providing knowledge commons and are complementing existing value chains with new components, such as the thematic S3 partnership on Sport. On the basis of open innovation and knowledge sharing, participants of such thematic S3 partnerships are collaborating along common emerging themes / challenges, such as security or digitalization. Some of these partnerships have universities as definitive stakeholders. A special example of the European Spallation Source (ESS), which is a centralised horizontal platform representing a shared laboratory with many regional clusters as partners. The joint investment in ESS offers access to unique technologies, which may be used in product development, innovation and growth in the region at home (Mariussen, Hegyi and Rakhmatullin, 2019).

The definitive stakeholders are likely to be aligned with expectant stakeholders, who are more or less passive partners that may consider joining. These stakeholders are oriented towards dominant stakeholders providing power. They are also closely aligned with stakeholders providing financial support, knowledge and legitimacy. These dominant stakeholders may be public sector investors (regions, member states or the European Commission) as well as “sleeping giants”, like large corporate actors and financial investors, who monitor the developments and are likely to start to buy into the project at a later stage, when the pilot seems to succeed. Dependent stakeholders may rely on powerful driving actors. They may be easy to replace, because the knowledge they apply is easy to access. Networks in value chains characterized by many dependent actors are likely to be centralized with a strong actor in the centre. Dependent actors have a short-term planning horizon, at the same time, they are likely to compete to obtain favourable positions.

Public authorities at different levels may be discretionary, thus they may or may not get involved, and they may choose to be neutral and follow general rules. Discretionary public authorities may apply rules, regulations and other policies that can foster or hinder progress. Table 3 summarizes the relation between definitive, expectant and latent stakeholders across different levels and helices (public sector institutions, firms, clusters, universities, laboratories) within the thematic S3 approach.

Types of stakeholders	Definitive stakeholders	Expectant stakeholders	Latent stakeholders
Supra-national level	Building new, stronger and more sustainable European value chains	Sector / policy instrument coordination	USA / China as competitor
Regional / national level	Leaders of partnership setting directions for the partnership	Possible participants expecting growth through network and knowledge of partnership	Non-participating regions avoiding investments favoring other / competing regions
RTO-s, academia	Building joint laboratory, research and human resource capacities, achieving leading role	Connecting, becoming part of a broader network	Potential role in dissemination
Firms, clusters	Technology leaders teaming up to maintain leading position and to create new value chains and clusters	Possible access to existing technologies / knowledge / value chains	Capacity for industrial upscaling / knowledge diffusion to competitors

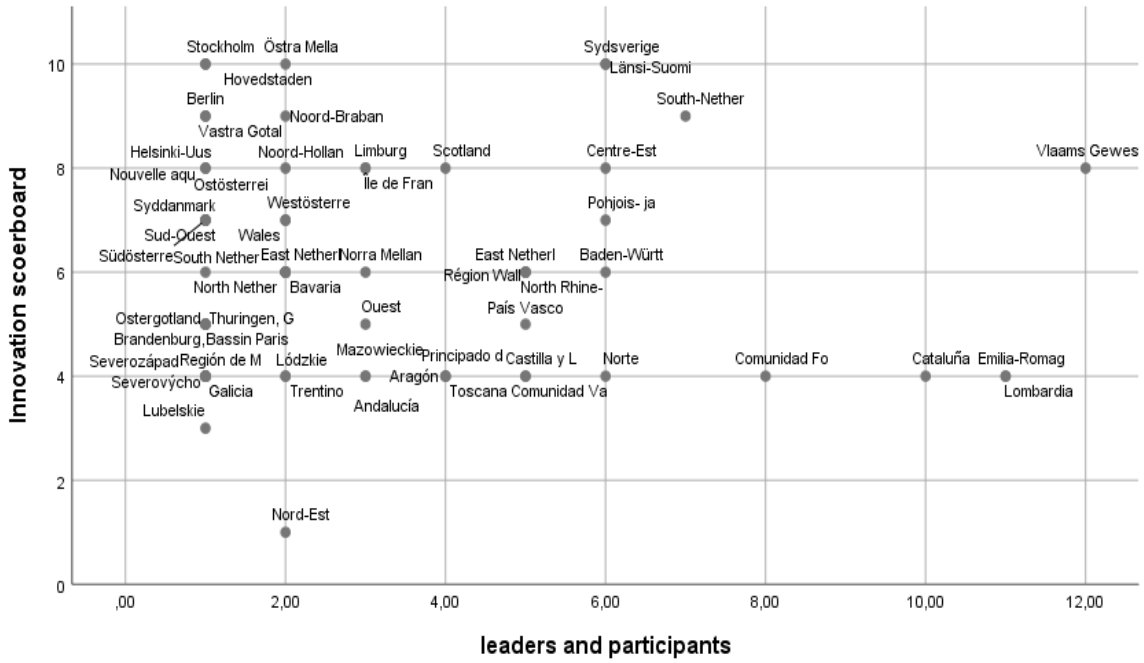
Table 3 Thematic S3 partnerships' stakeholder analysis

There are differences of dynamics and motivation between levels and helices. Firms in emerging technological clusters, such as 3D printing, aim to harvest first movers' advantages; feeling competitive pressure from potential copycats. Accordingly, there is a restricted interest in expanding the network. Similarly, regions may be reluctant to invest in other regions (like the joint investment in ESS) suspecting other regions to be able to profit from the growth opportunities.

The same considerations do not seem to be shared by the laboratories and universities who are involved in the process. For universities, knowledge diffusion may be seen as a source of expansion of networks, access to new resources, and deepening of their own knowledge base and infrastructure. Universities may think in longer term strategies, embracing an infinite mindset (Sinek, 2019). Correspondingly, motivations of regions differ depending on their level of innovativeness. For example, moderate innovator regions may be more motivated to actively participate in cross-border collaboration to get access to existing technologies and knowledge, which may be exploited in a shorter-term perspective. Figure 7 shows the distribution of leading and participating regions of the thematic S3 partnerships along their level of innovativeness based on the European Innovation Scoreboard.

On Figure 7, the dimension of leaders and participants assigns regions 1 point for each thematic S3 partnership membership, and 2 point for each thematic S3 partnership leader position. The Innovation Scoreboard ranking goes from 1 (moderate innovator) to 10 (innovation leader). The figure illustrates that several medium innovator regions in southern Europe are actively participating under the thematic S3 platforms.

Figure 7 Participating regions in the thematic S3 partnership along the European Innovation Scoreboard



Source: Own compilation based on thematic S3 partnership participation as of November 2018 and European Innovation Scoreboard data 2017

The European Commission has a perspective to build new European value chains and clusters, and to close the gap between innovation leaders and followers. Here, the competitive forces are the United States and China, which may or may not be able to get access to European research and take advantage of growth possibilities of industrial upscaling. In this respect, the European Commission is applying a long-term perspective in order to overcome market failures, critical mass or parallel investments across regional borders through its S3 strategy, which furthermore enables growth and regional convergence between innovation leaders and lagging regions. The thematic S3 platforms provide a sound framework to work towards these objectives along the thematic S3 partnerships.

3.3.1 Building clusters and transforming regions

S3 strategy design and implementation through entrepreneurial discovery processes may be seen as coordinated attempts to discover and unleash the potential for new network formation (Virkkala et al, 2018). In a region with a restricted knowledge base, new path creation may rely upon related variety and on a certain level of knowledge complexity (Forey et al, 2012, Frenken, Van Oort, & Verburg, 2007, Hidalgo et al, 2007; Neffke, Henning, & Boschma, 2011, Hidalgo & Hausmann, 2009). Thematic transnational partnerships can be considered as stages in the direction of strengthening and creating related and / or more complex knowledge domains, which might trigger the growth of new clusters.

The process or cluster emergence through the thematic S3 partnerships is depicted on Figure 8, aligned with the workflow steps of the thematic S3 process presented on Figure 1.

Figure 8: Cluster emergence through the thematic S3 process

Source: based on Mariussen, Hegyi and Rakhmatullin, 2019

3.3.2 A good practice from Ostrobothnia's energy technology clusters

The region of Ostrobothnia in Finland illustrates, how a region can find a good mix of the 'global pipelines' and 'local buzz' described in section 3 on the conceptual framework for synergies between place-based development and transnational networks. The S3 strategy of Ostrobothnia is focusing on growth based on its core strengths in energy and maritime technology, combined with systematic measurements of gaps between the three core components of entrepreneurial discovery processes: regional institutions, universities and firms (Virkkala et al., 2016). A total of 32 leading firms[5] in the energy technology clusters have indicated the importance of their innovation partners to them at regional, national and international level, as well as across the three helices: firms, universities and institutions.[6] A factor analysis of this survey has indicated that there are two main types of transnational and interregional innovation eco-

5 In a wider definition, the energy technology cluster includes 140 firms.
6 The survey was conducted as part of the LARS Baltic Sea Interreg project https://projects.interreg-baltic.eu/projects/lars-93.html

systems. The first one is the science-based innovation eco-system, in which some firms (both leading, large scale global actors and some small and medium-sized firms) indicate that regional, national and international universities are the most important innovation actors[7]. The other type is the economic innovation ecosystem, in which firms have more clearly defined networks with regional, national and international firms[8]. A principal component factor analysis generated two factors, which explain 66% of the variation, as shown in Table 1.

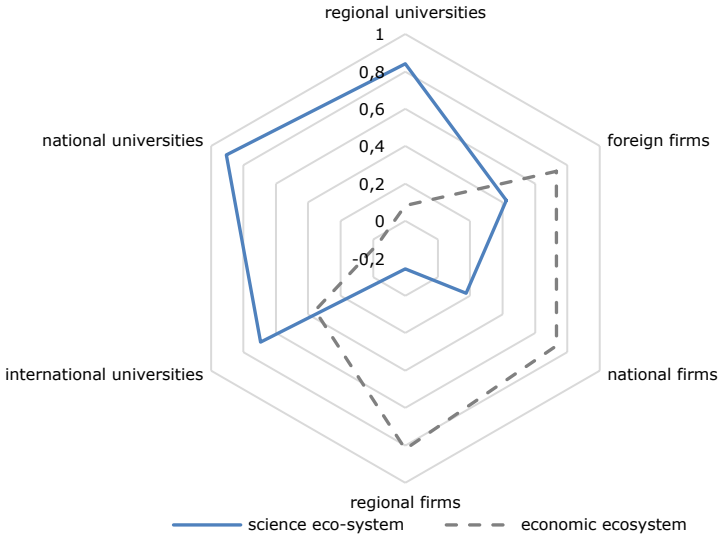
	Initial values			Extraction Sums of Squared Loadings		
Component	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
Economic eco-system	4,396	48,846	48,846	4,396	48,846	48,846
Scientific eco-system	1,546	17,178	66,024	1,546	17,178	66,024
3	,993	11,033	77,057			
4	,683	7,589	84,646			
5	,438	4,864	89,510			
6	,420	4,665	94,175			
7	,240	2,668	96,843			
8	,177	1,972	98,815			
9	,107	1,185	100,000			

Table 4 Total variance explained in case of Ostrobothnia energy technology cluster
Source: Own compilation, based on data from the LARS Interreg Baltic Sea project[9]

The extraction method used for this calculation is principal component analysis.

Figure 9 below indicates this differentiation of innovation strategies in the Vaasa energy cluster created by these two factors, providing an overview of the results collected from the 32 local firms in the energy cluster.

Figure 9 Factor scores on science eco-system and economic eco-system indicators in the Vasa energy cluster

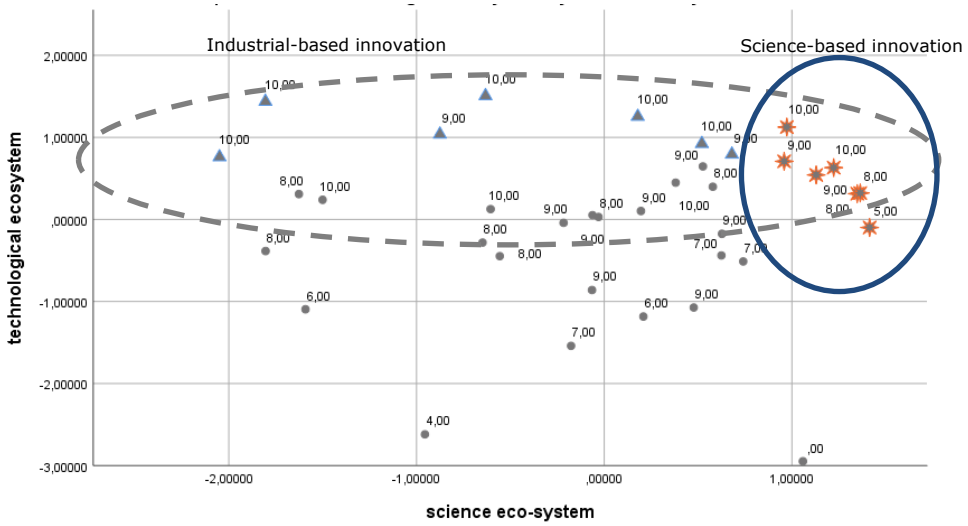


Source: own compilation, based on data from the Lars Interreg Baltic Sea project 2018

7 This corresponds to the concept "analytic knowledge base".
8 This corresponds to the concept "synthetic knowledge base"
9 https://projects.interreg-baltic.eu/projects/lars-93.html

Within the science innovation ecosystem, firms are more oriented to cooperate with regional, national and international universities. In the economic innovation ecosystem, the main focus is on foreign, national and regional firms as innovation partners. There is a certain overlap between the two ecosystems, which is illustrated on Figure 10 presenting the innovation ecology indicators of firms.

Figure 10 Scatter plot of firms in science and economic ecosystems in the Vasa energy cluster



Source: own compilation, based on data from the Lars Interreg Baltic Sea project 2019

The scores in the graph above indicate the significance of regional firms as innovation partners. There seems to be two sub-systems: one focusing on science-based innovation and the other one focusing on industrial innovation. Some firms have high scores either on the science or on the economy indicators. The sub-systems are partly overlapping, as some firms have a high score on both indicators. Both subsystems are also well connected regionally.

The Vaasa energy cluster has firms with a combination of economic and scientific innovation ecosystems that provide interaction between regional networks, corresponding to situation described, where “global pipelines” (challenge number 1 in Table 1) provide food for “local buzz” (challenge number 3 in Table 1). In this context, cooperation includes firms and universities regionally, nationally and at a trans-national level. This form of cooperation allows advanced regions to grow complex innovation ecosystems that are dynamic and resulting in continuous entrepreneurial discoveries and competitive innovation strategies.

3.4 Conclusion: questions for evaluation and research

This paper looked at how transnational cooperation may strengthen regional place-based development strategies and improve regional innovation capabilities. By analysing the methodology of the thematic S3 approach, combining spatial proximity inside regions with complimentary forms of trans-national proximity, such as cognitive, temporal, and organizational, regional strategies enable transnational synergies across different regions with related knowledge domains. The paper suggests how these synergies may provide new entrepreneurial discovery processes, where different forms of proximity (geographic, temporal, organizational and cognitive) are combined in different phases of the entrepreneurial discovery process (scoping, mapping, matching), and how each phase includes mobilisation of stakeholders. The process leads to a strengthened and more dynamic knowledge base of the regional innovation eco-system leading to new competitive advantages within regions and to an improved positioning of regional actors in global value chains.

Accordingly, through regions aligning their innovation agendas across regions and borders, regions can combine complementary strengths in research and innovation, which can exploit research and innovation competencies and may acquire necessary research capacities while overcoming lack of critical mass and fragmentation. Furthermore, learning via the institutionalised network of knowledge and expertise, aka via the thematic S3 partnerships can help regions overcome challenges of transnational collaboration. Innovative process have been showing a shift from in-house policy development to networked learning efforts involving peers, to which thematic S3 partnerships offer a structured framework (Hegyi and Rakhmatullin, *2020*). Through the identification of specific issues, where thematic S3 partnerships encounter challenges, peer learning can boost advancement, which then contributes to enhanced eco-system dynamics at regional-, partnership-, and at platform levels too. Supported by literature on network analysis, networks provide access to information, resources and markets that offer gains in terms of learning, effectiveness, innovation, legitimacy or internationalisation (Human and Provan, 2000; Provan and Sydow, 2008; Porter and Powell, 2006). The framework used to monitor progress of thematic S3 partnerships offers an instrument that enables thematic S3 partnerships to capture these dynamics (Hegyi and Rakhmatullin, 2020).

The stakeholder analysis helps to understand the motivating factors of diverse stakeholders bring to the table, and how synergies may be found through multi-level governance strategies. Likewise, it shows how mobilising stakeholders with different perspectives and timescales can be enhanced, including the role of European innovation ecosystems and value chains. The paper argues that the thematic S3 approach might create new and emerging European clusters; cluster emergence having the power to remove institutional barriers of innovation and improve place-based innovation capabilities of regions.

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