The potential of Smart Specialisation for enhancing innovation and resilience in Nordic regions

Preliminary report: Policy and literature review

Discussion paper prepared for Nordic thematic group for innovative and resilient regions

Version 2018/01/30

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Forewords

Nordregio, on behalf of the *Nordic thematic group for innovative and resilient regions 2017-2020*, under the *Nordic Council of Ministers' Committee of Civil Servants for Regional Affairs*, is undertaking an in-depth study: *The potential of Smart Specialisation for enhancing innovation and resilience in Nordic regions*. The in-depth study explores the concept of smart specialisation in the Nordic context. This discussion paper reports on the preliminary phase of the project: Policy and literature review.

The report is designed to provide a foundation for the remainder of the in-depth study which will include regional case studies in all Nordic countries to be conducted in 2018.

This discussion paper has been made publicly available with the aim of encouraging engagement with Nordregio's research while it is still in progress. As such, the findings presented here are preliminary and should be treated as such by the reader. Nordregio welcomes constructive feedback on the paper and hopes that this open process will ultimately contribute to a better result. The final report on the project will be available in late 2018 at www.nordregio.se.

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More information on the Nordic thematic group for innovative and resilient regions 2017-2020: http://www.nordregio.se/en/Metameny/About-Nordregio/Nordic-thematic-groups/Innovative-and-resilient-regions/

Overview of the discussion paper

Smart specialisation is an innovative approach that aims to boost growth and employment in Europe, by enabling regions to identify and develop its own competitive advantages. Through its collaborative and bottom-up approach, smart specialisation aims to facilitate the implementation of long-term growth strategies supported by EU funds.

Smart Specialisation (S3) corresponds to a new "policy-prioritisation logic" (McCann and Ortega-Argilés 2013) grounded in the entrepreneurial discovery process. In a nutshell, it can be said that whereas smart specialisation refers to the policy process, entrepreneurial discovery describes the functional processes enabling it. The reference to the 'entrepreneurial' reflects the importance of re-combining the existing entrepreneurial knowledge scattered across regional innovation system (Foray, David et al. 2011, McCann and Ortega-Argilés 2013, Boschma 2014); whilst the use of 'discovery' highlights the non-deterministic, interactive process of identifying novel applications from regional entrepreneurs, which is opposite of the 'picking-the-winner'-approach from previous generations of Research and Innovation Strategies (RIS). In other words, S3 can be defined as 'new "policy-prioritisation logic" which is fundamentally based on a process of entrepreneurial discovery in fostering specialised diversification across related sectors' (Foray et al 2011; Asheim and Grillitsch 2015; McCann and Ortega-Argilés 2013; Dubois, Kristensen and Teräs 2017).

The purpose of this discussion paper is to provide a knowledge and policy overview of smart specialisation in the Nordic Region, and to prepare the ground for empirical work to be carried out in 2018. Attempting to get a systematic overview of how the Nordic regions have adopted and adapted the concept of smart specialisation in their respective regional innovation strategies, it becomes evident that there is a significant knowledge gap for understanding how these countries might position themselves in comparison to their Nordic counterparts. This is particularly relevant for future collaborative cross-border work, as well as for identifying whether there is a specific 'Nordic model' of smart specialisation, considering both the presence of natural resources and the governance frameworks in place supporting innovation. Cross-sectoral collaboration has the longest tradition in Sweden and in Finland, implying that the most extensive S3 strategies can be found in these countries. It is worth noting, however, that e.g. Norway although a non-EU member, has nonetheless adopted the S3 approach in some of its regions and counties, despite smart specialisation not being an *ex ante* conditionality for receiving EU funding. This could be interpreted as a way of recognising and responding to the strengthening of regional advantages across the EU, wishing to remain relevant in R&I in the future. Additionally, this would help clarify the structural difficulties in ensuring regional growth as well as the pursuit of a green transition and sustainable bioeconomy.

From a policy point of view, the relation between the regional smart specialisation strategies and national policy remain an interesting nugget. Considering the cohesiveness, complementarities and dialogue between the different tires of government and regional actors will be investigated further in the analysis following the field study search, which will commence in March/April. Smart specialisation seemingly holds an important key to unlocking regional potential. The question is whether it is a viable future tool, and what new aspects to regional growth it might reveal.

1. Introduction

1.1. Background of the study

Drafting Research and Innovation Strategies for Smart Specialisation (RIS3) has become an *ex ante* condition to access the EU Structural Funds for the 2014-2020 program period. This implies that for the first time, territorial cohesion - the fundamental goal of European Regional policy is *''welded' with the objectives of competitiveness and innovation'* (Bellini 2015). While a large body of literature deals with the theoretical underpinnings of the smart specialisation concept (Foray et al. 2011, 2013; McCann et al. 2011, 2013; Morgan 2013, 2015; Foray 2015), understanding its potential to address growth challenges facing different European regions is still largely missing.

Currently, there is no systematic overview of how the Nordic regions adapt the concept of smart specialisation to their regional innovation strategies. There is also no overview of the differences between the concept of smart specialisation and the (regional) innovation and skills strategies. Thus, there is a significant learning gap in the Nordic context.

An evaluation of the impact of smart specialisation programmes/strategies at early stages of its implementation is rather challenging. Often the evaluation is limited to collecting feedback and reflections from the actors and participants involved in the respective smart specialisation programmes and projects only. This study comes at a critical moment as there is a need to meet the growing demand of policy-makers to help support their efforts in assessing S3 developments, as well as to provide them with the most recent data from the years 2017-2018.

Economic and social resilience in the Nordic region is one of the focus concepts within the framework of the Nordic Thematic Group for Innovative and Resilient Regions 2017–2020. Given that economic resilience incorporates aspects such as sustainable use of natural resources, it will be appropriate to not only consider the reactive measures that copes with the existing crisis, but also to identify and examine different proactive measures that prepare for and respond to regional crises, where smart specialisation emerges as an important approach for delivering smart, sustainable and inclusive growth solutions.

1.2. Aim and scope

The work program for the Nordic Thematic Group for Innovative and Resilient Regions 2017-2020 has listed three themes that should lay the basis for understanding the factors that support the creation of innovative and resilient regions across the Nordic countries. These prioritised themes were *resilience*, *smart specialisation (S3)* and *digitalisation*. The three themes are closely interlinked from a regional development perspective; therefore, their complementarities are considered throughout the entire implementation process.

The overall objective of the current S3 2017-2018 study is to **create an understanding of how the different Nordic regions adapt to the S3 policy concept and to analyse the added-value of its implementation in the Nordic context:**

(1) How do the national and regional governmental levels support S3 processes and which tools are in place for this purpose?
(2) What are the enabling and impeding factors influencing the adoption of S3 elements at the regional level?
(3) To what extent does S3 approach aid the understanding of the relevant processes in regional innovation systems and stimulation of necessary synergetic cooperation within it?

(4) As a place-based approach, how does S3 contribute to driving the green growth agenda forward in the Nordic context?

The relation between regional smart specialisation strategies and national policy as well as funding priorities are crucial issues for analyses. With a focus on the cohesiveness and complementarity between different tiers of government and the dialogue between regional and national levels vis-à-vis regional smart specialisation, such analysis might provide significant insights. The project also considers the different geographical scales of S3. This includes the highly relevant but not yet sufficiently analysed aspect of transnational and cross-border collaboration, and a benchmarking of smart specialisation design and its implementation in/from a pan-Nordic perspective. From a policy perspective, it is important to consider how the public authorities can initiate interregional learning processes for S3 and entrepreneurial discovery processes in a feasible manner. Furthermore, it is worth mentioning the green transition as it plays an important part to the future of the Nordic economies. With an abundance of natural resources available to the Nordic countries, the bioeconomy is particularly relevant.   Finally, the project will contribute to the sharing of experiences and knowledge at the Nordic level, regarding the design and implementation of smart specialisation strategies and their outcomes, related to their financing models, the organisation of horizontal governance structures at the regional level, and finally, the stakeholder involvement in S3 processes.

2. Conceptual framework[1]

2.1. The paradigm shift in innovation policy design

In the past decade, the innovation and knowledge-based economic development has become the headline for policy makers emphasising the strategic importance of building a strong knowledge base of the economy. In this discourse, knowledge is regarded as an asset that can appear in two forms: as an input (competence) and an output (innovation) in the production process (Lundvall, 2003). The question of how knowledge is produced, mediated and used has grown to be a prominent issue in policies for growth and regional development.

Existing disparities in growth patterns across regions entail individual policy approaches. Terms like 'radical innovation', 'fast movers' and 'competitive entry' positively reflect the imperatives of EU policies. However, they do not add much to the regions that are not frontrunners in any specific industry. The success of innovative communities depends on their ability to combine and share both knowledge and skills, as well as different approaches. A prevailing justification for the existence of an innovation policy is often related to the notion of market failure i.e. knowledge externalities, information asymmetries, capital market imperfections and the like. Any deviations from these established 'neutral points' would stir up debates around issues of wrong choices, such as 'picking winners' and market distortions, whereby leaving sectoral strategies or specialisations to "*the magical chaos of the blind watchmaker*" (Foray et. al 2011). However, the paradigm shifts in European innovation policy that have developed over the last few years have increasingly emphasised the role of the coordinating agents involved in the innovation process. Additionally, the demand-side measures of innovation policy have significantly enhanced the importance of competition-friendly sectoral policy, as well as highlighting the relevance of regional dimension by placing stronger emphasis on the knowledge assets required for long-term economic growth (OECD 2011; Foray, David & Hall, 2011).

A number of theoretical concepts exist to explain the policy processes of constructing regional advantage, thereby highlighting the role of regions in these developments. These theories include e.g.,

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[1] The purpose of the knowledge overview (completed in 2017) was to introduce the key concepts and provide an overview of national and regional policy support related to S3 processes.

i) *learning regions* where interactive learning is playing a key role in regional networks (e.g. Asheim 2011); ii) *innovative milieu* where strong emphasis is placed on regional institutional endowment and knowledge inter-exchange (e.g. Fromhold-Eisebith, 2004), and iii) *clusters* where industrial value chains with the spatial perspective of proximity are in focus (e.g. Asheim, Smith & Oughton, 2011). However, the long-ranged methods of regional innovation policy implementation might be challenged as they continue to focus strongly on R&D, which is exceptionally spatially concentrated, favouring only a small number of regions (Asheim, Boschma & Cooke, 2011; Boschma, 2008). Many policy-makers tend to fall for the fallacy of 'imitating success stories' and subsequently fail, whilst the presence of e.g. knowledge asymmetries and important region-specific assets remain unexplored. Asheim et al. state that *"innovation is about [the] creation of new products and processes, but to be effective it must draw on the capabilities of regions"* (Asheim, Smith & Oughton, 2011), emphasising the necessity of recognising differences and capitalise on regional advantages.

The investments into knowledge-intensive activities as a regional policy tool for realising the potential for knowledge spill-overs in innovation-related activities have been rising rapidly. However, more often than not, long-term sustainable economic outcome will depend on an expansion of those domains where innovation can generate complementarities between sectors thereby creating *"future domestic capability and interregional comparative advantage"* (Foray, David & Hall, 2011). Boschma (2008) argues that neither specialisation within specific economic sectors nor diversity of sectors promote innovation processes but rather promotes a *'regional specialisation in related variety'*. Such a line of reasoning echoes Schumpeterian views of 'new combinations' or a cross-fertilization of existing factors, generated by a multifaceted set of structures in a different way (Lundvall 1992:8). In this context, development of potential application areas is highly contingent upon the ability of the region to use existing capabilities in a way that will influence regional economic growth.

2.2. Towards smart specialisation

2.2.1.The origins of the concept

Past experiences with selective public intervention efforts to ensure a favourable environment for innovation and growth have failed. This is because policies of 'picking the winner' fails to optimise the existing innovation potential and take advantage of the knowledge-based resources, be it a 'leading' or 'following' region. Additionally, generating distinctive regional assets and competencies based on a region's unique economic structures and knowledge bases is an important part of the regional context. This should be taken into consideration in the policy making processes concerning innovation.

Originally, the idea of smart specialisation was introduced by a group of economists with expertise in growth and innovation (K4G expert team), with the aim to understand Europe's sluggish performance in the development and commercialisation processes of technological developments (McCann and Ortega-Argilés 2016). The role of entrepreneurship was considered vital, not just for facilitating innovation, but also because "*innovations […] can be successfully nurtured, disseminated and taken up within the wider EU economy'''* (ibid). Later, Foray et al. (2009) further refined the concept of smart specialisation by defining it as *"an entrepreneurial process of discovery…a learning process to discover the research and innovation domains in which a region can hope to excel"*. There are a few imperative aspects that distinguish smart specialisation from other growth models (COM (2010)546; McCann & Ortega-Argilés: 2011; Foray, David & Hall, 2009; 2011; Bellini 2015):

- Outward orientation and a strong emphasis on the role of all actors involved in the innovation cycle (internal and external networks);

- Prominence is given to contextual structure/existing local dynamics;
- Appliance of a not-fully bottom-up neither top-down approach i.e. specialisation starts with the process of entrepreneurial discovery;
- A focus on specialisation in R&D and innovation related to a particular sector/industry of economics;
- The use of a wider perspective of innovation impact (beyond technological innovation): structural advancement of the whole economy.

The term **'specialisation'**, however, is rather vague in the context of regional policy making. Bellini (2015) states that *"smart specialisation is an invitation not to specialise [the] economy, but the policies and their objectives"* and that it is a *"well-targeted diversification, based on 'related varieties', i.e. a reduction of sectorial specialisation"*. McCann and Ortega-Argilés (2016) state that policy results stimulated by smart specialisation approach have never been about sectoral specialisation but rather about *"carefully choosing priorities which are best suited to moving the region from its current development trajectory to a stronger trajectory via the enhancement of the local entrepreneurial climate"*. In other words, smart specialisation is not a structure but a transformative activity that aims at addressing unique capabilities, capacities and infrastructures specific to a technology or sector (Foray 2017 at RIP2017).

2.2.2. Entrepreneurial discovery process - the 'smart' core of S3

Smart Specialisation (S3) corresponds to a new "policy-prioritisation logic" (McCann and Ortega-Argilés 2013) grounded in the entrepreneurial discovery process. In a nutshell, it can be said that whereas smart specialisation refers to the policy process, entrepreneurial discovery describes the functional processes enabling it (see figure 1). Entrepreneurial discovery refers to the processes of promoting specialised diversification initiatives across related sectors, referred to as *domains*, in regional economies (Foray, David et al. 2011, Asheim and Grillitsch 2015). The reference to **'entrepreneurial'** reflects the importance of re-combining the existing entrepreneurial knowledge scattered across

Figure 1: Entrepreneurial discovery process
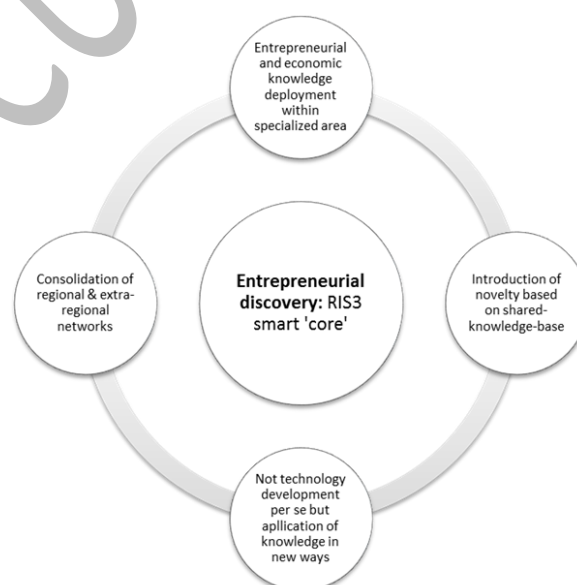
Source: Dubois, Kristensen & Teräs 2017

regional innovation system (Foray, David et al. 2011, McCann and Ortega-Argilés 2013, Boschma 2014); while the use of **'discovery'** highlights the non-deterministic, interactive process of identifying novel applications from regional entrepreneurs, which is opposite to the 'picking-the-winner' approach from previous generations of RIS.

In opposition to the promotion of individual innovations, the entrepreneurial search process stimulates demand-driven 'innovation discovery' (Rodrik 2004; Asheim and Grillitsch 2015) that leads to a structural transformation of the regional economy. As a policy process, S3 may therefore foster a heuristic approach aiming at gradually improving the capacity of regions to source and use knowledge more effectively as a key driver of economic growth and societal change. Bringing the S3 argument into the regional development context thus directs attention to regional capacity-building, the potential of exploiting related variety, and the importance of inter- and intra-regional connectivity between different organisations (McCann and Ortega-Argilés 2013).

Entrepreneurial search processes thus constitute of the 'smart' core of S3, underlining the vertical, or 'specialisation', logic of resource allocation. The entrepreneurial knowledge, which is needed for innovation discovery is rarely borne by a single organisation or individual. Therefore, smart specialisation can only be achieved through new collaborative behaviour between 'entrepreneurs'. This is loosely encompassing all stakeholders, including individual entrepreneurs, companies, universities, technology transfer offices and regional development agencies that have the capacity to contribute to the discovery of new domains (Foray and Goenaga 2013). To give a new perspective to the topic of RIS implementation, scholars have advocated a more pragmatic approach that puts entrepreneurs in a position *"to discover the domains of R&D and innovation in which a region is likely to excel given its existing capabilities and productive assets"* (Foray et al. 2011). In S3 thinking, entrepreneurial discovery is thus conceived as an iterative, cyclic process involving multiple streams of knowledge exchanges and shaping a joint knowledge base within a specialised area (domain) that can aid the generation of new knowledge *"about the future economic value of a possible direction of change"* (Foray 2015:24).

2.2.3. Domains as transformative activities

Figure 2: Development of transformative activity

The emergence of one or more domains within the regional economy crossing sectoral and local delineations represents the main vector by which S3 ensure their place-baseness. In doing so, regional innovation cannot be attributed to a specific sector or locality of the region but arises from new forms of cognitive connectivity. Foray defines a domain as a level at which S3 priorities are identified,
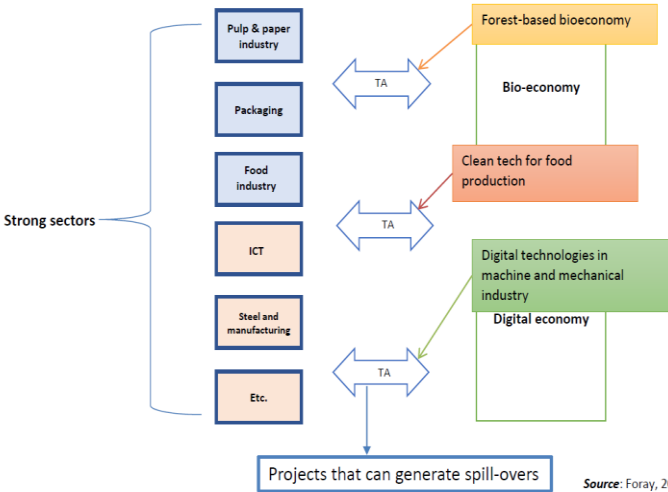
Source: Foray, 2017 (RIP conference 2017) + own interpretation

assessed and supported, neither too high (an entire sector) nor too low (individual firm) (2015:41). A domain thus corresponds to a mid-grained economic unit that stretches across several sectors or activities (without covering them entirely), which offers greater learning possibilities and generate knowledge-spillovers (McCann and Ortega-Argilés 2013). The promotion of new domains rather than entire sectors in S3 aims to *"realise the potential for scale, scope and spill-overs in knowledge production and use"*, and to *"develop distinctive and original areas of specialisation for the future"* (Morgan 2013:104). But it is arguably much less intuitive than promoting entire industries or individual champions.

The emergence of domains necessitates creating new functional linkages between firms across sectors and localities within the regional economy. Hence, Boschma (2008) states that neither specialisation within specific economic sectors nor in a diversity of sectors promotes innovation processes. Rather, it promotes 'regional specialisation in related variety', which relates more to the idea of smart diversification than specialisation (Asheim and Grillitsch 2015; Cooke 2016).

Building transformative activity (i.e. selecting priorities or building domains) means addressing specific capabilities, capacities and infrastructures specific to a technology or sector (see figure 2).

According to Foray (RIP2017), transformative activity (TA) is *"neither an individual project nor a sector as a whole, but a collection of innovation capacities and actions that have been 'extracted' as it were from existing structures and is oriented towards a certain structural change (e.g. transition, diversification or modernisation of regional economy)."* This implies that there is no one-size-fits-all regional recipe, and each transformative activity always involves some level of uncertainty and risk.

Based on the above discussion, this report's working definition of S3 is the following: **new 'policy-prioritisation logic' which is fundamentally based on a process of entrepreneurial discovery in fostering specialised diversification across related sectors** (Foray et al 2011; Asheim and Grillitsch 2015; McCann and Ortega-Argilés 2013; Dubois, Kristensen and Teräs 2017). This process of 'specialised diversification across related sectors' implies identifying and assessing capacities and potentials as well as opportunities for structural changes, and selecting a (small number) of Transformative Activities, which will be developed and supported (Foray, RIP2017 conference).

2.2.4.Approaches to RIS3 policy analysis

Compared to extensive use of S3 concept in European policy context, very scanty information is available on how to measure (quantitatively) the impact of RIS3 (e.g. Neffke et al., 2011; Rodríguez-Pose et al.,2014). There are a few reasons explaining it:

(i)   lack of indicators due to the novelty of the concept, requiring building of new databases (Sörvik and Kleibrink, 2015);

(ii)   complexity of the econometric analysis and the detail of the databases complicates the process of pre-and post-evaluation of RIS3 (Feder 2015);

(iii) lack of a comprehensive and structural theory for evaluation (Feder 2015).

The Table 1 presents a summary of approaches to RIS3 evaluation emerging from literature overview.

Table 1: Overview of approaches to RIS3 analysis

APPROACH	BRIEF DESCRIPTION	REFERENCES
Connectivity analysis	This analysis is used as input to structured dialogues between actors in leading positions in the Triple Helix and in smart specialisation policy-making and implementation. This approach may lead to policy interventions supporting entrepreneurial discoveries.	e.g. Virkkala, Mäenpää and Mariussen, 2017
Governance-based approach (to the interpretation of RIS3 outcomes)	This study suggests that diversity in implementation is strongly determined by differences in general institutions and, more importantly, regionally specific modes of governance.	e.g. Kroll 2014
S3 six step-framework	The study analyses similarities and differences in the smart specialisation implementation processes in different regions within the same national context, and analyses what is new in the two smart specialisation strategies.	e.g. Teräs, Mäenpää 2016

In his well-known study, Kroll (2014) attempted to systematically reflect on first experiences of RIS3 policy agenda implementation in European regions. Specifically, it sought to address a question of persistent failure in achieving the RIS3 agenda's objectives, and examine where policy-makers came to a positive cost–benefit assessment of bottom-up RIS3 processes, as well as determining the motivating factors used for this assessment. Two Europe-wide online surveys (2013 and 2014) yielded a sample of 80 full answers per survey, which was sufficient for a regression analysis but not for complex quantitative modelling. Based on the findings, this study shows that a complex process, such as smart specialisation, places high requirements on regional policy that many less experienced regions cannot easily fulfil. At the same time, however, as it has been proved by this study, the major *"merit of RIS3 processes lies in their contribution to changing routines and practices of governance even if those, for now, remain without measurable effect on policy"* (Kroll 2014). Table 2 summarises some outcomes of RIS3 process by member state group.

Table 2: Outcomes of RIS3 process by member state group

	Central Europe	Southern Europe	Eastern Europe	Contingency coefficient
Novelty of process/routines				
Not at all or only in some respects new	**78.3%**	55.6%	65.5%	**0.054**
In many respects or totally new	8.7%	**38.9%**	**31.0%**	
Novelty of findings				
High/very high degree of novelty	**8.7%**	38.9%	37.9%	0.390
Moderate degree of novelty	56.5%	44.4%	41.4%	
Low/very low degree of novelty	21.7%	**11.1%**	**13.8%**	
Main effect/benefit				
Clearer focus of allocations	**38.1%**	23.5%	6.9%	**0.041**
Better understanding of potentials	14.3%	**58.8%**	**48.3%**	
Renewal of planning culture	19.0%	5.9%	**34.5%**	
Technical improvement through methodological input	9.5%	0.0%	3.4%	
Overall cost/benefit assessment				
Benefits outweighed costs	43%	**76%**	38%	0.133
Benefits equalled costs	5%	12%	**38%**	
Costs outweighed benefits	14%	6%	**17%**	

Source: Kroll 2014

Another approach to addressing the question of RIS3 evaluation has been proposed by Virkkala, Mäenpää and Mariussen (2017). They suggest a connectivity analysis - where Triple Helix relations, involving universities, companies and government - are at the centre of the entrepreneurial discovery process - as a potential monitoring tool for smart specialisation strategies. Figure 2 illustrates TH connectivity in the EDP, and shows how better cooperation creates more opportunities for innovative interaction. Proximities and gap analysis are the main elements of the connectivity analysis and policy model. They conclude that new areas and activities can be discovered where perceived gaps might be bridged.

Figure 2: Triple Helix connectivity in entrepreneurial discovery process
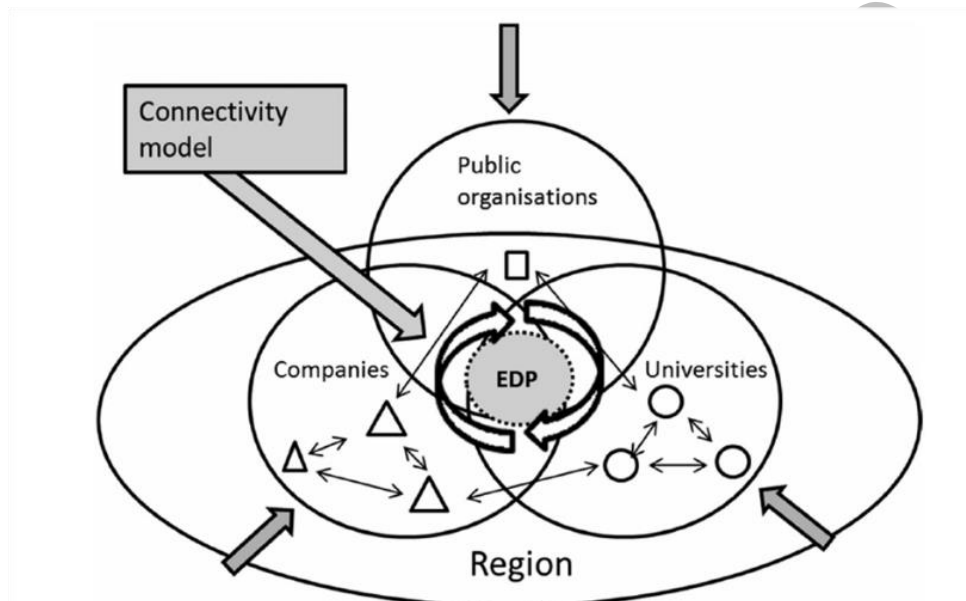
Source: Virkkala et al. 2017

Teräs and Mäenpää (2016) make use of a six step-framework of key concepts to analyse and compare the differences in RIS3 strategy formulation in two regions namely Ostrobothnia and Lapland. These steps include: (i) analysis of the regional context and potential for innovation; (ii) governance by ensuring participation and ownership; (iii) elaborating an overall vision for the future of the region; (iv) identification of priorities; (v) policy mix, preparation of policy mix, roadmap, and action plan; (vi) and integration of monitoring and evaluation mechanisms. The study reveals that (1) the implementation of S3 is time-consuming (compared to estimated timeframe set by the EC); (2) limited participation by companies and entrepreneurs in the entrepreneurial discovery process increases the risk of not full realisation of the regional capacity; (3) regions are largely motivated to participate in the S3 work largely because of the *ex-ante* condition related to the strategy.
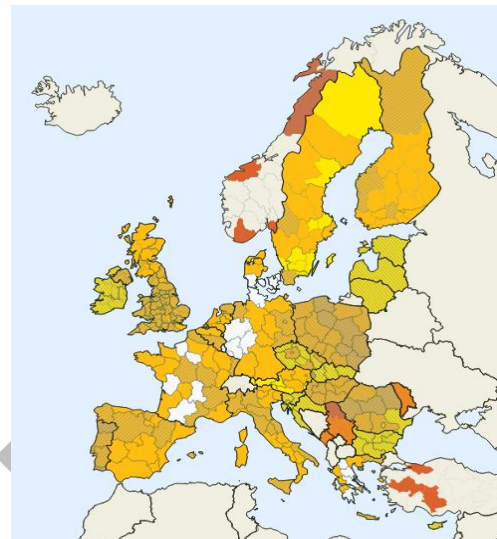
3. Policy review

3.1. European level: S3 as ERDF conditionality
European Commission manages its Cohesion Policy through the European Regional Development Fund (ERDF) where EUR 277 billion is spent on regional development in the years 2014-2020 (European Commission 2017). The Cohesion Policy's overall aim is to reduce regional differences and ensure

growth across Europe. The ERDF operates under the EU strategy for smart, sustainable and inclusive growth (2014-2020). This means that the funding mechanism follows the priorities of research and innovation, ICT, small and medium-sized technology developments, as well as advocating for a low-carbon economy.

The smart specialisation strategy is a precondition for regions to receive funding from EU's Structural Funds. The structural funds are considered a crucial tool for European regions to overcome the economic crisis, thus linking smart specialisation strategies to the concept of resilience. In this way the European Commission directs regions to design their place-based research and innovation strategies in an inclusive way, with smart specialisation as a guiding approach. In turn, this does not mean that a stand-alone S3 strategy is required to achieve EU funding, but that it requires such a strategy to already in place, as part of the regional development strategy at large.

The main tool to support regions in their S3 strategy design and implementation is the Smart Specialisation Platform. The S3 Platform, which is maintained by the EU Joint Research Centre, provides guidance material and good practice examples, and facilitates peer-review and mutual learning. The platform also supports access to relevant data. Incorporating S3 thinking has become part of the policy-making across the EU. There are currently 180 European regions registered on the EU's S3 platform, 34 of which are Nordic The S3 registration indicates the region's interest in smart specialisation and the international networking related to S3, as the level of implementing S3 strategies varies significantly between the registered regions. For instance, some regions include smart specialisation strategies within their regional programmes, whilst others are currently in the stage of finding ways to include S3 approach in their strategy design.

- EU Countries Registered in S3P
- EU Regions registered in S3P
- NON EU Countries Registered In S3P
- NON EU Regions Registered in S3P
- Country Peer Review
- Region Peer Review

3.2. Nordic national strategies supporting S3

As EU members, Sweden, Finland and Denmark face the requirement of drawing up a smart specialisation strategy in order to benefit from the structural funds. Standing outside the EU, Norway and Iceland do not face the same requirement. Smart specialisation strategies may be developed on both the national and the regional level, but it may be argued that the strategy is firmly placed within a synergy between the regional and the EU level, where the state's role remains supportive. This is particularly evident in Sweden and Finland, where there are no overarching national S3 strategy, but regional strategies nevertheless exist. In Finland, RIS3 efforts are coordinated and monitored from a national level (Helsinki-Uuismaa Regional Council, 2015). This means that although there are no national S3 strategies in place in e.g. Finland and Sweden, there are nevertheless national appraches to include such aspects, by developing regional strategies that are supported by national frameworks (cf. e.g. Helsinki-Uusimaa Regional Council 2015).

The reception of using S3 as a strategy differs between Nordic countries. Often considered an 'S3 sceptic', Denmark (Lindqvist, Olsen, Perjo & Claessen 2013) has merely developed an S3 strategy on the national level (Polverari 2016). Both Finland and Sweden have developed regional S3 strategies, albeit not in all regions (Ibid).

3.2.1. Finland

In Finland, smart specialisation takes place only on the regional level and not in all regions (Polverari 2016). The responsible authorities of S3 are the regional councils (Teräs & Mäenpää 2016). Finland has decided not to develop a national smart specialisation strategy (Polverari 2016). However, smart specialisation is supported at the national level in Finland. The Finnish *Regional Strategy 2020* regards regional specialisation as an essential means to promote regional development and innovation (Ministry of Employment and the Economy 2010), and will be supported from a national level. Furthermore, there are efforts put in place to enhance the collaboration and networking between citizens, regions and other actors to improve the effectiveness of regional development (Ibid). The *Regional Strategy 2020* aims at highlighting Finnish specialised domains in the world economy by focussing on regional competences (Lindqvist, Olsen, Perjo & Claessen 2013).

The regions' smart specialisation efforts can be supported by the national so-called AIKO-funding. AIKO-funding is part of the national innovation programme *Regional Innovations and Experimentations* (AIKO), and is running from 2016 through 2019. Additionally, AIKO-funding links together the idea of smart specialisation and resilience, as the objective is to regenerate regions by fortifying region-specific strengths and to implement measures for anticipated structural change. Another objective of AIKO is to raise the regions' specialisation profiles to become more internationally significant, and to achieve this the government has made strategic growth agreements between the metropolitan region and six other cities. Here, the government supports regional competitiveness based on regional strengths, through contract-based cooperation with the central government.

> **Information Box 1: Lapland, Finland**
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> Lapland in North Finland consists of an area of 98 982 km^2. There are 183 330 inhabitants in Lapland. Lapland is known for its tourism industry but also for its arctic expertise in several areas such as arctic car testing, sustainable use of mines and process industry. The region's research and education institutes include the University of Lapland, and Lapland University of Applied Sciences.
>
> The regional smart specialisation strategy process in Lapland took place in two major phases: the S3 formation in 2012-13, and the S3 implementation phase in 2015. The smart specialisation strategy in Lapland was coined as the Arctic Specialisation Strategy, with three major themes: 1) the refining of Arctic natural resources, 2) the utilisation of Arctic natural conditions, and 3) cross-cutting development enabling Arctic growth. The six-step S3 approach (analysis, governance, vision, priority selection, policy mix and monitoring/evaluation) was adopted and followed closely in Lapland.
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> After the strategy formulation, five smart clusters were introduced in 2014-2015: Arctic Industry, Arctic Rural Networks, Arctic Design, Arctic Security, and Arctic Development Infrastructure.

Smart Specialisation is gaining more ground in Finnish regional development. Currently, the regional councils, in collaboration with key regional actors, prepare regional strategic programmes for the 2018-2021 period. These programmes will steer and coordinate regional development, and the current drafts focus significantly on smart specialisation (e.g. the regions of Pirkanmaa and Central Finland). There is also coordination, monitoring and evaluation measures on the national level, regarding the preparation and implementation of regional strategic programmes. These programmes are guided by the Regional Development Act (Ministry of Economic Affairs and Employment, n.d.). The forthcoming formulations on the implementation plans will set out the priority areas for national and European

Union funding. Currently, the implementation plan entails a resilience aspect as part of a regional anticipation and preparation plan for structural changes (Ibid.)

The national contributions to smart specialisation include a national analysis of regional core strengths, which has been made to support the regions updating their regional strategies and preparing for the coming EU Programme Period for 2021- onwards (Owal Group Oy, 2017).

3.2.2.Sweden

As an EU member state, Sweden faces the smart specialisation condition for receiving European Regional Development Funds. The level of smart specialisation is national and to some extent, regional (Polverari 2016). Sweden has however, decided not to develop a separate national S3 strategy (Polverari 2016).

The current Swedish national innovation strategies include some starting points for regional smart specialisation. The Swedish Innovation Strategy (2012) states that Swedish regions shall increase their innovation capacity based on their unique conditions. Furthermore, the regional strategies shall be grounded in combined regional leadership to ensure improved forms of feedback loops. This will in turn help the dialogue between the national, the regional and the international level. According to the *National Strategy for Sustainable Regional Growth and Attractiveness 2015–2020*, 'greater collaboration between academia, society and industry is required, to bring about joint strategic and long-term initiatives' (Government Offices of Sweden 2015). The strategy guides the development and implementation of regional development strategies. Both strategies accentuate on the EU's Cohesion Policy as an integrated part of the Swedish regional growth policy and the need for an alignment of the regional, national and EU strategies for regional growth.

Information Box 2: Värmland, Sweden

Värmland region consists of 17 519 km² of land in the mid-western part of Sweden. The region borders with the Oslo region in Norway. The population of Värmland is 279,583 (2017). The regional capital is Karlstad and it has approximately 90.475 inhabitants. The Värmland region is mostly known for its steel and forestry industry. The region has one major innovation centre, Karlstad University, which has over 16 000 students (S3 Platform 2017b, Region Värmland 2015.)

The Värmland region prepared their RIS3 strategy in 2014-2015. After analysing the regional assets, the officials in Värmland identified their targets for specialisation, i.e. their *domains*. The region has come up with four different categories for specialisation: The first, *transverse specialisation* (value creation services) is more of general specialisation and thus is not necessarily that important for developing domains. The region, however, also came up with *prioritised specialisation* (includes forest-based bioeconomy, digitalisation of welfare services, and advanced manufacturing and complex systems), and *specialisation under qualification* (the "upcoming" areas of specialisation; includes nature, culture and place based digitalised experiences as well as system solutions with photovoltaics). Lastly, the region included a category of *new areas of smart specialisations*, which are yet to be discovered.

There are national efforts to ensure an increasing uptake of smart specialisation strategies in Sweden. Tillväxtverket, the Swedish Agency for Economic and Regional Growth, is a central actor strengthening regions in their work with smart specialisation. The agency's remit is to 'support actors that have regional development responsibilities regarding smart specialisation and to disseminate experiences and competences from this work' (ref). The agency's most important task is to ensure that EU funds

are invested in projects that promote regional growth and employment. The agency has supported regions in their innovation and S3 strategy development within the RIK-programme (regional work on innovation and clusters). The work on smart specialisation will be continued, drawing on lessons learnt from the RIK-programme (Tillväxtverket n.d.)

Information Box 3: Skåne, Sweden

The Skåne region is the southernmost region in Sweden and consists of 10 968 km^2 of land with a population of 1.324.565 (2017). The regional capital Malmö is the home of 328.494 inhabitants (2016). Skåne has a diverse industry with academic excellence in material science, medicine, mobile technology, food and nutrition (Lagnevik 2013). Skåne's strong clusters are in life-science, clean-tech, ICT, packaging, food and mobile communication (Vanguard Initiative n.d.) and in film (Cooke & Eriksson 2012). Also, a cross-border life science cluster, Medicon Valley, operates in Skåne and the Danish capital Copenhagen. Other important cooperation cities are Finnish Oulu (eHealth) and Tampere (Smart Cities) (Vanguard Initiative n.d.).

The *International Innovation Strategy 2012-2020* for Skåne (2011) envisions Skåne to be the most innovative region in Europe. The strategy identifies three areas of relative strength: personal health, smart and sustainable cities and smart materials. Further, Skåne has taken advantage of the international scope of S3 by being part of the Vanguard Initiativ, which aims to lead by example in industry-led interregional cooperation based on smart specialisation principles (cf. Vanguard Initiative n.d.). Skåne has participated in S3 peer review activities since 2012.

Skåne's International Innovation Strategy and related documents are owned by the Skåne Research and Innovation Council (FIRS) and the Sounding Board for Innovation in Skåne (SIS), where universities, institutes of technology, municipalities, arenas, industry, the public sector and student representatives can work together to support innovation and create the conditions for growth.

Most Swedish regions work with their own S3 strategies in line with the EU recommendations (Tillväxtverket n.d.). These can be either embedded in the respective regional development strategies, in general innovation strategies, or indeed, as a separate S3 strategy altogether. However, the guidelines for mandatory regional development strategies do already include an S3 approach to some extent. These strategies must be based on a regional analysis and contain goals and prioritisation for the work on regional growth (Tillväxtverket n.d.). Most of these strategies already include prioritisations of economic sectors, clusters or innovation systems (Lindqvist, Smed Olsen, Perjo & Claessen 2013). Interestingly, the Swedish national regional funds programme does not require a (regional) priority setting (Tillväxtverket n.d.).

3.2.3. Denmark

Denmark, as an EU member state, is now looking towards the smart specialisation concept in order to benefit from the EU structural funds. Smart specialisation in Denmark is currently employed on the national level only (Polverari 2016). However, two Danish regions, Nordjylland and Midtjylland, have now joined the S3 Platform.

The official national commitment towards smart specialisation is found in the national operational programme for the European regional development fund 2014–2020 *Innovative and Sustainable Enterprise Growth* (Danish Business Authority 2014). This programme entails the preconditions that should be met to qualify for the ERDF, and it argues how Denmark with its existing policy framework qualifies for the ERDF. Looking to the Danish government's innovation strategy *The Danish Strategy*

for Cluster and Network Policy and their regional growth and development strategies, it is evident that there is a smart specialisation strategy concerning both the national and the regional level.

Denmark's *Strategy for Cluster and Network Policy 2016-2018* names *the Cluster Forum* as the arena of S3 discussions. The Cluster Forum is responsible for "discussing and coordinating regional strategies for smart specialisation and ensuring cohesion with the general strategy for the cluster and network policy" (ref plus page). The Cluster Forum is a Danish informal forum where ministries, regions and municipalities, as well as the regional cluster forums, share knowledge and coordinate activities in the clusters and networks. The forum's overall purpose is to support Danish cluster development and to create cohesion between local, regional, national and international cluster and network efforts (The Danish Agency for Science, Technology and Innovation 2016.)

At the regional level, the regional growth forums are the focal points for business development (Danish Business Authority n.d.) and they are responsible for the RIS3 process (Asheim 2014). Designing of regional growth and development strategies falls under the remit of regions (Erhversstyrelsen n.d.), whereas the regional growth forums decide how the structural fund resources are to be allocated (Danish Business Authority n.d.).

3.2.4. Norway

Norway, as a non-EU member state, does not have an ERDF-related interest for adopting the concept of smart specialisation. However, 'many components of smart specialisation seem to have been applied, even if the concept has not been formally adopted' (Lindqvist, Olsen, Perjo & Claessen 2013). The components include regional partnerships, prioritisation of sectors, knowledge development and the implementation of various policy measures (Ibid). Regional authorities have the strategic and political responsibility for regional business development (Forskningsrådet 2017).

The national support for regional smart specialisation has in recent years looked to the Norwegian Research Council (Forskningsrådet) and the *Programme for Regional R&D and Innovation* (VRI), which is running in the years 2007-2016. VRI's aim has been to 'empower regions with competences and responsibility for research and innovation, and to give regions more autonomy in designing targeted policy mixes' (Sörvik & Midtkandal 2016). In 2013, the Norwegian Research Council stated the VRI Programme was to be in line with the idea of the smart specialisation concept (Forskningsrådet 2013). VRI is considered to have shared features similar to those of smart specialisation. One of its key objectives was to develop methods for regional analyses, which identified a limited number of prioritised areas, and furthermore, their targeted activities (Sörvik & Midtkandal 2016).

> **Information Box 4: Nordland, Norway**
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> Nordland county comprise of 38 456 km² of land in the North-Western part of Norway. Nordland has a population of approximately 242.000 inhabitants, with the largest concentration centred in Bodø, the regional capital (about 50 000 inhabitants). Nordland is mostly known from its extensive fish farming activities, as tenth of all the salmon from the world is grown there. It also uses hydroelectricity extensively. The second largest cluster in Norway is situated in Helgeland, and specialises in minerals, metal, fish, oil & gas and green hydroelectric power. Nordland's main innovation centre is the Nord University in Bodø, with 6000 students.
>
> Nordland has not published a separate S3 strategy document, but instead has produced the wider innovation-related *Innovative Nordland-* strategy. Smart specialisation is thus only one part of the wider innovation activities, which are generally focusing on educational aspects for the region. The strategy work began in Nordland in 2013, when the regional authorities were informed of the possibilities of S3. A study was commissioned by the county for evaluating the S3 for the region, and S3 was officially included in the regional innovation strategy in 2014. Nordland specialises in three distinctive areas: seafood industry, process industry (of metals, minerals, chemicals and machines), as well as experience-based tourism. The chosen fields represent the existing R&D and industrial sectors, and are all export orientated (Nordland County Council 2014, Foray et al. 2012).

VRI's successor is the on-going FORREGION-programme. This programme focuses on research-based innovation in the respective regions. The concept of smart specialisation has seemingly inspired the FORREGION-programme. For instance, the smart specialisation approach is to guide the dialogue between the various regional and national actors. Similarly, the FORREGION programme's specific activities will be 'based on the unique opportunities and challenges found in each region'. The Research Council continues to gather knowledge of the concept of smart specialisation by following-up the FORREGION- initiative (Forskningsrådet 2017.)

Several Norwegian regions have started working with the smart specialisation concept (Forskningsrådet 2016-17), and five regions have registered on the EU's S3 Platform. For instance, the county Møre og Romsdal developed their Innovation Strategy for 2016-2020 with the smart

specialisation method in mind (Møre og Romsdals Fylkeskommune n.d.). Another county, Nordland, officially included S3 in their regional innovation strategy in 2014.

However, S3 does not bring entirely new contents to regional development in Norway, but it continues to provide a rationale for Norway to rebalance its innovation system, incentivising further exploration of innovation (Mariussen & Finne 2017).

3.2.5. Iceland

Icelandic policy making for innovation and economic development is dominated by the national leve, due to their governance structure. The term 'regional' is limited in use (Lindqvist, Olsen, Perjo & Claessen 2013). In Iceland, 'strategies for smart specialisation are to be implemented at the national, rather than at the regional level' (Lindqvist, Olsen, Perjo & Claessen 2013). Iceland, as non-EU member, does not face the requirement of a smart specialisation approach in its regional development.

Iceland has not formally adopted the concept of smart specialisation. However, some processes incorporate general ideas of the concept. For instance, *Iceland 2020*, a guiding Icelandic policy statement is a product of collaboration and consultation with Icelanders, business interest groups, trade unions, local authorities and regional associations. Additionally, regional growth agreements between eight rural regions and the government have uncovered regional prioritisations, e.g. in tourism related to nature and culture, finished food products and renewable and eco-friendly energy. (Ibid.)

In conclusion, smart specialisation seems to be a rather distant concept for Iceland in comparison with its active integration into policies elsewhere in the Nordic countries.

3.2.6. Greenland, Faroe Islands and Åland

The Faroe Islands does not take a stand on smart specialisation nor is it a partner in S3 networks. However, there are some specific areas of investment and collaboration that are in line with S3 thinking. The Faroe Islands has decided to promote the country as "a maritime service hub" and "a shipping country" (The Government of the Faroe Islands 2015). Support is also given to areas of aquaculture, tourism and various creative industries, including for instance gaming and film. Further, collaborations between the University of the Faroe Islands, the research environment and industry is prioritised (Ibid.)

In Greenland, there are no references to smart specialisation on the national level. Possibilities of an S3 approach in policy formation have been sounded out in only one municipality, Kujalleq. Taking part in a REGINA project focusing on local smart specialisation (LS3), the first step towards LS3 in Kujalleq was to send out a survey to local companies in order to map out skills, competencies and development strategies in the region. The next step is engaging local stakeholders in the planned REGINA workshops to discuss local challenges and possible solutions. However, municipality's current efforts are targeted towards, for instance, skills development in food production and growth in innovative processing techniques (Jungsberg, Copus, Weber & Nilsson 2017).

Åland has incorporated smart specialisation in its Innovation Strategy for 2014-2020. The smart specialisation strategy builds on the region's structural funds programme "Entrepreneurship and competences 2014-2020" and the education policy "Competence 2025". The Ålandic approach to S3 emphasises the "entrepreneurial discovery process" and thus, seeks to support its companies' knowledge development rather than invest in the more traditional research and development (Innovation Strategy 2014-2020). Åland has identified its innovation potential in the maritime sector,

and states that the sector will work as a starting point for smart specialisation strategies (Ålands landskapsregering 2014.)

3.3. Regional level: the understanding of S3 approach in the Nordic regions

The key objectives of the smart specialisation concept revolve around finding regional areas of strength and including various stakeholders in the process. For the structural funds, these aspects are highlighted in regional strategies – be them innovation strategies, separate S3 strategies or general regional programmes. However, regions are in different stages regarding the work with the concept ranging from full implementation of S3 strategies to merely probing the concept. Further, there are different emphases on whether the selection of priority areas or the level of stakeholder inclusion outweighs one or the other.

On a Nordic level, the S3 concept has the longest tradition in Sweden and in Finland. Thus, the most extensive S3 strategies can be found in Swedish and Finnish regions. Swedish Östergötland, Skåne, Värmland and Örebro, and Finnish South Ostrobothnia, Helsinki-Uusimaa, Kymenlaakso and Lapland are examples of detailed work on smart specialisation. Some of these strategies include an action plan for monitoring the development, such as in the Finnish regions of South Ostrobothnia, Kymenlaakso and Helsinki-Uusima. The most comprehensive strategies on S3 additionally disclose the reasoning behind their priority selection, and comment extensively on stakeholder involvement (cf. Regional Council of South Ostrobothnia 2014; Kymenlaakso Liitto 2016; Helsinki-Uusima Regional Council 2015).

Smart specialisation as an approach is incorporated in regional strategies in an increasing manner. Ongoing strategy processes in Finland show that regional programmes are being structured according to the S3 concept (c.f. the Finnish Pirkanmaa and Central Finland's drafts for regional programmes). In its draft for the regional programme 2018-2021, Central Finland's overall goal of regional wellbeing/welfare is achieved by the five identified S3 spearheads. Also, South Karelia's forthcoming innovation strategy will take the role of the S3 strategy (Regional Council of South Karelia 2017). This showcases the fact that smart specialisation is not regarded as a disconnected strategy in relation to regional programmes, but instead might form the foundation of them.

However, many regions keep smart specialisation separate from their regional programmes. Often S3 deserves a place in regional innovation strategies or as a strategy of its own, whether comprehensive or brief. An interesting exception of S3 in a regional perspective is the Finnish rural Region of Kainuu. In their regional plans it is stated that S3-approaches tend to prioritise high-level expertise as well as research and innovation, rather than allowing for a more diverse approach to ensuring employment. The Kainee region needs to accommodate for both its top industries, which tend to require lower skilled labour, as well as identifying priorities within the framework of smart specialisation (Kainee Liitto 2017)

Not all regions have welcomed smart specialisation as a guiding tool. These regions include some Norwegian and Danish regions but also a combination of southern Swedish regions. Namely, the regions of Jönköping, Halland, Kronoberg, Blekinge and Kalmar (SBHSS) form an area that is predominantly rural where none of the single regions has joined the S3 Platform. However, these regions have joined forces in regional economic development and through their joint organisation SBHSS, they have identified two strong areas in which they continue to invest (e.g. Smart Housing, Smart Production)[2]. Still, smart specialisation appears as an imminent approach as it has not been included in the regions' current vocabulary. However, it should be mentioned that these regions do prioritise regional growth areas regardless. One step towards furthering the up-take of S3 is the

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[2] http://sbhss.eu/files/Handlingsprogram/Verksamhetsinrikting_forslag_2016.pdf

proposal by the SBHSS' managerial group, the so-called "chefgrupp", to establish a working group to identify the wider region's strengths within the framework of S3.

The selection of priority areas has not received a reception that was unanimously positive. While present in Finnish regions, some Swedish regions discard the part of the priority selection. Even though the recent innovation strategy of Jönköping (2017) is based on stakeholder collaboration, the strategy does not mention a single specific niche of key foci that usually tends to be the outcome of Nordic S3, innovation or regional strategies. A PhD-dissertation from Jönköping University proposes S3 to only be sensible for metropolitan regions, and that Jönköping's innovation strategy backs up the finding as Jönköping's 'innovation climate does not benefit from branch specific specialisation' (Wixe 2016).

4. Smart Specialisation and the green transition

In the Nordic context, smart specialisation as a place-based approach also links to the pursuit of a green transition and sustainable bioeconomy. Considering regional domains, the bioeconomy holds a promising place in the quest for possible smart specialisation strategies. The concept has gained increasing policy attention in later years, and is particularly prominent in research and innovation (R&I) agendas across the EU. Additionally, it is considered a research priority. The report 'Bioeconomy development in EU Regions' states that 207 out of the 210 territorial units analysed include bioeconomy aspects in their R&I plans (EC 2017). However, their focus areas for a bioeconomy vary significantly, with agro-food priorities being the most common (ibid.). With the bioeconomy playing an important part in the resurrection of regional economies across the EU, it would be interesting to take a closer look at its relevance to smart specialisation.

One example of using existing local and renewable resources for furthering the local economy through green smart specialisation, is the renewed focus on the forestry sector. Here, smart specialisation may be one way of bolstering the sector's role in a wider regional development perspective. Additionally, the forestry sector as part of the bioeconomy plays an integral part to a myriad of EU policy objectives. These include climate-energy, biodiversity policies (Bell et al 2018), industrial policies, and the EU's Cohesion policy; the latter being an important source for funding SMEs and new entrepreneurial search (McCann and Ortega Arguiles 2013). This is in turn at the very core of the smart specialisation agenda: a 'partnership-based policy process' drawing on entrepreneurs and policy makers insights, ensuring strong links between regional and industrial policies, and the creation of viable domains (ibid. 2013:1300). The bioeconomy and forestry as a 'domain' in smart specialisation is thus highly relevant, as it fundamentally draws on local resources, tacit knowledge, and know-how: simply put, it has an incremental potential to bear fruits.

4.1 Bioeconomy and S3 in the Nordic Region

The bioeconomy is firmly situated within R&I frameworks. It adds to the knowledge economy, enhanced innovation systems and demands favourable investment and policy frameworks. Local bioeconomy efforts represent the potential of a renewed focus on industrial policy. Moreover, it allows for the creation of a smart specialisation strategy that encourages knowledge spill-overs, innovative thinking in business models, as well as aggregating a range of relevant sectors and activities. Taking the Finnish and Swedish forestry sector as a case in point, it is evident that the innovations occurring in this sector of the bioeconomy hinges on "novel matching of existing scientific and technical knowledge" of the specific regions (Foray et al. 2011:7), as well as the increased R&D budgets to further explore innovative applications of e.g. nanotechnology and biotechnology as seen in Finland (ibid.).

Considering the case of the *Paper Province* in Värmland, Sweden, the spill over effects and links established in the region has arguably encouraged entrepreneurship in associated sectors; the necessary 'feeding and nursing' needed to ensure a successful smart specialisation strategy (Foray et al 2011). Furthermore, to ensure the stability and prospects for the use of forest resources, a continued use of smart specialisation strategies; the creation of an interconnected web of actors, there needs to be favourable frameworks in place, in terms of both policy and investment opportunities. Cushioning for a 'bumpy risk landscape' through long-term funding mechanisms, and the establishment of national or regional smart specialisation strategies, is thus highly necessary (McCann and Ortega-Argiles 2013; Mazzucato 2013).

4.2. The green transition in a wider perspective

The bioeconomy as a domain under smart specialisation has wide-reaching effects, and could feed into the green transition at a higher level. Digitalisation has revolutionised the way in which e.g. the forestry sector operates, facilitating processes, collaboration and trade (cf. e.g. SkogData AS n.d), but more importantly contributing to bolstering the outlooks for wider regional resilience. It can be argued that with the smart specialisation agenda, regional development becomes increasingly all-encompassing, placing emphasis on spatial planning and spill-over effects between industries (McCann and Ortega Argiles 2015; OECD). This in turn may help the renaissance of otherwise 'forgotten' industries, elevating these to be of wider national importance. This is particularly evident in terms of anticipated regional value creation (Bell et al 2018), regional development and cohesion (McCann and Ortega Argiles 2015) as well as arguably, creating a general optimistic outlook both within the sector itself, and for its potential investors. The green transition additionally realises the potential for viable regions in the future, emphasising the importance of recognising the benefit of such domains. Together with smart specialisation and regional resilience, the bioeconomy and the subsequent green transition may work its way into the fabric of regions that are endowed with sustainable quantities of biomass and natural resources. Smart specialisation may enhance the success-rate of implementing the regional bioeconomy agenda through funding, R&I, knowledge sharing and entrepreneurship.

However, it is worth noting that although smart specialisation and regional resilience go hand in hand, it may also serve as a tool for furthering regional disparities. As smart specialisation builds on innovation systems literature, it is inherently focused on frameworks of R&I (McCann and Ortega Argiles 2015). Arguably, this requires and assumes certain prerequisites in terms of Triple Helix-linkages, let alone the existence of e.g. a university or research institute within the region, that additionally does research within the reigns of the domain in question. As such, in regions with lower levels of knowledge creation, smart specialisation coupled to the bioeconomy may have a negative effect. It may serve to create an increasingly bigger gap between regions that encompass both knowledge centres *and* natural resources, and those that do not. Furthermore, and as with the logic buttressing competitive advantage, bioeconomy in a smart specialisation perspective may serve as a lock-in hindrance in the future. Thus, the question arises as to how this may be avoided, and how smart specialisation may serve as a system flexible enough to not 'get stuck', but remain agile in the future. Flexibility thus becomes key to ensuring the compatibility of domains, smart specialisation and regional resilience.

5. Conclusion

This report has provided a thorough knowledge and policy overview of smart specialisation in the Nordic Region. Attempting to get a systematic overview of how the Nordic regions a have adopted and adapted the concept of smart specialisation in their respective regional innovation strategies, it

becomes evident that there is a significant knowledge gap for understanding how the respective countries position themselves in comparison to their Nordic counterparts. This is particularly relevant for future collaborative cross-border work, as well as for identifying whether there is a specific 'Nordic model' of smart specialisation, considering both the presence of natural resources and the governance frameworks in place supporting innovation.

The S3 concept has the longest tradition in Sweden and in Finland, though it is noted that their respective regions have different outlooks regarding the necessity of adopting such a strategy or not. Thus, the most extensive S3 strategies can be found in these countries. However, it is interesting to note that e.g. Norway as a non-EU member, has nonetheless adopted the S3 approach in some of its regions and counties, despite smart specialisation not being an *ex ante* conditionality for receiving EU funding. This could be interpreted as a way of recognising and responding to the strengthening of regional advantages across the EU, wishing to remain relevant in R&I in the future. In turn, this re-emphasises Bellini's claim that the fundamental goals of territorial cohesion through EU regional policy has finally become cemented within the objectives of innovation and competition (2015). Additionally, this would help clarify the structural difficulties in ensuring regional growth, as well as the pursuit of a green transition and sustainable bioeconomy.

Furthermore, from a policy perspective the relation between the regional smart specialisation strategies and national policy remain an interesting nugget. Considering the cohesiveness, complementarities and dialogue between the different tires of government and regional actors will be investigated further in the analysis following the field study search, which will commence in March/April. Smart specialisation seemingly holds an important key to unlocking regional potential. The question is whether it is a viable future tool, and what new aspects to regional growth it might reveal.

6. Next steps

Over the next six months, the researchers grappling with the topic of smart specialisation will conduct field study search and analysis. Currently, the research team is busy reaching out to potential interviewees in the 5 Nordic countries, and is developing the methodological approach for the field study.

A pilot case study will be conducted and finalised by March 2018, the experiences of which will be used when implementing the remainder of the Nordic regional case studies on smart specialisation. Finally, the concluding analysis will be completed with in-depth studies by the end of the year 2018, when the final report will be published

References:

Asheim, B. (2011). The Changing Role of Learning Regions in the Globalizing Knowledge Economy: A Theoretical Re-examination, *Regional Studies*, 46(8): 993-1004.

Asheim, B. and M. Grillitsch (2015). Smart specialisation: Sources for new path development in a peripheral manufacturing region, Lund University, CIRCLE-Center for Innovation, Research and Competences in the Learning Economy.

Asheim, B., Smith, L. H. and Oughton, C. (2011) 'Regional Innovation Systems: Theory, Empirics and Policy', *Regional Studies*, 45(7): 875-891.

Bellini, N. (2015). Smart Specialisation in Europe: Looking Beyond Regionla Borders. Symphonya. Emerging Issues in Management, n. 1, pp. 22-29.

Boschma, R. (2008). "Constructing regional advantage: related variety and regional innovation policy." Report for the Dutch Scientific Council for Government Policy. University of Utrecht.

Boschma, R. (2014). "Constructing regional advantage and smart specialisation: comparison of two European policy concepts." Scienze Regionali.

Boschma, R. and Gianelle, C. (2014) `Regional Branching and Smart Specialisation Policy'. S3 Policy Brief Series, No. 06/2014. European Commission, JRC-IPTS, Spain.

Cooke, P. (2016). "Four minutes to four years: the advantage of recombinant over specialized innovation – RIS3 versus 'smartspec'." *European Planning Studies,* 24(8): 1494-1510.

Cooke, P. (2016). "The virtues of variety in regional innovation systems and entrepreneurial ecosystems." *Journal of Open Innovation: Technology, Market, and Complexity,* 2(1): 13.

Dubois, A., Kristensen, I. & Teräs, J. (2017). Outsmarting geography: implementing territorial innovation strategies in sparsely populated regions, *European Planning Studies*, 25:8, 1316 1333.

European Commission (2010) 'Expert evaluation network delivering policy analysis on the performance of cohesion policy 2007-2013. Task 2: Country Report on Achievements of Cohesion Policy: Sweden'. Directorate-General Regional Policy: Brussels.

Feder, C. (2015) Smart Specialization: Searching for New Theoretical Foundations. Regional Studies Association Conference 2016, Graz (Austria).

Foray, D. (2015). Smart Specialisation - Opportunities and Challenges for Regional Innovation Policy. London, Routledge.

Foray, D. and X. Goenaga (2013). The goals of smart specialisation, Publications Office.

Foray, D., David, P. A. and Hall, B. (2009) 'Smart Specialization – The Concept', Knowledge Economists Policy Brief n° 9, June.

Foray, D., P. A. David and B. H. Hall (2011). Smart specialisation From academic idea to political instrument, the surprising career of a concept and the difficulties involved in its implementation, EPFL.

Fromhold-Eisebith, M. (2004) 'Innovative Milieu and Social Capital – Complementary or Redundant Concepts of Collaboration-based Regional Development', *European Planning Studies*, 12 (6): 747-765.

Helsinki-Uusimaa Regional Council (2015) Smart Specialisation in the Helsinki-Uusimaa Region: Research and Innovation Strategy for Regional Development 2014-2020, available: [https://www.uudenmaanliitto.fi/files/16166/Smart_Specialisation_in_Helsinki-Uusimaa_Region_-_Research_and_Innovation_Strategy_for_Regional_Development_2014-2020_B_51_-_2015.pdf] accessed 31st of Jan 2018. accessed 31st of Jan 2018.

Henning Kroll (2015) Efforts to Implement Smart Specialization in Practice—Leading Unlike Horses to the Water, *European Planning Studies*, 23:10, 2079-2098

Kainuun liitto (2017) Kainee-Ohjelma. Maakuntasuunnitelma 2035. Maakunataohjelma 2018-2021. (Translated: Kainuu Program. Provincial Plan 2035. Provincial Program 2018-2021). Available: [https://www.kainuunliitto.fi/sites/default/files/kainuun_maakuntaohjelma_2018-2021_hyvaksytty_mv_18122017.pdf] Accessed: Jan 31st 2018

Kymenlaakso Liitto (2016) Kymenlaakso's Smart Specialisaton RIS3 Strategy 2016-2020. Available: [http://www.kymenlaakso.fi/attachments/article/3954/Kymenlaakso's%20smart%20specialisation%20RIS3%20strategy%202016-2020.pdf] Accessed: 1st of Feb 2018

Lundvall, B.-A. (1992) National Systems of Innovation. Towards a theory of innovation and interactive learning. London: Pinter.

Lundvall, B.-Å. (2003) 'The economics of knowledge and learning'. Department of Business Studies. Aalborg University.

Mariussen, Å. and Finne, H. (2017) Entrepreneurial discoveries in Norway: What's New? Innovation research in Norway – Recent findings and new perspectives. SINTEF/Nordlandsforskning. Available: [https://www.forskningsradet.no/servlet/Satellite?blobcol=urldata&blobheader=application%2Fpdf&blobheadername1=Content-Disposition&blobheadervalue1=+attachment%3B+filename%3D%22mariussen-finne.pdf%22&blobkey=id&blobtable=MungoBlobs&blobwhere=1274509864935&ssbinary=true] Accessed: 1st of Feb 2018.

McCann, P. and Ortega-Argilés, R. (2016). Smart Specialisation and SMEs: issues and challenges for a results-oriented EU regional policy. Small Bu Econ 46:537-552.

McCann, P. and R. Ortega-Argilés (2011). "Smart specialisation, regional growth and applications to EU cohesion policy." Documents de treball IEB(14): 1-32.

McCann, P. and R. Ortega-Argilés (2013). "Modern regional innovation policy." Cambridge Journal of Regions, Economy and Society 6(2): 187-216.

McCann, P. and R. Ortega-Argilés (2013). "Transforming European regional policy: a results-driven agenda and smart specialization." *Oxford Review of Economic Policy*, 29(2): 405-431.

Morgan, K. (2013). "The regional state in the era of Smart Specialisation." Ekonomiaz 83(02): 103-126.

Morgan, K. (2015). "Smart Specialisation: Opportunities and Challenges for Regional Innovation Policy." *Regional Studies,* 49(3): 480-482.

Neffke, F. M. H., Henning, M. and Boschma, R. (2011) `How Do Regions Diversify Over Time? Industry Relatedness and the Development of New Growth Paths in Regions'. *Economic Geography*, 87 (3), 237-265.

OECD (2011) Regions and Innovation Policy, OECD Reviews of Regional Innovation. Paris: OECD Publishing.

Regional Council of South Ostrobothnia (2014) South Ostrobothnia – Smart Outsanding: Strategy for Smart Specialisation. Available:
[http://www.epliitto.fi/images/B_64_South_Ostrobothnia_Smart_and_Outstanding_Strategy_for_S mart_Specialisation.pdf] Accessed: 1st of Feb 2018

Rodríguez-Pose, A., di Cataldo, M. and Rainoldi, A. (2014) `The Role of Government Institutions for Smart Specialisation and Regional Development'. S3 Policy Brief Series No. 04/2014. European Commission, JRC-IPTS, Spain.

Rodrik, D. (2004). "Industrial policy for the twenty-first century."

SkogData AS (n.d.) *Skog og Virke*, available: [http://skogdata.no/skog-og-virke] accessed: 30th of Jan 2018

Sörvik, J. and Kleibrink, A. (2015) `Mapping Innovation Priorities and Specialisation Patterns in Europe'. S3 Working Paper Series No. 08/2015. European Commission, JRC-IPTS, Spain.

Teräs, J. & Mäenpää, A. (2016). Smart Specialisation Implementation Processes in the North. Lessons Learned from Two Finnish Regions. *European Structural and Investment Funds Journal*, 4 (2): 75 - 86

Virkkala, S., Mäenpää, A. & Mariussen, Å. (2017) A connectivity model as a potential tool for smart specialization strategies, *European Planning Studies*, 25(4), 661-679

Policy-related references:

Asheim, B. (2014) North Denmark Region RIS3: Expert Assessment: An expert assessment of behalf of DG Regional and Urban Policy Retrieved from http://www.rn.dk/regional-udvikling/fakta-og-statistik/revus-analyse/-/media/Rn_dk/Regional-Udvikling/REVUS/REVUS-analyser/North_Denmark_Region_RIS3_Expert_Assessment.ashx

Cooke, P. & Eriksson, A. (2012) Resilience, "white spaces" and cluster platforms as a response to globalization shocks. In Cooke, P., Parrilli, M. D. & Curbelo, J. L. (2012) Innovation, Global Challenge and Territorial Resilience. United ingdom: Edward Elgar Publishing Limited./USA: Edward Elgar Publishing Inc.

Danish Business Authority (year) National Operational Programme for the European Regional Development Fund, 2014–2020 DENMARK 20 March 2014 Innovative and Sustainable Enterprise Growth. Retrieved from
http://s3platform.jrc.ec.europa.eu/documents/20182/223684/DK_RIS3_201403_Final.pdf/b7f00dc3-87cc-4519-8afc-59e40ec79ae9

Erhversstyrelsen (n.d.) Regional policy actors. Retrieved from
https://regionalt.erhvervsstyrelsen.dk/regional-policy-actors

Forskningsrådet (2013) Programplan 2014–2017: Program Virkemidler for regional FoU og innovasjon – VRI. Retrieved from https://www.forskningsradet.no/prognett-vri/Forside/1224529235249

Forskningsrådet (2016-17?) Programrapport 2016: Virkemidler for regional FoU og innovasjon/VRI. Retrieved from https://www.forskningsradet.no/prognett-vri/Forside/1224529235249

Forskningsrådet (2017) Forskningsbasert innovasjon i regionene (FORREGION): Programbeskrivelse. Retrieved from https://www.forskningsradet.no/prognett-vri/Regional_satsing_fra_2017/1254009745962

Forskningsrådet (2017) Sluttrapport VRI-programmet 2007–2017: Program Virkemidler for regional FoU og innovasjon – VRI. Retrieved from https://www.forskningsradet.no/prognett-vri/Forside/1224529235249

Government Offices of Sweden (2015) Sweden's National Strategy for Sustainable Regional Growth and Attractiveness 2015–2020. Retrieved from http://www.government.se/498c48/contentassets/ad5c71e83be543f59348b54652a0aa4e/swedens-national-strategy-for-sustainable-regional-growth-and-attractiveness-20152020---short-version.pdf

Government Offices of Sweden (2012) The Swedish Innovation Strategy. Retrieved from http://www.government.se/49b758/contentassets/cbc9485d5a344672963225858118273b/the-swedish-innovation-strategy

Jungsberg, L., Copus, A., Weber, R. & Nilsson, K. (2017). Demographic change and labour market challenges in regions with large-scale resource-based industries in the Northern Periphery and Arctic. Regina.

Lagnevik,B. (2013). Region Skåne. Towards a RIS3 Strategy. Powerpoint presentation in Seville, 3 May 2012 by Björn Lagnevik. Avaialable at: http://s3platform.jrc.ec.europa.eu/documents/20182/88981/MS_02+Pres+Skane.pdf/94b6a156-c2ea-460d-9a4c-12f63da5587b

Lindqvist, M., Smed Olsen, L., Perjo, L. & Claessen, H. (2013). Implementing the Concept of Smart Specialisation in the Nordic Countries. An Exploratory Desk Study. Nordregio working paper 2013:1 http://www.nordregio.se/Global/Publications/Publications%202013/WP2013_1.pdf

Ministry of Economic Affairs and Employment (n.d.) Regional development and regional councils. Retrieved from http://tem.fi/en/regional-councils

Ministry of Employment and the Economy. (2010). Suomen aluekehittämisstrategia 2020. Työ- ja elinkeinoministeriön julkaisuja. Alueiden kehittäminen 23/2010. http://www.lamk.fi/projektit/enne/materials/Documents/23_2010_web.pdf

Møre og Romsdals Fylkeskommune (n.d.) Strategiar og planar. Retrieved from https://mrfylke.no/Tenesteomraade/Regional-og-naeringsutvikling/Strategiar-og-planar/(language)/nno-NO

Owal Group Oy (2017) Alueiden vahvuuksien analyysi. Työ- ja elinkeinoministeriön julkaisuja, Alueet, 24/2017. Retrieved from http://owalgroup.com/wp-content/uploads/2015/01/TEMjul_24_2017_verkkojulkaisu.pdf

Polverari, L. (2016) The implementation of Smart Specialisation Strategies in 2014-20 ESIF programmes: turning intelligence into performance, IQ-Net Thematic Paper 39(2), European Policies Research Centre, University of Strathclyde

Sörvik, J. & Midtkandal, I. (2016) Continuous priority setting in the Norwegian VRI programme. In Kyriakou, D., Martínez, M. P., & Periáñez-Forte, I. (Eds.). (2016). Governing Smart Specialisation (Vol.

106). Taylor & Francis. Retrieved from
https://books.google.se/books?id=vwcxDQAAQBAJ&pg=PT249&lpg=PT249&dq=regional+analyses+n
orway+smart+specialisation&source=bl&ots=dcraOJJX7c&sig=E_Bu_LgToI4nZ1LrAM19a7KMOqw&hl
=fi&sa=X&ved=0ahUKEwilx-
iHurnXAhUjP5oKHWxbBMUQ6AEIVjAF#v=onepage&q=regional%20analyses%20norway%20smart%2
0specialisation&f=false

The Danish Agency for Science, Technology and Innovation (2016) CLUSTER STRATEGY 2.0: Strategy
for Denmark's Cluster and Network Policy 2016-2018. Retrieved from
http://s3platform.jrc.ec.europa.eu/documents/20182/232200/DK_Cluster_Strategy_Final.pdf/cec11
03a-b6bf-4895-8fe5-892ce3a0b00c

The Government of the Faroe Islands (2015) Coalition Agreement 2015, Annex. Retrieved from
http://www.government.fo/the-government/coalition-agreement/annex/

Tillväxtverket (2017) Finansiering för regional tillväxt 2016:

Tillväxtverket (n.d.) Utvecklingsansvariga aktörer. Retrieved from https://tillvaxtverket.se/aktuella-
amnen/regional-utveckling/utvecklingsansvariga-aktorer.html

Tillväxtverket (year) Tillväxtverkets strategi för smart specialisering. Retrieved from
https://tillvaxtverket.se/download/18.2f389fc715bc4774dbd252f9/1493878730736/Tillväxtverkets%
20strategi%20för%20Smart%20specialisering,%20maj%202017.pdf

Uppföljning av regionala företagsstöd och stöd till projektverksamhet. Retrieved from
https://tillvaxtverket.se/download/18.44451b6d15cc476e0b86d75b/1498718930162/Finansieringför
%20regional%20tillväxt%202016.pdf

Vanguard Initiative (n.d. a) Region Skåne. Retrieved from
http://s3vanguardinitiative.eu/partners/region-skane

Vanguard Initiative (n.d. b) Vanguard Initiative Position Paper: Regions and future EU policies for
Growth and Investment

Wixe, S. (2016) Regional Diversity and Economic Performance. Jönköping University International
Business School. Available: [http://hj.diva-portal.org/smash/get/diva2:1050036/FULLTEXT01.pdf]
Accessed: 1st of Feb 2018

Ålands landskapsregering (2014) Ålands innovationsstrategi. Retrieved from
http://www.regeringen.ax/sites/www.regeringen.ax/files/attachments/page/alands_innovationsstra
tegi_12_maj_2015_uppd_12_juni_2015.pdf

Prime Minister's Office (2011) Iceland 2020 – governmental policy statement for the economy and
community Knowledge, sustainability, welfare. Retrieved from
https://eng.forsaetisraduneyti.is/media/2020/iceland2020.pdf

Annex 1

Table 3: Nordic comparison of national S3 approaches

Country	Name of the S3-related Strategy	Content of the strategy	Major actors involved	Policy Support for S3
Denmark	National Operational Programme for the European Regional Development Fund, 2014–2020 (2014)	Entails the preconditions for qualifying for the ERDF and argues how Denmark with its existing policy framework qualifies for the ERDF	The Danish Business Authority, The Cluster Forum, Regional Growth Forums, …	Finance Bill allocations to R&D&I activities, including regional development funds; Structural funds; Growth Agreements
Finland	Finnish Regional Strategy 2020 (2010)	A strategy aiming at a specialised role for Finland in the world economy through regional competences	The Ministry of Economic Affairs and Employment, Regional Councils	Funding via AIKO-programme Growth agreements Information (a national mapping of regional strengths)
Iceland	Governmental policy statement for the economy and community "Iceland 2020" (2011)	A policy statement for efficient economy and society; emphases on e.g. smart growth, innovation and R&D, knowledge economy development and clustering	TBC	TBC
Norway	FORREGION Programme (2017)	Promotes research-based innovation in the regions and strengthens the connection between regional, national and international efforts to promote research-based innovation	The Research Council, the county councils, Innovation Norway, the Industrial Development Corporation of Norway (Siva)	Regional Research Funds. TBC
Sweden	Sweden's National Strategy for Sustainable Regional Growth and Attractiveness 2015–2020 (2015)	Guides the development of regional development strategies	County Councils and other regional authorities, Tillväxtverket	Tillväxtverket supports regions in their S3 strategy formulation
Åland	Åland´s Innovation Strategy 2014-2020	Entails the smart specialisation strategy as an annex	Landskapsregeringen (the Government of Åland)	TBC