Shaping Smart Specialisation: The Role of Place-Specific Factors in Advanced, Intermediate and Less-Developed European Regions

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Abstract

This paper examines the ways by which organisational and institutional features of regional innovation systems shape smart specialisation practices in less-developed, intermediate and advanced regions. Drawing on research from 15 European regions, we show that the implantation of smart specialisation creates challenges in all three types of regions. At the same time there is evidence that smart specialisation supports policy learning and system building efforts in less-developed regions and facilitates policy re-orientation and system transformation in more advanced regions.

1 Introduction

In a relatively short space of time, Smart Specialisation has become a powerful policy concept, not least due to its adoption by the European Commission as a condition for attracting EU funding assistance (European Commission, 2014a; Foray, 2014). The European Commission (2012, p. 8) explicitly describes Research and Innovation Strategies for Smart Specialisation as 'integrated, place-based economic transformation agendas' (see also European Commission, 2014a). This territorial focus responds to the EU's support for place-based development (Barca, 2009). Yet, the implantation of smart specialisation strategies (S3) has been met with criticism; in particular its applicability to less-developed regions has been questioned (Capello & Kroll, 2016) but also doubts have been raised about the relevance of the issues addressed by S3 for well-developed regions (Kroll, 2017). Somewhat surprisingly, despite its universal adoption across the European Union, little is known about how smart specialisation 'works' in different region types and what the particular opportunities and barriers to translating the concept into policy practice are.

The aim of this paper is to contribute to a better understanding of the challenges associated with the implantation of the smart specialisation concept 'on the ground'. Drawing on empirical research covering experiences of 15 regions (grouped into less-developed, intermediate and advanced ones), we explore how European regions engage in smart specialisation approaches and how opportunities and key obstacles to adopting smart specialisation differ between various geographical contexts. Special attention is given to two key components of the strategy development phase, i.e., stakeholder inclusion and policy prioritisation and to emerging issues related to implementation. Our analysis centres on the relation between regional innovation system (RIS) characteristics and smart specialisation. We explore how organisational and institutional RIS factors have affected the adoption of S3 in less-developed, intermediate and advanced regions and in what ways the introduction of smart specialisation has supported policy learning and RIS changes in these regions.

The remainder of this paper is structured as follows. Section 2 outlines some key principles of smart specialisation, reviews findings from recent empirical studies on S3 and introduces the RIS approach. This is followed by notes on the investigated regions, data and methods applied (Section 3). Section 4 presents our findings on the adoption of S3 in 15 European regions. We conclude with a summary discussion and conclusions in Sections 5 and 6.

2   Literature review and analytical framework

2.1   Smart specialisation: principles and novelties

Smart specialisation is now a key feature of contemporary regional innovation policies in Europe (Foray, 2014; McCann & Ortega-Argiles, 2016). The notion (more precisely, its 'translation' into a spatial concept that guides the development and implementation of S3) has been informed by work on new industrial policies (Rodrik, 2004), novel insights into the sources of regional structural change (Martin, 2010; Boschma, 2017) and an increasing awareness that regional innovation is fuelled by combinations of learning modes and knowledge bases (Asheim, Boschma, & Cooke, 2011; Jensen, Johnson, Lorenz, & Lundvall, 2007). Smart specialisation champions a new strategic orientation of innovation policy. It emphasises the modernisation of regional economies and their diversification into new fields building on the knowledge bases and capabilities developed in the past.

It also draws on many years of practical experiences with the design and implementation of regional innovation policies, aiming to obviate salient failures of previous strategies, which often suffered from a lack of sound analyses of regional potentials and the imitation of strategies implemented elsewhere (European Commission, 2012). The concept advocates place-based and evidence-based regional innovation policies that build on regional assets, thus avoiding traditional 'one size fits all' policy models (Tödtling & Trippl, 2005). Proponents of the approach also argue that it embraces a broad understanding of innovation that goes beyond narrow R&D-focused views, although this is contested by some (Cooke, 2016). A further novelty is the emphasis on strategies going beyond the dichotomy of either 'picking-winners' or providing generic support mechanisms, by focusing on the concentration of public resources on a few selected priorities and the envisaged shift from top-down towards bottom-up policies, which requires involvement of non-policy stakeholders into policy prioritisation processes (Gianelle, Kyriakou, & Cohen, 2016). In doing so, the smart specialisation concept stresses the importance of an 'entrepreneurial discovery process', both to identify those areas, or domains, where a region may find a competitive advantage, and as a means to generate innovative activities.

2.2   Studies of early S3 experiences

The smart specialisation approach propagates a set of new ideas and principles that constitute a break with past policy approaches in many regions. As the process of developing S3 in regions has progressed, recent studies have begun to explore experiences of regions in implanting the concept. Beside case studies, research covering larger sets of regions has been undertaken. Iacobucci's (2014) analysis of initial planning documents shows some sobering results, pointing to the selection of very broad areas of specialisation, lack of analysis of relations between the sectors, missing consideration of complementarities with other regions, and identification of a large number of specializing domains, some of which are only poorly founded in regional potentials and assets.

Other studies of early experiences of the implantation of the S3 agenda across Europe paint a more positive picture. McCann and Ortega-Argilés (2016) analyse the patterns of thematic and sectoral priorities chosen by EU Member States and regions and find little evidence for 'policy homogeneity'. The selected priorities appear to vary considerably across both countries and regions, much in line with the overall idea of smart specialisation to overcome 'one-size-fits-all' policy approaches of the past. Drawing on surveys of policy-makers' experiences with S3, McCann and Ortega-Argilés (2016) investigate the progress made towards integrating smart specialisation principles in policy processes and reveal that S3 has thus far had a positive effect on reshaping innovation policy in Europe. However, they also find 'weak spots', such as unclear links between the number of selected priorities and the regions' economic and innovation potential and the adoption of conservative approaches to monitoring and evaluation. According to the authors, progress has been made regarding governance (stakeholder involvement) and institutional processes. Kroll (2017) sees a high potential in S3 to rejuvenate and reorient policy practice towards a more effective, stakeholder-driven approach, but calls for more contextual sensitivity when developing and implementing S3. The extent to which S3 has induced policy changes varies considerably across regions. Kroll (2015) distinguishes between 'starters' (mainly Eastern European regions, where S3 governance principles were difficult to implement due to traditional planning cultures and centralist governance systems), 'active beneficiaries' (mostly Southern European regions, where the hard institutional framework proved to be more suitable to the introduction of bottom-up approaches), and 'drivers' (mainly Central and Northern European regions, where S3 processes induced amendments of governance practices).

Typically, existing studies are based on large-scale survey results and provide important insights into how S3 performances of regions are shaped by government systems and capabilities of policy actors. However, they paint a rather general picture and are solely based on the perceptions and experiences of policy-makers. Other studies tend to be based on unique case studies in a particular country (see, for instance, Cooke, 2016; Estensoro & Larrea, 2016; Healy, 2016; Morgan, 2016; Kroll, 2017). These provide a valuable in-depth analysis but lack cross-country comparability and can be difficult to generalise. Applying a RIS perspective, we seek to complement these studies through a meso-level analysis, examining a variety of regions drawn from across Europe. In doing so, we shed light on a broader set of factors by examining the link between characteristics of RISs and capabilities of a variety of stakeholders and S3 practices.

2.3   RIS and smart specialisation

Invoking the RIS approach provides an analytical lens through which to investigate the role of place-specific organisational, institutional and systemic factors in smart specialisation. 'A RIS can be understood as a … framework in which collective learning, innovation and entrepreneurial activities are shaped by … inter-firm interactions, knowledge and support infrastructures, socio-cultural and institutional configurations' (Trippl et al. 2017, p. 2) as well as policy and governance set-ups (see also Asheim & Isaksen, 2002; Tödtling & Trippl, 2013; Coenen et al., 2017). Such a perspective provides ground for arguing that the ways by which smart specialisation is taken-up and implemented in a region are influenced by and reflect the idiosyncrasies of the RIS. In a next step we seek to outline the link between RIS features and smart specialisation challenges.

Policy and governance capabilities of RIS and smart specialisation: The degree to which formal competences and power (autonomy) to design regional innovation strategies (and, crucially, the financial resources to independently implement them) are decentralised is a key determinant of strong policy and governance capabilities of RISs. These features will inevitably affect the adoption of S3. Low levels of formal competences and financial endowments at the regional level can be expected to lead to various 'autonomy challenges' in the implementation phase of S3. Whilst the degree of decentralisation shapes the room of manoeuvre for regional innovation policy making, much depends on the institutional structures and quality of government found in the region (Rodríguez-Pose & Cataldo, 2015; Kroll, 2017) and the

capacity and knowledge of actors in the policy and administrative system to design and implement modern regional innovation strategies like S3 (Kroll, 2015; Sotarauta, 2018). Past policy practices and policy path dependency may be powerful barriers to the adoption of new innovation policy approaches (Aranguren et al., 2018; Morgan, 2017). These may relate to the type of innovation policies pursued (e.g. Science-Technology-Innovation (STI) versus Doing-Using-Interacting (DUI) policies, firm- versus system level policies) and the forms taken (e.g. evidence-based, priority setting, stakeholder involvement, monitoring, evaluation, etc.). Arguably, regions with high qualities of governance and experiences with setting priorities, including stakeholders in policy processes and adopting broad-based systemic policies are better prepared to adopt S3 than those in which these assets still need to be developed. For the latter group, the design and implementation of S3 implies a steeper learning curve and sound strategies to overcome challenges associated with poor institutions and policy path dependencies. However, the change (and the benefit) brought by S3 might be bigger in this group than in the one with well-developed processes for policy making (Kroll, 2017). Finally, smart specialisation calls for and benefits from well-established multi-level governance set-ups and horizontal policy coordination (Kroll, 2017; Aranguren et al., 2018). Regions with functioning mechanisms for policy alignment will thus be in an advantageous situation, whilst those where such mechanisms are largely absent can be expected to face severe 'coordination challenges'.

Innovation and diversification capacities of RIS and smart specialisation: Density and degree of specialisation of the organisational structure of RISs, that is, the number, variety and 'quality' (capabilities and performances) of firms, industries and knowledge and support organisations will bear a strong influence on how smart specialisation is adopted in the region. Due to differences in historically grown economic structures and degree of heterogeneity in the industry mix as well as varying firm capabilities to innovate and move into new fields, regions differ markedly in their innovation and diversification capacity (Boschma, 2017; Isaksen & Trippl, 2016) and thus in terms of opportunities for selecting priorities that are in line with smart specialisation. Endowment of a sufficiently large number and – even more importantly – capable knowledge, intermediary and support organisations (organisational thickness) provides a strong basis for stakeholder inclusion and the transformation of selected priorities into concrete development projects. Organisationally thin regions may be confronted with the challenge to mobilise a critical mass of capable actors to engage in S3, whilst organisationally thick regions may face difficulties to make tough choices as regards whom to include in S3

practices and how to balance the needs and ideas of a large number of capable actors. Beside the degree of organisational thickness, the nature and level of internal and external connectedness (Thissen, van Oort, Diodato, & Rujis, 2013) and institutional structures, i.e., formal and informal incentives to and cultural patterns of innovation and cooperation (Gertler, 2010; Zukauskaite, Trippl, & Plechero, 2017) will affect the adoption of S3. Regions which are well-endowed with these features will be better equipped to set in motion a collective search for, discovery of and joint experimentation with novel ideas than those where institutional challenges prevail, that is, where the values of innovation and collaboration are contested and where formal institutions frustrate S3 endeavours.

In section 4 we explore how the RIS characteristics identified above have influenced the adoption of smart specialisation, focusing particularly on S3 practices and challenges related to stakeholder inclusion, prioritisation and implementation.

3   Investigated regions, data and methods

Our empirical analysis compares emergent smart specialisation practices from 15 European regions. The findings are based on research carried out in the context of the project 'Smart Specialisation For Regional Innovation' (2013-2016)[1]. The project mobilised researchers from different universities and other organisations across Europe, who were responsible for conducting research on smart specialisation practices in these regions (see Appendix A). Nine of the regions were partners in the project self-selected through an invitation to participate from ERRIN (the European Regions for Research and Innovation Network). This provided a strong level of access to policy officials and other actors as well as the opportunity to debate key themes in a shared community of practice. The selection of the remaining six regions was designed to provide a variety of institutional, economic and social contexts, which could provide a strong analytical matrix through which generalizable conclusions might be drawn and applied across the EU territory. The selection of the six additional regions was based on the following five criteria: innovation performance, socio-economic context, geographical location, population size and history of working with (regional) innovation strategies.

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[1] The project has been funded under the European Union's 7th Framework Programme; grant agreement no. 320131). https://www.cardiff.ac.uk/research/explore/find-a-project/view/461391-smart-specialisation-for-regional-innovation-smartspec

Empirical work in the 15 regions was focused on the NUTS level to which smart specialisation has been applied: Basilicata (Italy) (NUTS 2), Bremen (Germany) (NUTS 2), Flanders (Belgium) (NUTS 1), Great Plain Region (Hungary) (NUTS 2), Limburg (The Netherlands) (NUTS 2), Lodzkie (Poland) (NUTS 2), More and Romsdal (Norway) (NUTS 3), Murcia (Spain) (NUTS 2), Navarre (Spain) (NUTS 2), North East Romania (Romania) (NUTS 2), Northern Ireland (UK) (NUTS 2), Provence-Alpes-Cote d'Azur (PACA) (France) (NUTS 2), Scania (Sweden) (NUTS 3), South Moravia (Czech Republic) (NUTS 3) and Pirkanmaa-Tampere (Finland) (NUTS 3). This paper draws on comprehensive and detailed reports on each of these regional cases (see Appendix A).

To ensure coherence, consistency and comparability, a common framework was used for data collection and empirical analysis of all 15 cases. Research teams applied the same mixed-methods approach, combining secondary data analysis, desk-based analysis of existing practices, policy documentation and evaluative material, and 10-15 personal in-depth interviews in each of the 15 regions, covering a balance of key stakeholders (policy actors, firms, representatives of research organisations, intermediaries, etc.). In sum, almost 200 interviews with stakeholders across the 15 regions have been conducted. In each of the investigated regions the same questionnaire was used and the collected data was analysed against the common framework.

The investigated regions are geographically situated across Europe and they differ strongly in terms of geography, size, level of economic development, innovation capacity and governance context (Table 1)[2].

>> insert Table 1 about here <<

There is a wide divide in terms of innovation performance (measured by the Regional Innovation Scoreboard). Two regions in the North of Europe, South Sweden and West Finland (where Scania and Tampere are located) as well as Flanders, Limburg, Northern Ireland,

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[2] It is important to note that due to data availability the information given in Table 1 refers to NUTS 2 regions (with the exception of Flanders (NUTS 1)). However, in some cases smart specialisation strategies have been developed for lower spatial levels, covering NUTS 3 regions (Scania, Pirkanmaa-Tampere, More and Romsdal, South Moravia). In the remaining sections the unit of analysis is the area for which smart specialisation strategies have been designed.

Bremen and PACA have been in the 'innovation leader' or 'strong innovator' categories for the period 2008 to 2017. Vestlandet (where More and Romsdal is located) and Navarre also appear to have relatively strong innovation capabilities, although they seem less solid as their classifications as both strong and moderate innovators in different years show. These nine regions share a set of common characteristics such as strong economic performance measured by GDP (with Northern Ireland as an exception) and high rankings according to the European Quality of Government Index (EQI) and the EU Regional Competitiveness Index (RCI). Regions with relatively weak innovation capacities include Jihovychod (where South Moravia is located), Basilicata, Murcia, Lodzkie and Eszak-Alfold ('moderate innovators') and North East Romania ('modest innovator'). With the exception of Jihovychod, North East Romania and Lodzkie, these regions have higher unemployment rates than the EU average and their GDP is clearly below the EU average. Furthermore, they suffer from low levels of competitiveness and quality of government as indicated by their RCI and EQI rankings.

The analysed regions exhibit distinctive RIS configurations (see Table B1, Appendix B) and they face unique transformation challenges. They can be grouped into three main types of regions: less-developed regions, intermediate regions and advanced regions. In grouping regions, we have taken a broader consideration of factors than a simple GDP analysis. The considerations that underlie this classification can be summarised as follows.

In the initial stage of analysis we have divided the regions into two large groups based on their rankings in the Regional Innovation Scoreboard 2016. A preliminary distinction was made between well-developed regions (innovation leaders and strong innovators: Scania, Tampere, Bremen, Limburg, Flanders, PACA, Northern Ireland) and less-developed regions (moderate and modest innovators: More and Romsdal, Navarre, Murcia, South Moravia, Basilicata, Lodzkie, Great Plain Region, North East Romania). However, a detailed analysis of challenges in relation to the development and implementation of S3 has revealed a need for re-grouping to include an 'intermediate' category to take into account those regions which are less similar owing to wider institutional factors or overall economic performance.

This affected four regions, as follows. More and Romsdal in Norway has mostly been classified as moderate innovator in the period 2008-2016. However, in 2017 it has been in the 'strong+' category. What is more, it is a wealthy region, performing well in DUI types of innovation and it benefits from a vibrant entrepreneurship culture. Thus, it faces very different challenges when

compared to other regions that belong to the less-developed group. Northern Ireland, PACA and Navarre are strong innovators in most of the evaluations for the period for 2008-2017. However, they face more severe challenges in relation to S3 than other well-developed regions due to less developed organisational environment compared to other well-developed regions and different institutional deficiencies (see below and Table B1, Appendix B). Thus, More and Romsdal, Navarre, PACA and Northern Ireland are formed into a separate group of regions which are more advanced than less developed ones, but their RIS are not as developed as of those in the well-developed regions group.

These amendments resulted in the following grouping of regions.

- Less-developed regions: North East Romania, Great Plain Region, Lodzkie, Basilicata, Murcia, South Moravia
- Intermediate regions: PACA, Northern Ireland, More and Romsdal, Navarre
- Advanced regions: Scania, Tampere, Bremen, Limburg, Flanders

Although some analysts (Kroll, 2015) have advocated the separation of regions in the east of Europe from those in the south of Europe as relevant for the classification of regions by their capacity to implement smart specialisation, our analysis of experience in the 15 regions under consideration here suggests that such an approach is too simple a generalisation for detailed application. Regions such as Murcia appear to have more in common with regions such as Lodzkie than they do with Navarre, for example. Consequently our analysis does not take geographical location to be a defining criterion.

4   Regional Analysis

In a next step, we discuss how RIS factors influence the development of S3 and we shed light on the opportunities and challenges for smart specialisation approaches in the variegated spatial contexts that characterise the 15 investigated regions. Two key areas emerge from our analysis: the level of stakeholder involvement and the identification of priority domains.

4.1   Less-developed regions (LDRs)

With the exception of South Moravia, our findings suggest that innovation policies in the LDR group are characterised by historically limited levels of ***stakeholder involvement*** (Table B1,

Appendix B). The evidence suggests that smart specialisation has triggered a break with past top-down policy practices. All regions mobilised non-policy stakeholders (Table C1, Appendix C) in the strategy development phase. However, the process of crafting more inclusive forms of governance has not been without its difficulties.

Some of the challenges proved to be closely related to the specificities of the organisational infrastructure prevailing in these areas (Table B1, Appendix B). A typical feature is 'organisational thinness', restricting the number of capable stakeholders to be mobilised for joint S3 development. The firm population in these regions consists of SMEs with weak innovation capabilities and, typically, externally controlled MNCs, which pay little attention to regional development matters. The investigated regions have a well-developed knowledge infrastructure, hosting relatively strong universities and research institutes. However, these organisations focus mainly on teaching and basic research. Collaboration with industry and public authorities is often outside the scope of their activities, bedevilling their involvement in S3 practices. As a consequence, inclusion of private sector actors, universities and research organisations in the development of S3 has been a daunting task. In addition, intermediate organisations are few, young and with rather limited authority in the region (with South Moravia as an exception).

Challenges to stakeholder involvement also arise from the institutional infrastructure. Unfavourable informal institutions such as mutual mistrust and a weak cooperation culture were found to frustrate stakeholder inclusion in all investigated LDRs[3]. Collaborative practices are confined to a few areas only rather than being a widespread phenomenon, with the value of innovation itself often questioned by important stakeholders. Arguably, such institutional features are in conflict with the idea of an inclusive strategy that seeks to promote regional development by enhancing innovation activities.

Finally, challenges to stakeholder involvement also reside within the policy system. Policy-making capacities vary considerably across the investigated LDRs (Table B1, Appendix B). On one side of the spectrum are highly centralised countries such as Hungary and Romania, leaving the regional level with limited power and governance capacities (Great Plain Region, North East Romania). In North East Romania this leads to the apparently paradoxical situation that

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[3] Some regulative institutions set at the national level have also proven to constrain stakeholder. For example, in all the regions, reward systems in academia do not favour third task activities, providing few incentives for university researchers to participate in S3 processes.

regional S3 are developed as voluntary exercises. Yet, where there is the political mandate to develop regional innovation policies at the regional level, this is claimed by regional government with only a limited role assigned to other stakeholders (Table C1, Appendix C).

In some of the regions where there is more autonomy, leadership capacities in the field of innovation are under development but still rather weak. Lodzkie, for example, has no tradition of inclusive governance practices and limited competence for the development of the strategies. This has resulted in the outsourcing of inclusive governance practices and initial steps of S3 development to a consultancy company. Thus, regional authorities may have missed the chance to develop inclusive governance capabilities in-house (see also Kroll, 2017). Basilicata has used inputs from international experts to identify regional opportunities and challenges. However, the strategy itself was developed by a new governance body ('partenariatio') which brings together representatives from the research sector, the regional development agency and business associations. It has been the first time that more inclusive, bottom-up governance processes have been established in this region.

LDRs face severe ***prioritisation challenges***. The selected areas resemble a grouping of all economic activities under certain headings rather than an actual prioritisation (Table D1, Appendix D). This appears to be related to policy capture by vested interest groups and missing experiences with inclusive forms of governance. Searching for broad consensus among all stakeholders came at the expense of rejecting too few of the ideas fetched in collective discussions. Consequently, the regions under study face the challenge to achieve real prioritisation by upgrading inclusive governance practices, allowing for stakeholder participation on the one hand and having mechanisms in place for making prioritisation choices on the other hand.

Another prioritisation challenge is associated with the identification of areas that reflect current strengths as well as directions for future development. In the analysed regions, many of the selected priority areas point to strengthening areas that are already well established in the region. However, there is also evidence in each of the regions for prioritisation choices that seek to upgrade existing strengths and grow new paths by combining existing competences in novel ways, demonstrating adherence to S3 values. Few priority areas, though, explicitly seek to open up new path creation, such as through the exploitation of scientific capacities of research organisations. The bias towards existing paths reflects limited innovation and diversification

potentials, since university-industry links, spin-off activities and entrepreneurial dynamism are only slowly emerging in the LDRs under study. Furthermore, institutional factors loom large. Stakeholders reported that past failures with new path creation, coupled with strong beliefs in current strengths, have also created legitimisation problems for new development paths.

Although the LDRs in our study face many challenges when developing S3, the adoption of S3 has triggered learning processes and has supported efforts of RIS building. This has taken different forms. In particular, stakeholders identified how S3 development has led to more positive attitudes among researchers (especially younger ones) towards collaboration with industry and reduced mutual mistrust between parties. It also seems to have set in motion a process towards changing routines and norms based on top-down approaches in governance and may strengthen the policy-making capabilities at the regional level in the longer term. Thus, S3 has triggered institutional change processes. It will take time to see the effect of this on innovation activities and policy-making processes.

4.2 Intermediate regions (IRs)

Our IRs present a diverse mix of characteristics. Although most benefit from relatively high degrees of institutional thickness, our analysis points to some organisational deficiencies such as the absence of organisations performing basic research, low innovation capabilities in the firm sector and a lack of capable support organisations in individual cases. Institutional and systemic structures, such as cooperation cultures, also differ among the regions, often (but not always) resulting in rather fragmented RISs. Finally, different policy capabilities, degrees of autonomy and histories of innovation policy development are also present (Table B1, Appendix B). Despite these differences our analysis demonstrates strong consistency in the strategy development experiences.

Generally, all regions belonging to this group have succeeded in including a large number of actors in the S3 development phase (Table C1, Appendix C). In each of the regions there are capable players that could be mobilised for joint S3 development exercises and these regions benefit from past experiences with *stakeholder involvement*. They have also used the advent of smart specialisation for experimenting with new, more inclusive, governance modes, often involving the establishment of new representative bodies (Navarre, Northern Ireland and PACA). One of the key values of this has been to give voice to actors (such as SMEs) who have been overlooked by policy makers in the past. This has commonly led to a change in emphasis

in strategy development and, generally, contributed to a reduction in the traditional emphasis on the science and technology focus of innovation.

Our analysis of ***prioritisation challenges*** reveals that all investigated IRs have put in place evidence-based S3 that appear to reflect their unique strengths and characteristics. This positive finding, however, should not hide the fact that several challenges have impinged S3 prioritisation exercises. Overall, there is a strong focus on traditional economic activities with an emphasis on their upgrading. The S3 process has also led to new combinations of competencies being identified (e.g. mechatronics in Navarre, Connected Health in Northern Ireland, Health and Nutrition in PACA) in an effort to develop new paths (Table D1, Appendix D). Whilst these priorities clearly encompass the spirit of the S3 approach, the regions have also faced the challenge of narrowing the focus of these. For some this is due to specialised economic structures limiting opportunities for cross-industrial path development activities (leading More and Romsdal, for example, to identify 'Ocean Space' as a priority), whilst for others the power of vested interests and political priorities have encouraged the inclusion of those sectors where employment is strongest.

Across the IRs in the study there is evidence that the S3 approach has widened stakeholder engagement and led to the identification of new, cross-industrial, domains. Whilst these are often broadly drawn at present, evidence from Northern Ireland and other regions shows that through the introduction of smart specialisation requirements regional actors are now beginning to think more critically about identifying narrower domains for prioritisation.

4.3   Advanced regions (ARs)

The regions in this group benefit from organisationally thick and diversified RIS structures (Table B1, Appendix B). This creates both opportunities and challenges to ***stakeholder involvement*** in S3 processes. A large variety of industries, a critical mass of innovative small and large firms, strong universities engaging in research, teaching and knowledge transfer, and a large number of intermediaries constitute favourable organisational structures for the adoption of S3.

The institutional infrastructure found in the investigated ARs is supportive for innovation and collaborative activities. This is further reinforced by a high quality of government. The regions in this group show a strong innovation performance and have developed values, attitudes and

routines that support these processes. The main challenge experienced in this rich organisational environment has been to set up structures that allow both established and emerging actors to participate in collective governance processes.

The regions under study have been addressing these challenges in different ways. In Scania new collective governance bodies including key individuals from the public and private sector have been established. Interestingly, they have been selected on the basis of their knowledge of and interest in matters of regional innovation rather than on their position in particular organisations. Tampere has involved a large variety of actors to discuss challenges and opportunities related to the regional development. In Flanders and Bremen a mixed approach was adopted, building on both the establishment of collective governance bodies and a wide consultation of local stakeholders (Table C1, Appendix C).

Whilst there is some evidence of new actors being drawn into the process, these still tend to reflect the established 'triple-helix' constellation that is already well represented. Although some measures have been taken to include a larger variety of stakeholders, this still remains a challenge. Yet, the changing nature of innovation, with an emphasis on public sector innovation, service innovation and social innovation, suggests that this is a challenge that should be met, if these regions are to avoid the risk of locking themselves in to outmoded development paths.

Each of the ARs has developed their own S3, although the responsibility for this is undertaken by different bodies. Each also has a long history of innovation policy, which has resulted in complex systems for innovation governance. This has provided a legacy landscape that includes cluster-based policies, cross-sectoral platform approaches and other governance structures. Whilst this provides a strong basis for developing the S3 approach, there is also a tendency to favour continuing with existing practices and, in some cases, a limited willingness of stakeholders to engage in novel S3 processes until the policy context settles.

Turning to *prioritisation challenges*, it is important to state that all ARs under study have selected areas that represent current strengths and future development potentials as well as leave space for further experimentation (Table D1, Appendix D). Since these regions are characterised by industrial diversity, the challenge is to find a balance between the inclusive breadth of the areas and focus that would enable the allocation of resources where they can

make an impact. A second challenge for these regions is to avoid lock-in into previously successful paths. This challenge is especially relevant in the case of Tampere, Flanders and Bremen, which each host industries that have struggled to maintain their competitiveness.

The investigated ARs have generally developed evidence-based strategies that both aim to further existing strengths and to develop new growth paths. Only in the case of Flanders, has there been a conscious decision not to focus on new path creation, but rather to consolidate, exploit and streamline what is already embedded in the region. Some of the prioritised areas in these regions are defined in relation to global challenges such as personalised health care (Scania and Flanders), smart sustainable cities (Scania) and industry renewal (Tampere). This has enabled the inclusion of stakeholders based on their capability to contribute to challenge-solutions rather than their sectoral-belonging. Some regions have also incorporated a sector or cluster logic into their approach (Flanders, Bremen, Limburg) or centred on general purpose technologies, such as advanced materials/smart materials (Limburg, Scania).

5 Discussion

The findings presented in the previous sections reveal that opportunities and barriers to the development of S3 varies markedly between LDRs, IRs and ARs. There is clear evidence of the influence of RIS factors on S3 participatory processes. Stakeholder involvement requirements set by the S3 agenda constitute a true novelty in LDRs. Stakeholder inclusion takes place in a context characterised by organisational thinness (restricting the number of capable stakeholders to be mobilised for S3 development), unfavourable institutional conditions like poorly developed cooperation cultures and weak policy capacities. Depending on the specific regional context under consideration, this has led to policy-dominated governance set-ups, failures to include key stakeholders, or the 'outsourcing' of stakeholder involvement to consultancy firms. At the same time there is evidence that S3 has had a positive impact on the RIS of LDRs. This is related to the development of an understanding of the importance of collaboration, the reduction of mutual mistrust and a strengthening of policy-making capabilities. However, it remains to be seen if these are long-lasting changes in policymaking capacities or short-term deviations (see also Kroll, 2017). IRs offer a more fertile ground for participatory S3 practices due to thicker organisational structures, well-established or at least emerging cultures of cooperation, and past policy experiences with stakeholder involvement. The introduction of S3 has advanced these practices in some regions, facilitating

the inclusion of previously neglected actors. In ARs collective S3 search and discovery processes benefit from organisational thickness, a pronounced culture of innovation and collaboration, strong policy capabilities and a long history of stakeholder involvement in policy processes. Adoption of S3 exerts a positive impact on the RIS of ARs, reinforcing attempts underway to move beyond traditional triple helix actor constellations and experiment with new forms of innovation. However, ARs regions face the challenge to coordinate diverse and often conflicting values and interests of various stakeholders.

A common pattern found in LDRs is the selection of a too large number of very broad priorities. This reveals the challenge of setting up inclusive governance structures that allow for a broad inclusion of stakeholders and consensus-building *and* tough choices and avoidance of capture by vested interest players alike. Existing paths have been privileged over new path development. This not only reflects that these regions are constrained in their innovation and diversification capacity but also points to policy repertoires that favour existing paths and frustrates new ones. Owing to the influence of vested interest players and high degrees of industrial specialisation, setting too broad priorities is also a characteristic of S3 in some IRs. At the same time there are signs that S3 has increased the awareness of the need to identify narrower domains for prioritisation and to choose priorities that do not only favor well-established actor groups. In ARs it is paradoxically their key strengths, i.e. organisational, institutional and industrial variety, that create prioritisation challenges. These are about balancing an inclusive breadth of areas on the one hand and targeted impulses for a few areas only on the other hand. Regardless that it has been challenging, ARs have found appropriate level of aggregation based on global challenges and general purpose technologies, allowing for broad inclusion and experimentation.

At the time of our research, implementation of S3 had not yet begun. However, our research identifies some emerging issues, which will determine the success of S3 processes. At the heart of this is the extent to which S3 is embedded in practices designed to promote economic renewal and transformation at a regional level, or is a parallel process.

One of the most fundamental issues concerns unclear funding and budgetary commitments. Dedicated financial resources for the implementation of S3 are limited across most of the investigated regions. In the LDRs, a combination of limited financial autonomy and the effects of austerity (often relating to the past economic crisis) restrict the amounts of funds earmarked

for regional action. In addition, due to poor policy capacities, some of the LDRs are not capable to use the funds that are assigned for regional development. In some IRs and ARs, limited levels of financial decentralisation are also perceived by stakeholders as potential constraints on implementation. As with LDRs, the significance of budgets operated by national actors suggests a need for close multi-level collaboration between regional and national scales.

Implementation is also affected by governance change and complexity. At one level, political instability can introduce a discontinuity to the strategy-implementation process, which, at best, may delay implementation and, at worst, lead to strategy abandonment. Whilst our research has highlighted numerous examples of delay and disruption to date, there have been no examples of abandonment. Indeed, in the one case where this was regarded as potentially likely (Navarre), the strength of the strategy process caused the new governing bodies to incorporate the S3 into new institutional arrangements. A more insidious process may be at work in some regions however, which is where the S3 is sidelined in favour of everyday realities and preferences of stakeholders. The concern of some stakeholders is that S3 is regarded as a formal process (the 'ex-ante conditionality') which can then be conveniently forgotten once the EU funding programmes are approved. Finally, particularly in our ARs, stakeholders pointed to the risk that complex governance structures limit the responsibility of any single body to deliver the S3. It is not clear from our work that a sense of collective responsibility is in place in these situations to ensure implementation.

Across all the regions, there were concerns that the policy tools may not be present to deliver on the ambitions of S3. This can be due to dependence on national programmes or, in other circumstances, to a reliance on pre-existing approaches which are simply retained to deliver the S3. For many stakeholders, there was also concern that it would be the same actors benefitting, either due to policy-capture or, more prosaically, simply because non-traditional actors do not have the capacity to engage with the ambitions of S3 delivery programmes.

6 Conclusions

This paper casts light on how RIS factors have shaped emerging S3 practices in LDRs, IRs and ARs in Europe and how S3 has in turn triggered policy learning and RIS building/transformation processes in these areas. Our analysis of findings from 15 regions suggests that it is the interplay of a set of region-specific characteristics that shapes the

development and implementation of S3 practices in distinct ways. Degrees of industrial and organisational thickness and diversity, institutional set-ups, systemic features, policy capabilities, past experiences with innovation strategies as well as levels of policy centralisation mould the spatial contexts in which the uptake of smart specialisation takes place. In this regard place matters and place-based policies are clearly fundamental. Yet, we can also draw some important generic conclusions from the experience to date across three different types of regions.

Firstly, in LDRs we see the most positive impact of the introduction of S3 on stakeholder involvement, with some changes to past practices also evident in IRs. In contrast, the gains in ARs appear to be more incremental, rarely extending beyond those parties traditionally involved in innovation strategy making. This raises a real challenge for the S3 approach if it truly wishes to embrace notions of social and more inclusive innovation.

Secondly, we find that there has been a strong impact of smart specialisation in LDRs in terms of the introduction of contemporary approaches to innovation practices. Once again, there is less evidence of the evolution of new approaches in ARs, with something of a mixed picture present in IRs. The clear challenge for the S3 approach is how it might generate new innovative approaches to promote stronger innovation practices across the European territory as a whole, and not simply raise standards to the existing mean.

Thirdly, our work suggests that there are some signs for optimism in that there is some evidence that the S3 approach has promoted the capacity for an enhanced entrepreneurial search and discovery process in ARs. This finding is nuanced, however, in that whilst in some ARs this seems to be laying the foundations for potential economic transformations, in others it may be serving to promote lock-in to existing routines. How this will play out in practice is a crucial consideration for the future.

A fourth finding to our work recognises the challenge that many regions have faced in identifying priority domains. That this has been largely due to political and cultural factors reinforces the understanding that the identification of priority domains can never be a wholly technical exercise. Whilst our work suggests that there is some credence to the claims that some of the priority domains selected are overly broad and lack focus, there are also reasons to argue that such breadth allows for experimentation and self-selection during the post-strategy

development phase. Such refinement would form the measure of a true entrepreneurial discovery process and demonstrate the value of the approach undertaken. That it has been the ARs that have proven more able to develop novel groupings suggests that inherited capacity provides the foundations for such experimentation.

The findings presented in this paper suggest that the advent of smart specialisation has induced policy innovations in LDRs whilst in IRs and particularly in ARs, which have undergone substantial policy learning processes already in the past, the main effect of smart specialisation has been a re-orientation and upgrading of existing policy practices. Our results thus corroborate the findings from other recent studies (McCann and Ortega-Arquiles, 2016). However, there are also effects of smart specialisation on the wider RIS beyond the policymaking arena.

The fifth finding is the constant challenge of political instability in some regions. Whilst this is certainly not a novel finding, the fact that there has been, as yet, no abandonment of agreed S3 approaches, despite changes in political hue, suggests a strong value in the S3 process, which has not always been the case in the past.

Our final findings focus on the challenge of implementation. Many of the factors found to affect S3 development will also exert an influence in the implementation stage. It is too early to provide evidence of this as yet, but certain signs are emerging. In LDRs the success of S3 implementation will depend on efforts to further strengthen RIS building processes by enhancing the absorptive capacity of firms, integrating research organisations into regional development processes and improving the institutional structures. Another core challenge relates to uncertain funding and budgetary commitments related to the S3 itself, creating a fragile environment for implementing strategies fashioned at the regional level. The apparent lack of appropriate tools to deliver the RIS3 ambitions has been a source for concern across the regions analysed. Supporting the evolution of an S3 toolbox should be a key priority for applied research agendas in the future.

Implementation may also be impeded by the presence of misaligned funding streams and the identified lack of resources dedicated to the delivery of RIS3 strategies. This is exacerbated by complex governance systems for innovation, reflecting vertical and horizontal coordination challenges that may also negatively affect the implementation of S3. Seeking solutions to these

implementation challenges may well lie outside of the S3 remit, but highlights the importance of seeing S3 not as a parallel policy process, which the ex-ante condition has encouraged, but as a process that is embedded in the RIS.

Our analysis provides grounds for claiming that smart specialisation supports RIS building processes that are underway in less-developed regions and contributes to RIS transformation and re-configuration in intermediate and advanced regions. It remains to be seen how enduring these effects will be, but success here is essential if there is to be the adoption of a meaningful entrepreneurial discovery process in practice. The learning processes and changes outlined in this paper hardly take place overnight. This calls for future studies on the longer-term effects of smart specialisation, particularly in its relation to achieving economic transformations.

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Table 1: Socio-economic and innovation characteristics of examined regions

Region names used in the paper (region names according to EU standards) Region names in bold letters: level at which S3 have been developed	Codes (NUTS 2013)	Regional innovation scoreboard 2016 ** (2017) ***	Regional innovation scoreboard 2008, 2010, 2012, 2014 **	Population 2017 *	Unemployment rate 2017 (2012) EU-28: 7.6 (10.5) *	GDP per inhabitant PPS 2015 (2012) (EU-28: 100) *	EQI 2017 **** (2013) *****	RCI 2016 ****** (RCI 2013 *******)
South Sweden (Sydsverige)	SE22	Innovation Leader (Leader +)	Leader, leader, leader, leader	1,483,018	8.4 (9.4)	106 (107)	5 (6)	24 (27)
Scania (Skåne län)	SE224	---	---	1,324,565	---	107 (108)	---	---
West Finland (Länsi-Suomi)	FI19	Strong Innovator (Leader +)	Leader, leader, leader, leader	1,380,593	9.3 (8.2)	98 (105)	15 (8)	72 (66)
Pirkanmaa – Tampere	FI197	---	---	509,356	---	99 (110)	---	---
Bremen	DE50	Strong Innovator (Leader -)	Strong, strong, strong, strong	678,753	4.3 (6.6)	157 (159)	36 (39)	65 (38)
Vestlandet	NO05	Moderate Innovator (Strong +)	Moderate, moderate, moderate, strong	896,503	4.0 (2.9)	136 (144)	---	---
More and Romsdal (Møre og Romsdal)	NO053	---	---	266,274	---	131 (140)	---	---
Flanders (Vlaams Gewest)	BE2	Strong Innovator (Leader -)	Strong, strong, strong, strong	6,526,061	4.4 (4.5)	121 (122)	47 (48)	---
Limburg	NL42	Strong Innovator (Leader -)	Strong, strong, strong, strong	1,117,546	4.8 (5.4)	108 (108)	23 (26)	30 (17)
Navarre (Comunidad Foral de Navarra)	ES22	Moderate Innovator (Moderate +)	Strong, strong, strong, strong	640,353	10.2 (16.2)	114 (112)	73 (98)	148 (131)
Provence-Alpes-Côte d'Azur – PACA	FR82	Strong Innovator (Strong)	Strong, strong, strong, strong	5,047,942	10.3 (9.6)	98 (102)	93 (96)	117 (125)

Northern Ireland	UKN0	Strong Innovator (strong)	Strong, moderate, strong, strong	1,875,228	4.6 (7.4)	81 (82)	72 (43)	145 (140)
Murcia	ES62	Moderate Innovator (moderate)	Moderate, moderate, moderate, moderate	1,472,991	18.0 (27.6)	75 (74)	110 (90)	210 (181)
Jihovýchod	CZ06	Moderate Innovator (moderate +)	Moderate, moderate, moderate, moderate	1,687,764	3.1 (7.6)	81 (76)	102 (133)	151 (168)
South Moravia (Jihomoravský kraj)	CZ064	---	---	1,178,812	---	85 (79)	102 (133)	
Basilicata	ITF5	Moderate Innovator (moderate -)	Moderate, moderate, moderate, moderate	570,365	12.8 (14.5)	73 (73)	191 (180)	226 (227)
Lodzkie (Łódzkie)	PL11	Moderate Innovator (moderate -)	Moderate, modest, modest, modest	2,471,620	4.6 (11.1)	64 (62)	149 (151)	181 (197)
Great Plain Region (Észak-Alföld)	HU32	Moderate Innovator (moderate -)	Moderate, moderate, modest, moderate	1,468,088	7.4 (13.9)	43 (42)	175 (129)	232 (231)
North East Romania (Nord-Est)	RO21	Modest Innovator (modest -)	Modest, modest, modest, modest	3,239,612	2.9 (4.3)	34 (34)	189 (191)	251 (251)

Sources: * Eurostat database (n.d.) ** European Union (2016), *** European Union (2017),
 **** http://ec.europa.eu/regional_policy/en/information/maps/quality_of_governance#2 (Scorecards – Interactive Web Tool; accessed: 27th June 2018)
 ***** Charron et al. (2014), ****** http://ec.europa.eu/regional_policy/en/information/maps/regional_competitiveness/#2 (Scorecards – Interactive Web Tool; accessed: 27th June 2018), ******* Annoni and Dijkstra (2013)

Note: ---: no data

Appendix A: Regional Reports

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Appendix B - Table B1: RIS features

Region names	Innovation and diversification capacities	Policy and Governance Capabilities
Scania	• Economic structure: diverse; many different industries: strengths in food, packaging, life science, ICT, cleantech, moving media • Presence of research intensive firms and SMEs with strong innovation capabilities; many local & global knowledge links • High profile universities: active engagement in regional development; strong local & global linkages • Intermediaries: 100 innovation & business support organisations with overlapping functions, too little coordination • Strong institutional incentives for innovation & collaboration	• High level of regional autonomy in innovation policy but limited financial resources • Larger municipalities play important role in the implementation of innovation policies • Evidence of strong alignment of regional policies with national and EU strategies to secure funding • Past policy practices: promoting research-based innovation; cluster policies, inward looking policies; recent shifts towards social, service & public-sector based innovation, platform policies, outward looking policies (promotion of global knowledge links)
Pirkanmaa - Tampere	• Economic structure: strong specialisation in ICT, machine engineering: previously successful sectors struggle to keep their competitive position while new sectors are yet to emerge • Branches of national / multinational firms with HQs outside the region • Strong universities with manifold linkages to regional stakeholders; some barriers to research commercialisation (funding models, etc.) • Large number of intermediary organisations with dispersed & unclear responsibilities: fragmented structures in need of consolidation • Strong global networks through large MNCs & universities • Culture of collaboration favours university-industry partnerships but does not support interaction with wider society and public sector servants	• Regional level has relatively little formal decision and funding power • Fragmented & complex system of multi-level governance of innovation: innovation policy initiatives often coordinated between national and city levels with no formal power given to the region • Past policy practices: long tradition of regional innovation policy: focus on promotion of university-industry connections and clusters; signs of shift towards demand-driven, problem-focused & cross-sectoral policies • Well-developed processes of inclusive governance but mainly focused on triple helix constellations
Bremen	• Economic structure: strengths in advanced manufacturing; key sectors: automobile, aeronautics, agro-food, logistics • Relatively weak R&D base in the private sector • Presence of branch plants with HQs and R&D centres outside the region (Mercedes, Airbus, Kraft Foods, etc.) • SMEs (in some sectors): conservative mindset restricts collaboration • Large number of strong research institutes and universities but low levels of knowledge transfer with local firms • Little knowledge exchange across different sectors / organizational fields • Relatively few intermediaries	• Strong regional autonomy • Past policy practices: cluster policies, STI policies; strong focus on strengthening traditional sectors • Excessive reliance on informal networking
Flanders	• Economic structure: historically strong position in automotive, chemical, electronics industries (nowadays under threat), pharmaceuticals, mechatronics • Strong R&D and innovation capacities in the private sector; co-presence of MNCs & innovative SMEs; collaboration culture • Presence of strong universities and research centres; many collaborations with firms and public authorities • Strong intermediaries facilitating knowledge exchange	• Region has full autonomy in innovation policy • National level and communities: competence for limited number of specific fields that affect regional innovation dynamics • Regional policy-making characterised by individual ministries making their own strategies but coordination across policy domains • Multi-layered and complex governance structures; institutional fragmentation & uncertainty addressed by recent governance reforms

		• Past policy practices: growing trend towards strategic targeting (prior to smart spec); strong focus on science- and research-based innovation
Limburg	• Economic structure: chemicals, agro & food, high tech industries (biotech); large healthcare sector • Presence of global R&D players (PHILIPS, ASML, OCÉ, DAF, etc.) • Strong universities including the applied sciences universities: strong links to firms and policy actors • R&D and innovation are increasingly based on open innovation networks • Long-standing tradition of triple helix-type cooperation • Strong intermediary sector	• Province has limited competences and limited own sources of income • National level has a high degree of capacity to influence prioritisation and innovation policy through its control of significant income streams • Complex and multi-layered character of the governance system: two tiers of sub-national government (provinces, municipalities); cross-border innovation schemes; many different collaborative arrangements • Past policy practices: early adoption of system-oriented policies; experiences with inclusive governance focused on triple helix actors; little experiences in strengthening demand-side innovation policies & promotion of service innovations
More and Romsdal	• Economic structure: strong specialisation in traditional industries: furniture, textile, fishery & aquaculture, shipping & machinery, oil & gas • Internationally competitive firms (including global players & foreign MNCs) with regional & global knowledge and trade links • Entrepreneurial culture deeply rooted in the self-image of the region • Prevalence of the DUI innovation mode supported by,high levels of trust and informal interaction • Normative differences between MNEs (formal hierarchical structures and profit orientation) and SMEs (flat hierarchies, informal communication, long-term interest in regional development) • Strong endowment of applied knowledge organisations (university colleges, applied research institutes) with tight networks to firms and other regional stakeholders; narrow focus on current technologies • Lack of basic research capabilities and scientific (analytical) knowledge • Strong intermediaries: several innovation support & cluster organisations	• Limited regional autonomy; limited financial means for innovation policy • National level still dominates the design and implementation of many policies relevant for regional innovation dynamics (despite recent decentralisation trends) • Complex regional governance structure: various regional layers (municipalities, counties, regions administrating regional research funds) in need of better coordination • Past policy practices: long-standing experiences with inclusive (but rather informal) governance structures: involvement of firms, research institutes, cluster & innovation support organisations in the design and implementation of regional innovation strategies
Navarre	• Economic structure: diverse: automotive, agri-business, machinery, health industry, renewable energies • Presence of MNCs with knowledge-intensive activities outside the region and little interest in regional matters • SMEs lack capacities to absorb university knowledge • Strong universities; promotion system does not favour third mission activities; weak participation in EU/global knowledge networks • Large number of innovation support organisations: most of them lack critical mass/resources; fragmented structures; weak cluster organisations	• High degree of regional autonomy: regional government enjoys budgetary autonomy and independence in the design and execution of innovation support measures • Political crisis since 2012 (dissolution of coalition government), lack of funding since financial crisis • Past policy practices: strong focus on technology-based innovations
Provence-Alpes-Côte d'Azur	• Economic structure: still dominated by lower value added activities; key sectors: tourism, culture, sports industry, maritime, logistics, agriculture, agro-food, aeronautics, space, naval & defense, health • Weak endogenous business structure: domination of SMEs with low capacities in R&D & innovation	• Limited regional autonomy (despite long-term decentralisation trend) • Vertical policy coordination between national and regional level of varying quality • Past policy practices: linear approach, strong focus on STI (technology push); gradual adoption of a broader approach (technological, organisational and social innovation) in the recent past

	• Well-resourced universities but little concern about applicability of their research to business activities (relatively week university-industry links) • Relatively large number of intermediaries but lack of coordination	• Some experiences in prioritisation (since 2009); inclusive governance mainly focused on academia and public research sector
Northern Ireland	• Economic structure: still dominated by relatively low-value activities (agriculture, construction, retail, manufacturing) • Few large, mostly externally owned firms in key strategic sectors (engineering, pharmaceutical & healthcare, financial service technologies) • Local SMEs: relatively poor innovation capabilities • Strong universities & other HEIs: active role in knowledge transfer & governance networks; well-developed non-local academic links • Regional connectivity: new relations between firms in the same sector and with universities facilitated by competence centers • Low levels of extra-regional connectivity • Strong intermediaries	• Region benefits from decentralised powers (education, health, economic development policy), control over innovation policy but limited own income raising powers • Large number of departments that make up the regional government as source of fragmentation; recent increase in cross-departmental agreements: development of a 'whole of government' approach • Complex multi-level (within the UK) and cross-border governance framework (with the Republic of Ireland) • Past policy practices: Experiences in prioritisation prior to smart spec; earlier shift from direct allocation of public grants for R&D projects to individual firms towards a more entrepreneurial and networked perspective; stakeholder inclusion (particularly firm sector)
Murcia	• Economic structure: relatively diverse; strong specialization in agriculture; varied manufacturing industries: food, drinks, tobacco; chemistry, pharmacy, refined petroleum, shipbuilding, maritime industry • SMEs: poorly developed innovation and networking capabilities • MNCs with HQs outside the region; lack of interest in regional matters • Intermediate level universities: no tradition to collaborate with firms; lack of suitable incentives & structures for third mission activities • Underdeveloped culture of collaboration; poor regional connectivity, limited participation of regional actors in non-local innovation networks • Several but relatively weak intermediary organisations	• Regional government with high degree of autonomy with regard to spending, some regulatory power (but without taxation power): responsibilities for regional development issues and capacity to lead and fund the process • Constrained financial resources • Past policy practices: long tradition of innovation policy making (STI plans since 2003); strong focus on supply-side policies (investment in public sector R&D), neglect of demand side; no tradition of stakeholder inclusion
South Moravia	• Economic structure: relatively diverse: engineering, electrical equipment & electronics, financial & insurance activities • MNCs in advanced business services • Many firms (particularly SMEs): limited innovation capabilities but recent increase of number of firms with own R&D activities • Cooperative & trustful relationships have formed so far in a few branches only • Strong endowment of universities & research organisations; weak links to firms and other stakeholders: mutual mistrust; absence of managerial & strategic capabilities at universities; national institutions (R&D funding, criteria for promotion of academics) do not reward cooperation with firms • Strong and well-coordinated business & innovation support system	• Regional self-government; weak formal competences for innovation policy but good endowment of financial resources • Presence of well-respected key organisations with strong capabilities to implement innovation policy • Weak government & low quality of public administration at the national level: poor predictability of actions and unclear strategies for research & innovation • Past policy practices: long-standing experiences in developing and implementing regional innovation strategies partly based on stakeholder inclusion (since 2002); emerging experiences with system-level policies (promotion of university-industry partnerships, networking) and development of visions and strategic focus
Basilicata	• Economic structure: strong specialisation in automotive industry; presence of other sectors such as sofa production, agro-food, oil industry • Small firms operating in low tech sectors with lacking innovation capabilities; no recognition of the value of collaboration • MNCs with some in-house innovation activities and non-local links but no regional spillovers	• Region has full autonomy to develop and implement innovation policy (but no fiscal autonomy) • Long history of top-down regional policy governance: region not considered as a policy making centre but as a place for administrative practices • Poor capacity to manage (EU) funds

	• Weak intra-regional and extra-regional knowledge linkages • Relatively strong research system (basic research institutes); no tradition of collaborating with the private sector and other stakeholders • Intermediate agencies: few and young, have not reached the capacity yet to mobilise regional stakeholders and facilitate knowledge exchange	• Past policy practices: history of top-down approach, little experiences in strategic policy making and inclusive governance; innovation policy mainly focused on addressing specific actors rather than targeting the system level and promoting networking activities
Lodzkie	• Economic structure: relatively diverse: light industry, textile, agriculture, food, construction materials, pharmaceuticals, ICT • Low innovation capabilities in the firm sector; innovation and collaboration (with universities) not perceived as having high value • Strong research sector: three universities • Low level of trust, no tradition of academia-industry collaboration, reward system in academia do not value collaboration with firms • Regional connections: lack of trust within firm sector, between academia and industry, between triple helix actors • Various (newly established) intermediaries with poorly developed competences forming a fragmented system • Excessive level of regulation (e.g. bankruptcy procedure, academia-industry links)	• High degree of regional autonomy: regional governmental body (Marshall office) with legal power, financial resources and experience in developing and implementing regional development strategies • Past policy practices: no involvement of stakeholders in development of regional strategies; emerging experiences with system-oriented policies
Great Plain Region	• Economic structure: relatively diverse: health industry (medical instruments, pharmacy & biotech), food, ICT, (thermal) tourism • Presence of innovative MNCs (Electrolux, Samsung, Michelin, etc.) • SMEs have limited innovation & networking capacities • Knowledge exchange confined to a few functioning clusters only • Strong but underfunded research sector: universities, public research institutes; interactions with industry confined to a few branches only; mutual mistrust • External connectedness: involvement of universities in EU networks • Several intermediary organisations with limited capacities: tasks and funding are changing in the context of ongoing reforms	• Strongly centralised system of government • Recent restoration of counties (for public administration and self-government): regulatory competences for strategic development planning but regionally decentralised resources for implementation are missing • Still major challenges in terms of clarifying the competencies of county governments and overall stabilisation of key organisations (regarding, e.g., the management of the STI policies, financing of investments) • Role of regions (NUTS 2 level) remains largely undefined: only administrative units without self-government capacities • Past practices: no stakeholder involvement in developing innovation strategies; emerging experiences with system-oriented cluster policies
North East Romania	• Economic structure; dominated by agriculture; main industries: wood processing, furniture, textile, footwear, machine-tools & equipment, drug industry & food • Low innovation capabilities of the private sector • Small number of clusters in early stages of development with some future potential for developing collaborative activities • Relatively strong public research institutes & universities but very few linkages to firms: little interest in partnerships with the private sector; institutions reward academic excellence but not commercialisation of research & knowledge transfer • Very few capable intermediary organisations	• Government authority highly centralized with three primary tiers of administration: national, county and local (municipality, city, commune); region has no administrative or legal status, no role in innovation policy making • Very weak coordination between national and sub-national government levels • Past policy experiences: over a decade of activity in the field of innovation strategy development; little stakeholder inclusion

Source: Regional reports (see Appendix A)

Appendix C – Table C1: Stakeholder involvement

Region names	Formal responsibility	Operational responsibility	Mobilized stakeholders	Not included stakeholders
Scania	The regional government	Collective governance bodies – FIRS and SUS	Regional and local governments; Universities; Support organisations; Private sector; Governmental agencies for regional development and innovation at the national level	Civil society
Pirkanmaa - Tampere	The regional government for S3 The city of Tampere and Innovation agency (Tekes) for related programmes	The regional government for S3 The city of Tampere and Innovation agency (Tekes) for related programmes	Representatives from private and public sector; universities; private sector (included via consultation)	Civil society
Bremen	The regional government	The regional development agencies for Bremen and Bremerhaven	Firm and entrepreneurs belonging to the three main sectors (aerospace, logistics and off-shore wind energy)	Firms outside the three main sectors; Universities and research institutes; Civil society
Flanders	The regional government	The regional government and regional development agencies	Private sector; Civil society (in form of employer organisations, labour unions, socioeconomic councils); Higher education and research organisations	-
Limburg	The province of Limburg	The province of Limburg	The province of Limburg; Maastricht University	Private sector Civil society
More and Romsdal	The regional government	The regional government	Regional and municipal government; Private sector (MNEs & SMEs); Regional research organisations; Cluster and innovation support organisations	Civil society
Navarre	Moderna foundation – a non-profit entity of general interest	Moderna foundation	Trade unions; Civil society in a form of political parties; Business associations; SMEs; Limited inclusion of universities & the regional government	MNEs
Provence-Alpes-Côte d'Azur	The regional government	Steering committee	Steering committee: the Regional Council, the Prefecture, a Regional Committee for Innovation, including all the regional actors, and a permanent regional conference of regional innovation stakeholders; Private sectors participation was strengthened Participation by universities / research centres deliberately restricted	Municipalities; Civil society

Northern Ireland	The Regional government – Northern Ireland Assembly	Science Industry Panel, Matrix – independent-of-government and industry-led advisory panel	Private sector was given biggest influence; Limited inclusion of universities and public innovation support organisations	Civil society
Murcia	The regional government	The regional government	The regional government; Universities; Business associations; Individual SMEs; Civil society (consulted in form of a survey).	MNEs
South Moravia	The regional government	Innovation office (JIC)	Private sector; Regional government; Support organisations; Universities; Civil society	-
Basilicata	The regional government	The regional government	Universities, municipalities and business associations in a form of 'partenariato'.	Private sector; Civil society
Lodzkie	The regional government (S3 approved by the National government)	Outsourced by the regional government to a consultancy company	ICT cluster organisation and university partly involved in drafting a strategy (parts of ICT specialisation). 400 individuals consulted on a strategy as a whole	Not clear to what extend private sector and civil society were represented among 400 individuals
Great Plain Region	National government	The regional innovation agency (S3 needs to be approved and implemented by the National government)	County and local governments; Regional agencies; Universities and research organisations; Chambers of commerce; Industry and agriculture associations; Support organisations; Private sector (MNCs and SMEs); Civil society in form of NGOs.	-
North East Romania	National government	The Regional Development Agency (provided consultation to the national level; developed an informal regional S3 strategy)	The regional development agency; Six County Councils in the region; Universities; Private sector	Civil society

Source: Regional Reports (see Appendix A)

Appendix D – Table D1: Selected Priorities and Assessment

Region names	Priorities selected by regions	Assessment*
Scania	• Smart sustainable cities • Smart materials • Personal health	• Selected priorities are not defined in terms of sectors but around societal / global challenges and opportunities in the region • Focus on path diversification & path creation
Pirkanmaa - Tampere	• Smart mobility, smart housing & infrastructure • Industry renewal • Advanced treatments and human spare parts	• Selected priorities reflect focus on problem areas rather than on sectors • Focus on path renewal, path diversification & path creation
Bremen	• Aerospace • Logistics • Automobile • Off-shore wind energy	• Selected priorities reflect strong focus on established paths & current strengths (path extension & path renewal) • Focus on emerging activities at the intersection of different sectors and areas of expertise (path diversification) less important in comparison
More and Romsdal	• 'Ocean space' (with a particular focus on technology development in the fields of biotechnology, logistics, materials, automatization, robotisation)	• Selected priority ('ocean space') is very wide: very broad topic under which many potential specialisations are feasible • Strong focus on existing cluster initiatives, reflecting path renewal & path diversification and to a lesser extent path creation
Flanders	• Sustainable chemistry • Specialised manufacturing solutions • Personalised cure and care • Value-added logistics • Specialised agro-food • Integrated building-environment-energy cluster • New ICT-platforms	• Selected priorities reflect logic of building on the potential of existing assets • Focus on consolidation and reinforcement of what is already embedded in the region (path renewal & path diversification) rather than promoting new clusters or domains of activities (path creation)
Limburg	• Agro-food and Horticulture • High-tech systems and materials • Chemicals and materials • Life Sciences & Healthcare • Biobased Activities • Logistics, Maintenance	• Selected priorities reflect focus on clusters which are already world-leading in performance / which have strong international potential • Strong alignment with national clusters (priorities) • Strong focus on path diversification based on technological crossovers
Navarre	• Healthcare economics (health services; medical appliances; biomedicine) • Green economics (sustainable construction; sustainable vehicles; renewable energies; sustainable tourism; environment & waste) • Talent economics (mechatronics; design and creativity; safety)	• Selected priorities reflect existing strengths and future areas of development of the region (path renewal, path diversification & path creation) • Lack of real prioritization: searching for the broadest consensus came at the expense of focus
Provence-Alpes-Côte d'Azur	• Energy transition-energy efficiency • Smart and sustainable mobility • Risk, safety and security • Health and nutrition	• Selected priorities strongly inspired by poles of competitiveness approach and global challenges • Focus on path renewal, path diversification & path creation

	• Tourism, cultural and digital content industries	
Northern Ireland	• Agri-food technologies (integrated value chain, niche/functional food) • Sustainable energy (intelligent energy systems) • ICT (software engineering, big data/data analytics, cyber security, etc.) • Advanced manufacturing/materials (advanced engineering, composites, electronics and electrical components) • Life and health sciences (connected health and stratified medicine)	• Selected priorities are very broad, covering major sectors of employment in the regional economy (weak prioritisation) • Focus on path renewal, path diversification & path creation
Murcia	• Agrofood (agriculture, livestock, fishery and food industry) • Quality of life (tourism, health, habitat) • Driving forces (energy, shipbuilding, maritime, petro-chemistry)	• Selected priorities represent grouping of the whole economy into certain areas rather than actual prioritisation • Selected priorities have no common denominator (blurred strategy): inclusion of a sector based group (agrofood); a theme group (quality of life), and a group based on the importance in the regional economy (driving forces) • Novelty in relation to path development is hard to assess
South Moravia	• Advanced manufacturing and engineering technologies • Precision instruments • Development of software and hardware • Drugs, medical care and diagnostics • Technologies for the aircraft industry	• Selected priorities reflect existing capabilities found in well-established sectors & opportunities for cross-fertilization (path renewal & path diversification) • No focus on path creation (e.g. by exploiting university knowledge) due to failed attempts in the past, lack of commercialisation capabilities of research organisations, little support by key stakeholders
Basilicata	• Aerospace (earth observation sector) • Automotive • Bio-economy; energy • Cultural and creative industry	• Selected priorities represent traditional economic strengths of the region and research expertise • Focus on path renewal & path creation (but no private sector capacity in the latter field)
Lodzkie	• Modern textile and fashion industry, including design • Advanced building materials • Medicine, pharmacy, cosmetics • Power engineering, including renewables; innovative agriculture and food processing; IT and telecommunications	• Selected priorities represent all the major players / sectors in the region (no real prioritisation) • Focus on existing industrial branches (path extension) & path renewal • Regional stakeholders do not support path creation
Great Plain Region	• Health industry (pharmaceuticals, medical devices, biotech, medical and health tourism, thermal water) • Food (functional, innovative, perspective food, dietary supplements) • ICT (future internet, security, big data, smart cities, e-business, automat.) • Electronics - manufacturing of machines • Agriculture (crop production, manufacturing, precision agriculture) • Renewable energy (biomass, geothermal energy) • Material sciences (photonics, nanotech, biomedical materials, etc.)	• Selected priorities reflect innovation potentials within some key branches/technological fields and specialisations within academia • (Too) high number of priorities (due to rent-seeking behaviour of important stakeholders); majority of priorities are rather broad (no real prioritisation) • Focus on path renewal and to some extent to path diversification & path creation
North East Romania	• Agro food (also a national priority field) • Biotechnologies (also a national priority field) • Clothing and textile • ICT (also a national priority field)	• Selected priorities reflect economic activity areas which are regarded as being of regional significance • Alignment with national priorities • Focus on path renewal and to a lesser extent to path creation

Source: Regional Reports (see Appendix A)

* Note: Assessments are based on deeper analyses drawing on the finding in the regional reports

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