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Shaping smart specialization: the role of place-specific factors in advanced, intermediate and less-developed European regions

Michaela Trippl^a , Elena Zukauskaitė^b and Adrian Healy^c

ABSTRACT

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

KEYWORDS

regional innovation policies; smart specialization; advanced regions; intermediate regions; less-developed regions

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INTRODUCTION

In a relatively short space of time, smart specialization has become a powerful policy concept, not least due to its adoption by the European Commission as a condition for attracting European Union (EU) funding assistance (European Commission, 2014; Foray, 2014). The European Commission (2012, p. 8) explicitly describes Research and Innovation Strategies for Smart Specialization as ‘integrated, place-based economic transformation agendas’ (see also European Commission, 2014). This territorial focus responds to the EU’s support for place-based development (Barca, 2009). Yet, the implantation of smart specialization 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 EU, little is known about how smart specialization ‘works’ in different region types and what are the particular opportunities and barriers to translating the concept into policy practice.


The aim of this paper is to contribute to a better understanding of the challenges associated with the implantation of the smart specialization 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 specialization approaches and how opportunities and key obstacles to adopting smart specialization differ between various geographical contexts. Special attention is given to two key components of the strategy development phase, that is, stakeholder inclusion and policy prioritization and to emerging issues related to implementation. Our analysis centres on the relation between regional innovation system (RIS) characteristics and smart specialization. We explore how organizational 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 specialization has supported policy learning and RIS changes in these regions.

The paper is structured as follows. The next section outlines some key principles of smart specialization, reviews findings from recent empirical studies on S3 and introduces the RIS approach. This is followed by notes on the


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investigated regions, data and methods applied. The subsequent section presents our findings on the adoption of S3 in 15 European regions. We conclude with a summary discussion and conclusions.

LITERATURE REVIEW AND ANALYTICAL FRAMEWORK

Smart specialization: principles and novelties

Smart specialization is now a key feature of contemporary regional innovation policies in Europe (Foray, 2014; McCann & Ortega-Argilés, 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 (Boschma, 2017; Martin, 2010) 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 specialization champions a new strategic orientation of innovation policy. It emphasises the modernization 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- and evidence-based regional innovation policies that build on regional assets, thus avoiding traditional ‘one-size-fits-all’ policy models (Tödting & Trippel, 2005). Proponents of the approach also argue that it embraces a broad understanding of innovation that goes beyond narrow research and development (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 prioritization processes (Gianelle, Kyriakou, & Cohen, 2016). In doing so, the smart specialization 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.

Studies of early S3 experiences

The smart specialization 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 specialization, 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) analyze 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 specialization to overcome the ‘one-size-fits-all’ policy approaches of the past. Drawing on surveys of policy-makers’ experiences with S3, McCann and Ortega-Argilés investigate the progress made towards integrating smart specialization 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 (e.g., Cooke, 2016; Estensoro & Larrea, 2016; Healy, 2016; Kroll, 2017; Morgan, 2016). These provide a valuable in-depth analysis but lack cross-country comparability and can be difficult to generalize. Applying an 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 a 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.

RIS and smart specialization

Invoking the RIS approach provides an analytical lens through which to investigate the role of place-specific organizational, institutional and systemic factors in smart specialization. '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' (Trippel, Grillitsch, & Isaksen, 2018, p. 688) as well as policy and governance set-ups (see also Asheim & Isaksen, 2002; Coenen, Asheim, Bugge, & Herstad, 2017; Tödting & Trippel, 2013). Such a perspective provides ground for arguing that the ways by which smart specialization 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 specialization challenges.

Policy and governance capabilities of RIS and smart specialization

The degree to which formal competences and power (autonomy) to design regional innovation strategies (and, crucially, the financial resources to independently implement them) are decentralized 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 decentralization shapes the room of manoeuvre for regional innovation policy-making, much depends on the institutional structures and quality of government found in the region (Kroll, 2017; Rodríguez-Pose & Di Cataldo, 2015) and the capacity and knowledge of actors in the policy and administrative system to design and implement modern regional innovation strategies such as 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, Magro, Navarro, & Wilson, 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 specialization calls for and benefits from well-established multilevel governance set-ups and horizontal policy coordination (Aranguren et al., 2018; Kroll, 2017). 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 specialization

Density and degree of specialization of the organizational structure of RISs, that is, the number, variety and 'quality' (capabilities and performances) of firms, industries and knowledge and support organizations will bear a strong influence on how smart specialization is adopted in the region. Owing 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 & Trippel, 2016) and thus in terms of opportunities for selecting priorities that are in line with smart specialization. Endowment of a sufficiently large number and – even more importantly – capable knowledge, intermediary and support organizations (organizational thickness) provides a strong basis for stakeholder inclusion and the transformation of selected priorities into concrete development projects. Organizationally thin regions may be confronted with the challenge to mobilize a critical mass of capable actors to engage in S3, whilst organizationally 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 organizational thickness, the nature and level of internal and external connectedness (Thissen, van Oort, Diodato, & Ruijs, 2013) and institutional structures, that is, formal and informal incentives to and cultural patterns of innovation and cooperation (Gertler, 2010; Zukauskaite, Trippel, & Plechero, 2017) will affect the adoption of S3. Regions 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.

Below we explore how the RIS characteristics identified above have influenced the adoption of smart specialization, focusing particularly on S3 practices and challenges related to stakeholder inclusion, prioritization and implementation.

INVESTIGATED REGIONS, DATA AND METHODS

Our empirical analysis compares emergent smart specialization practices from 15 European regions. The findings are based on research carried out in the context of the project

'Smart Specialisation for Regional Innovation' (2013–16).¹ The project mobilized researchers from different universities and other organizations across Europe who were responsible for conducting research on smart specialization practices in these regions (see Appendix A in the supplemental data online). Nine of the regions were partners in the project self-selected through an invitation to participate from the European Regions for Research and Innovation Network (ERRIN). 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 EU territory. The selection of the six additional regions was based on the following five criteria: innovation performance, socioeconomic context, geographical location, population size and history of working with (regional) innovation strategies.

Empirical work in the 15 regions was focused on the Nomenclature of Territorial Units for Statistics (NUTS) level to which smart specialization 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 in the supplemental data online).

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 organizations, intermediaries, civil society organizations, etc.). In sum, almost 200 interviews with stakeholders across the 15 regions were conducted. In each of the investigated regions the same questionnaire was used and the collected data were analyzed against the common framework. Key themes and questions discussed with companies, research institutes, intermediaries, policy actors and other interview partners included (1) innovation, collaboration and policy practices before smart specialization; (2) forms and intensity of inclusion in (newly created) collective governance set-ups; (3) motivation, incentives, capabilities and barriers to contribute to the development and implementation of S3; (4) roles played in policy prioritization processes and the influence of organizational and institutional RIS factors on the

selection of priorities; (5) learning experiences and changes of interaction and innovation policy practices through smart specialization; and (6) assessments of emerging issues of strategy implementation. Interviews with policy actors (and partly intermediaries) covered a set of additional questions on vertical and horizontal policy coordination and needs for institutional reform.

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

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, Bremen and PACA have been in the 'innovation leader' or 'strong innovator' categories for the period 2008–17. 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 gross domestic product (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 analyzed regions exhibit distinctive RIS configurations (see Table B1 in Appendix B in the supplemental data online) 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 summarized 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 regrouping to include an

Table 1. Socioeconomic and innovation characteristics of examined regions.

Region names used in the paper (according to European Union standards)	Codes	Regional innovation scoreboard, 2016 ^b (2017) ^c	Regional innovation scoreboard, 2008, 2010, 2012, 2014 ^b	Population, 2017 ^a	Unemployment rate, 2017 (2012) (EU-28 = 7.6 (10.5)) ^a	GDP per inhabitant PPS 2015 (2012) (EU-28 = 100) ^a	EQI, 2017 ^d (2013) ^e	RCI, 2016 ^f (2013) ^g
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)

Notes: Region names in bold are the level at which Smart Specialisation Strategies (S3) have been developed.

EQI, European quality of government index; GDP, gross domestic product; NUTS, Nomenclature of Territorial Units for Statistics; PPS, purchasing power standards; RCI, regional competitiveness index.

Sources: ^aEUROSTAT database (n.d.).

^bEuropean Union (2016).

^cEuropean Union (2017).

^dSee http://ec.europa.eu/regional_policy/en/information/maps/quality_of_governance/#2 (Scorecards – Interactive Web Tool; accessed June 27, 2018).

^eCharron, Dijkstra, and Lapuente (2014).

^fSee http://ec.europa.eu/regional_policy/en/information/maps/regional_competitiveness/#2 (Scorecards – Interactive Web Tool; accessed June 27, 2018).

^gAnnoni and Dijkstra (2013).

‘intermediate’ category to take into account those regions that 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 a moderate innovator in the period 2008–16. However, in 2017 it was 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 with 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 2008–17. However, they face more severe challenges in relation to S3 than other well-developed regions due to less developed organizational environments and different institutional deficiencies (see below and Table B1 in Appendix B in the supplemental data online). Thus, More and Romsdal, Navarre, PACA and Northern Ireland are formed into a separate group of regions that are more advanced than less developed ones, but their RISs 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 (LDRs): North East Romania, Great Plain Region, Lodzkie, Basilicata, Murcia, South Moravia.
- Intermediate regions (IRs): PACA, Northern Ireland, More and Romsdal, Navarre.
- Advanced regions (ARs): 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 specialization, our analysis of experience in the 15 regions under consideration here suggests that such an approach is too simple a generalization 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.

REGIONAL ANALYSIS

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

Less-developed regions (LDRs)

With the exception of South Moravia, our findings suggest that innovation policies in the LDR group are

characterized by historically limited levels of stakeholder involvement (see Table B1 in Appendix B in the supplemental data online). The evidence suggests that smart specialization has triggered a break with past top-down policy practices. All regions mobilized non-policy stakeholders (see Table C1 in Appendix C in the supplemental data online) 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 organizational infrastructure prevailing in these areas (see Table B1 in Appendix B in the supplemental data online). A typical feature is ‘organizational thinness’, restricting the number of capable stakeholders to be mobilized for joint S3 development. The firm population in these regions consists of small and medium-sized enterprises (SMEs) with weak innovation capabilities and, typically, externally controlled multinational corporations (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 organizations 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 organizations in the development of S3 has been a daunting task. In addition, intermediate organizations 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 (see Table B1 in Appendix B in the supplemental data online). On one side of the spectrum are highly centralized 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 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 (see Table C1 in Appendix C in the supplemental data online).

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 ('partenariato') 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 prioritization challenges. The selected areas resemble a grouping of all economic activities under certain headings rather than an actual prioritization (see Table D1 in Appendix D in the supplemental data online). 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 prioritization by upgrading inclusive governance practices, allowing for stakeholder participation on the one hand and having mechanisms in place for making prioritization choices on the other hand.

Another prioritization challenge is associated with the identification of areas that reflect current strengths as well as directions for future development. In the analyzed 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 prioritization 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 organizations. 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 legitimization 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.

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 organizational deficiencies such as the absence of organizations performing basic research, low innovation capabilities in the firm sector and a lack of capable support organizations 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 (see Table B1 in Appendix B in the supplemental data online). 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 (see Table C1 in Appendix C in the supplemental data online). In each of the regions there are capable players that could be mobilized for joint S3 development exercises and these regions benefit from past experiences with stakeholder inclusion. They have also used the advent of smart specialization 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 prioritization 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 prioritization 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 (see Table D1 in Appendix D in the supplemental data online). 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 specialized 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 specialization requirements regional actors are now beginning to think more critically about identifying narrower domains for prioritization.

Advanced regions (ARs)

The regions in this group benefit from organizationally thick and diversified RIS structures (see Table B1 in Appendix B in the supplemental data online). 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 organizational 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 organizational 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 organizations. 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 (see Table C1 in Appendix C in the supplemental data online).

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 prioritization 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 (see Table D1 in Appendix D in the supplemental data online). Since these regions are characterized 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 prioritized areas in these regions are defined in relation to global challenges such as personalized 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).

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 characterized by organizational thinness (restricting the number of capable stakeholders to be mobilized for S3 development), unfavourable institutional conditions such as 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 policy-making capacities or short-term deviations (see

also Kroll, 2017). IRs offer a more fertile ground for participatory S3 practices due to thicker organizational 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 organizational 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 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 specialization, 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 prioritization and to choose priorities that do not only favour well-established actor groups. In ARs it is paradoxically their key strengths, that is, organizational, institutional and industrial variety, that create prioritization 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 decentralization 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 multilevel 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 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.

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 organizational thickness and diversity, institutional set-ups, systemic features, policy capabilities, past experiences with innovation strategies as well as levels of policy centralization mould the spatial contexts in which the uptake of smart specialization 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.

First, 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.

Second, we find that there has been a strong impact of smart specialization 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.

Third, 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 recognizes 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 specialization 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 specialization has been a reorientation and upgrading of existing policy practices. Our results thus corroborate the findings from other recent studies (McCann & Ortega-Argilés, 2016). However, there are also effects of smart specialization on the wider RIS beyond the policy-making 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 organizations 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 S3 ambitions has been a source for concern across the regions analyzed. 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 S3 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 specialization supports RIS building processes that are underway in LDRs and contributes to RIS transformation and reconfiguration in IRs and ARs. 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 specialization, particularly in its relation to achieving economic transformations.

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NOTES

1. The project was funded under the European Union's Seventh Framework Programme [grant agreement number 320131]; see <https://www.cardiff.ac.uk/research/explore/>

find-a-project/view/461391-smart-specialisation-for-regional-innovation-smartspec.

2. Owing 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, S3 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 S3 have been designed.

3. Some regulative institutions set at the national level have also proven to constrain stakeholders. 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.

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