Smart Specialisation strategies on the periphery: a data-triangulation approach to governance issues and practices

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ABSTRACT

In spite of our current understanding of Smart Specialisation Strategy (S3) design and implementation, an understanding of interrelated governance practices aimed at addressing S3 governance issues is lacking. Applying a data-triangulation approach to a large peripheral Finnish region (Lapland), the analysis suggests that S3 implementation faces two key challenges: first, the development of stakeholder networks to support diversified specialization; and second, the lack of entrepreneurial discovery activity and associated differentiation of specialization. Policy solutions aimed at successful S3 implementation could focus on more targeted stakeholder engagement to mobilize resources for further diversified specialization.

KEYWORDS

Smart Specialisation; governance; regional development; sparsely populated areas; peripheral regions; Finland

INTRODUCTION

The European Union's (EU) place-based regional innovation strategy for Smart Specialisation Strategy (S3) has been recognized as a key capabilities-driven means for strengthening regional growth (Foray, 2015). S3 is meant to contribute to Europe 2020 objectives of smart, sustainable and inclusive growth by developing a knowledge economy, investing in social innovation and strengthening territorial cohesion (Smart Specialisation Platform, 2012). The focus on inclusive growth and cohesion implies that peripheral regions should be of particular policy interest, in efforts to identify domains of competitive advantage for diversified specialization (Asheim, 2019). Furthermore, identifying competitive advantage through S3 implies that the entrepreneurial-discovery process should be understood broadly to encompass all local stakeholders (Asheim et al., 2017). The premise of diversified specialization requires, however, effective routines, capacities and practices of governance (Karo & Kattel, 2015). While the literature

highlights that these capacities and practices of governance relate to local stakeholders, there is limited empirical evidence from peripheral regions on how capacities and practices of governance associated with S3 implementation relate to regional stakeholder networks (Aranguren et al., 2019; Asheim et al., 2017; Dubois et al., 2017; Kristensen et al., 2019; Larty et al., 2017).

Focusing on stakeholder networks in a peripheral Northern European region of Lapland (Finland), this paper addresses this research gap by analysing how S3 implementation and associated capacities and practices of governance relate to stakeholder networking and relational characteristics. In doing so, it contributes to three debates. First, to whether formal or informal coordination structures are more effective for S3 coordination (Aranguren et al., 2019). Second, to whether and how stakeholders from organizations involved in S3 cooperate in identifying and implementing a region's unique diversified specialization (Gerber et al., 2013; Grillitsch & Asheim, 2018; Trippl et al., 2019; Uyarra et al., 2014). We expect not only that

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multiplicity of stakeholder groups and the involvement of non-policy stakeholders influence collective action (Grillitsch & Asheim, 2018; Trippl et al., 2019), but also that such types of clustering in stakeholder networks (membership in clusters) leads to cascading benefits in the form of network externalities (Levine & Kurzban, 2006), which could help a region in the process of identifying and implementing S3 (Gerber et al., 2013). These cascading benefits are also anticipated in the regional context, since the alternative form of embedded exchange within a given organizational form can be inefficient for knowledge transfer (Levine & Prietula, 2012; Uzzi, 1997). Third, this study contributes to the debate initiated by the Organisation for Economic Co-operation and Development (OECD) on peripheral regions. Although Lapland has been identified to have a strong focus on developing its regional economy through S3 (Mikkola, 2016), the OECD has highlighted the need to establish more effective governance arrangements and their alignment with company needs (OECD, 2016). This apparent lack of effective regional governance is striking in the face of the overall strength of institutions in Finland. We could thus expect that weak endowment and capacity of relevant institutions (Karo & Kattel, 2015; Wang et al., 2017) are less important for impeding effective S3 implementation compared with a lack of cooperation capacity among regional stakeholders (Huggins & Prokop, 2017; Rodríguez-Pose et al., 2014). Sörvik et al. (2019) suggest that the institutional thinness of peripheral sparsely populated areas (SPA) raises the importance of multilevel governance issues related to alignment and coordination of programmes and strategies.

In light of the above considerations, this paper addresses four interrelated research questions:

- Are governance practices employed effectively as part of S3 coordination, and, in particular, which coordination structures arise in the S3 implementation?
- Has S3 been successful with respect to the development of informal and formal stakeholder networks?
- Does stakeholder networking, with respect to intra-regional S3 implementation relationships, matter for local stakeholders?
- Do stakeholders belonging to organizations engaged in S3 implementation prefer to cooperate with stakeholders who belong to organizations of a similar type?

Our conceptual framework builds on a resource-based theory view of the role and impact of regional stakeholders (Barney, 2001; Larty et al., 2017). Central to our analysis is an actor-based perspective (Isaksen et al., 2018) and the premise that resources underlying regional stakeholders are important for successful S3, since they are leveraged by and embedded with the actors in those regions (Larty et al., 2017). These actors operate under varying institutional conditions (Karo & Kattel, 2015) as part of actor-based networks that help to foster and co-create larger and more inclusive regional networks (EU, 2018; Isaksen et al., 2018).

The paper differs in several ways from existing contributions. In contrast to other works on peripheral regions that have applied single or multiple comparative case study approaches (e.g., Papamichail et al., 2019), it applies a mixed-methods triangulation exercise (Bryman, 2003) to S3. Huggins and Prokop (2017) have shown that regional performance can be better understood by accounting for network relationships of local public actors; however, previous work on stakeholder networks has typically neglected that focal actors are characterized by different relational characteristics (Papamichail et al., 2019).

LITERATURE

This work contributes primarily to three research streams: first, the literature on S3 coordination and networks; second, works on mobilizing resources and capabilities for S3 implementation; and third, literature on S3 implementation in peripheral SPA.[1]

Smart Specialisation coordination and networks

As Figure 1 shows, governance issues and practices[2] play a key role in the context of S3, including the issues of active engagement in processes of regional entrepreneurial discovery, configuration of a more inclusive decision-making process, identification of new related activities, unbalanced involvement of local science actors compared with enterprises, as well as coordination and cooperation. In the subsequent empirical analysis, we focus on a set of interrelated governance practices aimed at addressing S3-related governance issues. Further, we envisage that three practical tools are linked to these governance practices and are important for S3 implementation, namely cluster initiatives, sharing infrastructures (including workshops and roundtables) and collaboration networks. As Figure 1 suggests, these tools each has a dual function for the corresponding governance practices, for example, cluster initiatives are implementation tools for both regional knowledge transfer and a bottom-up approach to governance practices, ultimately driving diversified specialization.

The literature on governance-induced regional network growth and its underlying S3 mechanisms is rapidly increasing (Aranguren et al., 2019; Foray, 2018; Huggins & Prokop, 2017; Larty et al., 2017; Lopes et al., 2019; Sörvik et al., 2019). Aranguren et al. (2019) highlight that there is still no consensus as to whether formal or informal coordination structures are more effective for S3 implementation. They emphasize that the analysis of stakeholder networks would allow a better understanding of the implementation of innovation practices, while Foray (2018) highlights that the underlying coordination mechanisms are still rather unexplored. Papamichail et al. (2019) investigate regional inter-organizational networks and conclude that the practical S3 implementation challenges also include the capability of regional actors to build inter-organizational networks. Fitjar and Rodríguez-Pose (2011) show how business networks relate to innovativeness and different levels of cooperation, accounting for diversity of partners by geographical and personal distance.

Figure 1. Governance issues and governance practices in S3.
Sources: Adapted from Aranguren et al. (2019), Capello and Kroll (2016) and Sörvik et al. (2019).

The S3 literature on stakeholder networks has further explored the role of connectedness of domains (McCann & Ortega-Argilés, 2015) and organizational relatedness (Boschma et al., 2017). McCann and Ortega-Argilés (2015) highlight the importance of connectedness in the context of S3, since it is all about the potential of stakeholders to learn about economic opportunities. Hence, the entrepreneurial-discovery process is related to regional cooperation as part of stakeholder networks, and the discovery of related variety in terms of the development of areas of specialization which are cognitively related (Santoalha, 2019; Sörvik et al., 2019). Organizational relatedness can be particularly important when organizational gatekeepers can offer related knowledge resources, since critical links in knowledge networks show a propensity to be formed between actors that offer related knowledge resources (Broekel & Mueller, 2018). Evidence from Sörvik et al. (2019) further highlights the role of such regional gatekeepers in the context of governance practices, since their analysis suggests that for sustained human capital in peripheral regions, new governance practices constitute the most critical resource.

Mobilizing resources and capabilities for Smart Specialisation implementation

Considering the governance practices under investigation (Figure 1), we relate to the literature on local governance capabilities and institutions (Gong & Hassink, 2019; Rodríguez-Pose et al., 2014). In particular, we contribute to the literature on regional knowledge networks and organizational partnerships, which has emphasized the importance of stakeholders' resources (Inkinen & Suorsa,

2010). Stakeholder capabilities are closely related to the resources embedded in networks, hence the S3 literature has identified the importance of the mobilization of extra-regional resources (knowledge), as well as the importance of inter- and intra-regional resource connectivity (Dubois et al., 2017; Papamichail et al., 2019).

When considering such resources relevant for S3 implementation, their access and mobilization is thus closely related to the notion of critical links in knowledge exchange (Broekel & Mueller, 2018). In order to deepen our understanding on knowledge exchange networks and the role of intermediaries, the resource-based view (Barney, 2001) has therefore been put forward as a conceptual lens by scholars studying Smart Specialisation (Larty et al., 2017). As Larty et al. (2017) suggest, organizational resources of intermediaries are necessary yet not sufficient for establishing a successful network. In particular, their analysis shows how key individuals in regional government agencies and higher education institutions foster network growth through resource combinations between such individuals and organizational resources of intermediaries.

Smart Specialisation implementation in peripheral sparsely populated areas (SPA)

Recent literature has emphasized that the obstacles (and benefits) of S3 are region specific and, thus, vary between different types of regions (Kroll, 2019; Trippl et al., 2019). The literature on S3 focusing on peripheral SPA has provided predominantly case-study insights from Northern and Southern Europe. In their exploratory comparative case study of four Northern European regions (Scotland in the UK, Nordland in Norway, Västerbotten

in Sweden and Lapland), Sörvik et al. (2019) conclude that S3 is one of several factors influencing how regional innovation support policy is carried out. The authors identify five critical issues on S3 implementation in SPA, namely entrepreneurial discovery, related variety, domains, mobilization of extra-local resources and a broadened view on innovation. Norway has been also assessed by Fitjar and Rodríguez-Pose (2011) and Asheim et al. (2017), the latter exploring to what extent there are new path developments in Northern peripheral manufacturing regions as advocated by S3.

Several studies have focused exclusively on Finland. Using a resource-focused perspective, Rönkkö et al. (2017) argue that smart urban–rural development in Finland requires resource-wise spatial planning and a particular focus on networking. The indices of S3 developed by Kaivo-oja et al. (2017) revealed comparative advantage and regions' overall relative specialization, concluding that many growing sub-regions have similar comparative advantages. To the best of our knowledge, the only study that addresses stakeholder networks in northern Finland (Ala-Rämi & Inkinen, 2008) investigates the role of relational structures for product development in small and medium-sized enterprises (SMEs), to conclude that spatial proximity is important.

Several case studies have also been conducted on SPA in southern Europe (e.g., Kinossian, 2018; Sörvik et al., 2019), highlighting that the lack of readiness and credibility of public authorities to design and implement S3 strategies (RIS3) is a major issue for effective S3 implementation.

DATA AND METHODS

We implement a triangulated research design at regional level, which differs from country-level case studies (Chrysomallidis & Tsakanikas, 2017; Komninos et al., 2014). Data triangulation has emerged as a key methods tool to give strength to both qualitative and quantitative analysis as part of mixed-methods research (Bryman, 2003), mapping out human and organization behaviour from more than one standpoint (Cohen & Manion, 1986). This approach allows a reduction in the problems associated with the limitations of using a singular data set, while verifying for potential source biases (Denzin, 2009). We triangulate different data sources following existing standards in mixed-methods research to achieve highest rigour possible. We first examined the RIS3 produced by the Regional Council of Lapland (RCL) for the European Commission in November 2013. Second, in-depth interviews were conducted with representative stakeholders who demonstrated to be active in the development of the RIS3. Finally, we developed an online survey to collect data from regional stakeholders.

Lapland's Smart Specialisation Strategy (S3) analysis

The following analysis is based on Lapland's Arctic Specialisation Programme (i.e., the RIS3 of Lapland) drafted by the RCL (2013). The RIS3 was analysed through qualitative structural content analysis (Rich et al., 2018). More specifically, the qualitative analysis employed a text-driven approach in search for patterns (Krippendorff, 2013), thus comprising of descriptions of the manifest content, which were then sorted into thematic categories and formulated as themes related to our research questions. In particular, we searched for statements and references to topics that are related to the above governance issues (section 2) (Figure 1). We therefore identified which governance practices have been implemented in Lapland to address these issues. In this process, the statements were first manually coded, then grouped by thematic categories and subsequently related to the governance issues. NVivo 11 software was used for data management.

Interviews with key stakeholders

We employed content analysis further to transcribed interview data (Rich et al., 2018). The interviewees were contacted after identifying them through the Smart Specialisation platform which shows active participation of key stakeholders and thus informants to S3 in Lapland.[3] Out of the 12 key stakeholders identified and contacted, seven replied positively to our request and were subsequently interviewed between September and October 2018 over the telephone using a semi-structured telephone script. The interviews, which were recorded and transcribed, lasted between about 25 and 50 min. Consistent with our qualitative analysis approach as outlined in the third section, the interview script was based on Lapland's RIS3 (i.e., the Arctic Specialization Programme) document, earlier literature (Figure 1) and the impact assessment framework presented by Auri et al. (2019). This framework was implemented as a part of the project Evaluation of Finland's Structural Funds Programme, commissioned by the Ministry of Economic Affairs and Employment of Finland. The interview constructs included questions relating to governance practices for (1) promoting local innovative activities, (2) strengthening local R&D infrastructure, (3) enhancing local and international networking though S3 as well as for enhancing outputs of these actions, (4) promoting new business formation (or the growth of established businesses), (5) promoting commercialization of innovations, (6) diversification of the economic base and (7) enhancing employment opportunities.

Stakeholder questionnaire

An online questionnaire was targeted to stakeholders (74 informants from 49 organizations) in October 2018. In light of our research questions, this questionnaire was built from RIS3 data, in line with the RIS3 analysis and the interviewing approach as outlined in the third section. To identify the appropriate stakeholders, we double-checked their affiliation and active participation from the official websites of the RCL. Six categories of stakeholders were identified: advisory companies; education and research organizations; enterprise associations; expert

organizations; local authorities; and local development companies.

The questionnaire, which was also pre-tested with a senior Finnish municipality representative, consisted of five sections: general information to classify the respondent; objectives and adopted strategies; expectations and effects of S3; areas of stakeholder collaboration; and networking. It included 14 multiple-choice questions in addition to a section for collecting inter-organizational network data. Validated questions were used and adapted from previous studies on Smart Specialisation (e.g., JRC, 2016). The data collection proceeded from October to November 2018, and included a second wave of following-up respondents via the telephone. We received 21 responses from individuals who completed the questionnaire independently online; seven responses were received from individuals who received telephone support with the completion of the questionnaire. This resulted in a total of 28 responses, leading to a response rate of 38%.

Network data

Network data obtained from the questionnaire are analysed by exploring the nature of multiplex relationships through social network analysis (SNA) (Vörös & Snijders, 2017). SNA is a method for investigating the social relations between network actors and studying the influence of network structures on their behaviour, and vice versa (Scott & Carrington, 2011). In this study, we use SNA to assess to what extent drivers of collaboration are present within the S3 stakeholder networks, thereby providing evidence of how stakeholders balance multiple relationships for promoting Smart Specialisation.

The respondents were asked to nominate those stakeholders with whom they had informal or formal collaborations regarding S3.[4]

Information originating from individuals belonging to the same stakeholder organization was recoded into a single observation (for a total of nine cases) in order to have organizations as observations. This resulted in two adjacency matrices 19×19 (formal and informal network) which were used in the subsequent analysis, applying uni- and bivariate exponential random graph models (ERGMs), which allow it to be understood 'how and why social network ties arise' (Lusher et al., 2013, p. 9). The univariate ERGM employed takes the general form (Lusher et al., 2013):

$$\Pr(Y = y) = \left(\frac{1}{k}\right)\exp\left\{\sum_A \eta_A G_A(y)\right\} \qquad (1)$$

The probability that the observed network y is identical to the randomly generated network Y is given by an exponential model, where η_A is the parameter corresponding to network configuration A; and $g_A(y)$ is the network statistic corresponding to configuration A. For the bivariate case, $g_A(y)$ is a bi-graph defined by the relationships across the two networks under examination. Assuming that all counted network formation instances are equiprobable,

Markov dependence allows one to identify the associated parameters for each configuration.[5]

The ERGMs include the following network configurations: 'Edge', '2-Star', '3-Star' and 'Alternating k-triangles (AT)'. 'Edge' controls for the number of edges in the network; '2-Star' and '3-Star' suggest the presence of central stakeholders creating connections within the network; 'Alternating k-triangles' indicates that when stakeholder i can indirectly reach stakeholder j through one or more intermediaries; i is also directly connect to j, indicating transitivity.[6] Moreover, we explore whether stakeholders with the same organizational form tend to develop more single or multiple relationships ('Matching-category'). This phenomenon is called 'homophily', reflecting whether similar actors are more likely to relate to each other (Lusher et al., 2013).[7]

RESULTS

The following sections discuss the data triangulation findings in sequence, for each empirical tool employed, focusing on the governance issues of 'entrepreneurial discovery', 'decision-making process', 'promotion of new domains', 'related variety', and 'intra- and extra-regional cooperation' (cf. Figure 1).

Lapland's Smart Specialisation Strategy (S3)

The analysis of the RIS3 suggests that stakeholders have carried out major efforts towards the implementation of different governance practices. The most challenging issue relates to 'entrepreneurial discovery'. Since Lapland suffers from a depopulation problem, a challenge is to increase the number of SMEs and promote entrepreneurship among young people. The governance practice identified for addressing this issue is the implementation of a structured knowledge-transfer system (as in regional clusters) capable of generating skills and competencies amongst current entrepreneurs and potential entrepreneurs. However, the development of such a system, including the 'tutoring' of start-ups, the development of five cross-sectoral clusters as spearheads of S3 development and the mapping of company needs, is judged as yet to come. In this respect, the engagement of local research organizations is seen to be increasing, but a bigger effort is viewed necessary.

With regard to the 'decision-making process' issue, this is judged to have been positively addressed in Lapland. In particular, the use of a bottom-up approach, that is, the inclusion of a broad variety of stakeholders in the decision-making process, has characterized the actions carried out by the Regional Council and has been judged to have generated positive spillovers. Furthermore, an additional positive aspect relates to the fact that the bottom-up approach has been used by the Regional Council for the definition of its guidelines. Nevertheless, the implementation of cluster policies with the involvement of actors is judged as work in progress.

The 'promotion of new domains' led to the introduction of participatory methods. As described in the RIS3

document (RCL, 2013, p. 11), 'Interviews, workshops and regional hearings were arranged during the preparation process. … A number of stakeholder meetings and workshops were arranged during the project, theme interviews were conducted with companies and economic stakeholders.' These activities produced the definition of six thematic domains: mining and metal industries; SMEs and large industries services; bioeconomy; SMEs refining natural resources; independent or new industries; and tourism and related industries.

With regard to 'related variety', that is, the development of areas of specialization cognitively related (Sörvik et al., 2019) and based on previously existing economic activities, Lapland stakeholders interacted and defined a macrodomain referred to the Arctic's natural resources. While not focusing on a specific sector, 'The leading principle is the sustainable utilization of natural resources and conditions. Instead of a simple division between branches, the aim is to find cross-cutting Arctic business opportunities across sectoral boundaries' (RCL, 2013, p. 36). Nevertheless, the focus on natural resource exploitation has been adopted by most of the Northern European regions. Thus, the involvement of knowledge institutions through round tables and workshops does not seem to have produced a particular variety and differentiation from other Northern European regions.

Finally, the Regional Council declared that the issues related to 'intra- and extra-regional cooperation' have been fully managed through the intensification of local and external partnerships. Lapland stakeholders are interested in developing international partnerships with other Arctic economic actors, because of the long and well-working tradition of cross-border cooperation in the north. At the same time, the strengthening of the relationships between local stakeholders is considered strategic and is viewed as deserving constant support. Companies 'hoped that authorities would increase the amount of relevant information, set up concrete networks and projects' (RCL, 2013, p. 18), while universities and research centres are trying to consolidate their internal and external partnerships focusing their expertise on Arctic themes.

Interview results

The analysis of the transcribed interview data suggests that stakeholders were overall satisfied with the impacts of S3. As single most positive impact, the interviewees identified that Lapland's networks have become more dense and diversified, supporting intensified knowledge exchange.

In relation to 'entrepreneurial discovery', it was underlined that the specialization domains were chosen based on local industry interests – considered a crucial factor for regional innovativeness and development. Considering the chosen domains and the cross-sectoral clusters which Lapland promoted as the spearheads of S3, they were judged to have had a positive impact on the commitment of the industry to S3 development.

With regard to the 'decision-making process', the drafting of the RIS3 for further cluster development has not been led solely by administrative organizations, such as the Regional Council. Rather, it has been steered through inclusive governance processes including workshops, taking into account the opinions 'of a large variety of different actors from Lapland', as noted by a representative of one of the universities.

According to the interviewees, the 'promotion of new domains' has been done taking into account the prioritization of regional development needs. In the case of tourism, the interviewees stressed that since the industry is functioning very well in the region by itself without much support from administrative organizations, it has not been included directly among the 'smartness clusters' of the contemporary S3 development work.[8] Rather, sectors designated for further cluster development have been selected as a function of their potential, and as a function of the 'additional push' they are perceived to need to realize this potential.

In terms of 'related variety', the S3 development toward related areas of specialization is viewed to have led to the sharing of R&D infrastructures and know-how for promoting interdisciplinary and intersectoral cooperation. Such cooperation is viewed to have led to synergies and to a greater readiness of the local research organizations to serve the needs of the local industry. However, except for early pilot projects, interviewees view it still too early to assess whether this improved coordination of R&D infrastructures has led to successes. This was, however, considered by the interviewees as a natural step in the comprehensive development work that S3 in Lapland is striving for. As stressed by one of the local university stakeholders: 'We are developing a totally new way of doing things here in Lapland, one cannot expect results from such profound change to manifest instantaneously.'

With regard to 'intra- and extra-regional cooperation', the intra-regional networking was judged to have intensified significantly, not solely between universities and other research institutes but also with companies and administrative organizations. Furthermore, cooperation between local actors is viewed to have become more coordinated with regard to information-sharing, and with regard to reducing the overlap in activities. Also, the S3 development work performed in Lapland is judged to have significantly improved local actors' success in bidding for international R&D funding in collaboration with extra-regional and international actors, bringing with it the establishment of high numbers of new links to other EU regions and to EU decision-makers in Brussels. As highlighted by a representative of one of the research institutes: 'We have now established contacts not only to other research organizations but also to local development organizations' and 'We now have partners from all around Europe.'

Questionnaire results

With regard to 'entrepreneurial discovery', two questions are used to investigate the extent to which this has been addressed, namely: 'In your view, which are the main objectives of the S3 initiatives applicable to your region?' and 'To what extent does the RIS3 set priorities that support innovation for entrepreneurship?'[9] For about 30% of the

respondents, the creation of jobs was viewed as one of the main objectives of the RIS3. At the same time, only half of the respondents reported a high or very high prioritization of innovation for entrepreneurship.

To investigate which practices have been applied to ensure an inclusive 'decision-making process', we employ the question: 'Since 2015, which are the top three ways through which the RIS3 has been achieved in your region?' Amongst the possible answer categories, 'providing access to technology or information services' and 'providing access to skilled personnel/researchers' are considered important for the implementation of an inclusive 'decision-making process' that supports the development of capabilities. Both answer categories were selected by about 50% of respondents, hence local stakeholders aim for an inclusive approach, yet there is ambiguity over which kind of governance practices they have to establish.

Considering the related governance issues of developing related specialization ('related variety') and new domains ('promotion of new domains'), we consider the responses to: 'Which key RTDI policies have been implemented as part of the RIS3 of your region?' and 'In your view, which are the main objectives of the S3 initiatives applicable to your region?' As for the latter, respondents identified cooperation and knowledge-sharing initiatives as relevant objectives of the S3 implementation, since more than 50% chose the answer category 'increasing R&D expenditures', while about two-thirds of respondents highlighted the objective of cooperation, selecting 'support cooperation between businesses and universities/research centers'. Amongst the key research, technology, development and innovation (RTDI) policies implemented in Lapland with a focus on the 'promotion of new domains', respondents indicated that 'cluster policy' is the single most important type of RTDI policy implemented (31%), followed by 'internationalisation' (27%).

The last governance issue ('intra- and extra-regional cooperation') is investigated with the three questions: 'Overall, how would you judge the extent to which RIS3 has achieved the creation of new stakeholder networks (in or across regions) since 2015?', 'In your view, has RIS3 supported the development of interregional collaborations?' and 'If RIS3 has supported the development of interregional collaborations, could you please select your 'top three' areas in which such interregional collaborations have been fostered?' More than 64% of respondents suggested that S3 implementation contributed highly or very highly to creating new stakeholder networks, while more than 90% of respondents declared that such strategy implementation supported the development of interregional collaborations, focused on environment, tourism and manufacturing.

Social network analysis (SNA) results

Overall, the results from the SNA highlight the presence of different features regarding multiple intra-regional stakeholder networks for developing operational S3-related cooperation. Table 1 shows the results for the univariate ERGMs. 'Edge' is always statistically significant; it has a negative sign for the formal network, while it is positive for the informal network. Network theory suggests that it is costly to establish new relationships (Lusher et al., 2013), yet the result here suggests that the transaction costs of establishing informal stakeholder networks in Lapland are very low. The propensity to establish informal collaboration is fostered by the presence of '3-Star', that is, network configurations where central stakeholders are able to connect to others as part of informal collaboration. On the other hand, the propensity to establish formal collaborations is positively influenced by the presence of 'AT' configurations, that is, when stakeholders can indirectly reach other stakeholders through one or more intermediaries. This suggests that the way local stakeholders approach the creation of network relationships is very different, depending on whether the type of collaboration they intend to create is formal or informal. Nevertheless, there is a common characteristic for stakeholder behaviour irrespective of whether the networking is formal or informal: the 'Matching-category' has a positive effect in both cases, yet it not statistically significant. This suggests that local stakeholders prefer to connect with different organizations when they establish any type of collaboration.

The results from the bivariate ERGM (Table 2) show that '2-Star' and '3-Star' multiplex combinations of informal and formal collaborations ('2-StarAB', '3-StarAAB' and '3-StarABB') are not statistically significant, while only 'AT-ABA' is significant amongst high-order configurations. Therefore, the more two stakeholders are involved in informal relations with third parties, the more they will develop a formal relation amongst each other. This finding could indicate that a network system characterized by trustworthy informal collaborations facilitates the establishment of formal relationships.

Table 1. Univariate models.

Parameters	Informal network (A)		Formal network (B)	
	Estimate (SE)	Convergence statistics (t-ratio)	Estimate (SE)	Convergence statistics (t-ratio)
Edge	7.052 (2.251)**	0.083	−2.588 (0.947)**	0.008
2-Star	−1.178 (0.287)*	0.077	0.026 (0.231)	0.020
3-Star	0.129 (0.025)*	0.067	−0.005 (0.046)	0.027
AT	1.955 (1.458)	0.086	0.620 (0.297)*	0.023
Matching-category	0.032 (0.248)	0.022	0.187 (0.316)	−0.030

Note: Statistically significant parameters (**1%, *5%).

Table 2. Bivariate model.

Parameters	Informal and formal networks	
	Estimate (SE)	Convergence statistics (*t*-ratio)
EdgeA	9.781 (2.724)**	−0.020
2-StarA	−0.948 (0.273)*	−0.025
3-StarA	0.091 (0.034)*	−0.030
Matching-category A	−0.454 (0.345)	−0.084
EdgeB	−9.624 (2.384)**	−0.081
2-StarB	0.420 (0.247)	−0.072
3-StarB	−0.024 (0.064)	−0.055
Matching-category B	−2.920 (2.322)	−0.087
EdgeAB	1.004 (0.539)	−0.044
2-StarAB	−0.365 (0.248)	−0.062
3-StarAAB	0.041 (0.030)	−0.047
3-StarABB	−0.024 (0.032)	−0.051
AT-ABA	4.925 (1.641)*	−0.080
AT-BAB	0.104 (0.224)	−0.061
Matching-category AB	3.598 (2.372)	−0.052

Notes: Statistically significant parameters (**1%, *5%).
A, informal network; B, formal network; AB, multiplex informal/formal network; and AT, alternating *k*-triangles.

DISCUSSION

Table 3 summarizes the key results from the data triangulation exercise. Overall, our evidence complements and expands recent work, which found that the introduction of S3 appears to have advanced regional practices (Belussi & Trippl, 2018). While the following discussion concentrates in sequence on governance issues 'entrepreneurial discovery', 'decision-making process', 'promotion of new domains', 'related variety' and 'intra- and extra-regional cooperation' in relation to governance practices, the most striking findings relate to regional networking. In particular, S3 has been successful with respect to the development of intra- and interregional collaboration networks, a result also found in other recent research, albeit in different regions and with different analysis tools (e.g., Belussi & Trippl, 2018; Papamichail et al., 2019). The SNA suggests that the way local stakeholders interact to foster networking depends on the type of relationship (formal or informal). Whereas informal networks are driven by central stakeholders, formal networks are established through more complex configurations. Strikingly, organizations do not seem to prefer cooperating with organizations of a similar type, a finding that also receives support from the interviews.

The triangulation approach has also identified that the lack of 'entrepreneurial discovery' is likely the greatest governance issue in the region under investigation. This is striking in the face of our evidence for growing network intensity and diversity in Lapland, and since previous

Table 3. Key results from data triangulation.

	Entrepreneurial discovery	Decision-making process	Promotion new domains	Related variety	Intra-regional cooperation	Extra-regional cooperation
RIS3 document	Lack of support for SMEs and young entrepreneurs	Positive implementation of a bottom-up approach	Positive use of participatory methods to define 'classical' domains	Similarities with other Northern European regions	Consolidation of intra-regional partnerships	Strong public support to increase international cooperation
Interviews	Focus on local industry interests	Inclusive governance processes for cluster development	Prioritization of development needs; domains have been selected as a function of their potential	Sharing of R&D infrastructure; results will be visible in the next years	Intra-regional networking has intensified significantly	S3 significantly improved local actors' international partnerships
Questionnaire	Not high prioritization of innovation for entrepreneurship	Need for inclusive approach	Promotion of 'classical' domains	Knowledge-sharing initiatives as relevant objectives of S3	Development of interregional collaborations focused on 'classical' domains	Importance of internationalization; S3 contributed to create new partnerships
Network data					Networking propensity depends on the type of collaboration	

Note: R&D, research and development; S3, Smart Specialisation Strategy; SMEs, small and medium-sized enterprises;.

work has highlighted the role of resource access that is provided by such inter-organizational networks (Larty et al., 2017). Nevertheless, Aranguren et al. (2019) suggest that the small involvement of businesses in the early phase of S3 implementation is common.

This combination of networking intensity with little significant entrepreneurial discovery activity might be explained by two factors. First, by the lack of resources and capabilities essential for knowledge transfer in this peripheral region. Second, by the early stage of development of the networking relationships. In light of the crucial relationship between absorptive capacity and networking capabilities for S3 implementation (Papamichail et al., 2019), our evidence suggests that the networking capabilities and intensities have not yet delivered the absorptive capacity level to support stronger entrepreneurial activity.

Concerning the 'decision-making process', our triangulation approach suggests that bottom-up governance practices have supported an inclusive stakeholder interaction in Lapland, with further scope for development. This finding, together with the identified important role of formal and informal stakeholder networks, points to the key role of inclusive governance forms for reaping the benefits from S3 (Belussi & Trippl, 2018). Further, our survey results highlight the importance of a collaborative inclusive environment to promote intersectoral cooperation, as also found for other regions (Foray, 2015; Papamichail et al., 2019).

Our triangulation approach also suggests that the 'promotion of new domains' is in need for further resource support, an issue also highlighted by Sörvik et al.'s (2019) emphasis on the role of human resources for domain development. However, although respondents testified that the introduction of participatory methods has been an important and successful governance practice, our triangulation approach revealed little evidence for specific new domains.

With regard to 'related variety', we find limited evidence that S3 resources have stimulated the region toward a greater development of related areas of specialization, except for support from the interviews which suggest that sharing of R&D infrastructure know-how has contributed to the development of related domains.

CONCLUSIONS

In this study we attempt to improve our understanding of governance practices aimed at addressing S3 governance issues through a data-triangulation approach, analysing both primary and secondary data from a large peripheral region: Lapland. Following previous studies that have also taken the resource-based theory (Barney, 2001) as a conceptual lens (Larty et al., 2017; Papamichail et al., 2019), we take the view that resources and capabilities embedded in regional network relationships are important for resolving governance issues. Existing research on peripheral regions has identified stakeholder capability to build inter-organizational networks as the key implementation challenge for S3 (e.g., Papamichail et al., 2019). It has also highlighted the need for more stakeholder

engagement to connect to extra-regional knowledge sources (Sörvik et al., 2019), and has found that a lack of stakeholder interaction is a common feature (Aranguren et al., 2019). Compared with these works, our data-triangulation approach yields a more nuanced understanding of governance issues and stakeholder relationships and is therefore a promising method for future research on this and similar topics. Moreover, it suggests that intra-regional cooperation has intensified as part of S3 implementation. Furthermore, our analysis results suggest that the way in which stakeholders interact in such implementation depends on whether the type of relationship is formal or informal. Whereas central stakeholders in informal networks are key for developing such relationships, this is not the case for formal networks. Further, existing informal stakeholder networks are important as they foster the building of formal networks. Regional stakeholders were also found to prefer inclusive and diverse governance practices for S3 implementation.

In spite of the above significance of networking relationships, the analysis suggests a significant lack of entrepreneurial activity. Thus, while we have evidence that several governance practices are employed effectively as part of S3 implementing, stakeholder networking may not yet have reached the potential to enable regional absorptive capacity to translate into performance. Furthermore, on top of having identified the lack of entrepreneurship as a key factor that hampers regional development, the related observed lack of distinct strategies of regional differentiation corroborates also with earlier evidence (Boschma et al., 2017).

Our research findings have three policy implications. First, policy efforts regarding S3 could be targeted differently according to stakeholder types, to engage them more effectively in diversified specialization. If the policy objective is to promote informal networking as a potential avenue to strengthen formal networks, then efforts are needed to support central stakeholders, since our research suggests that informal networks are primarily driven by central stakeholders. Such support of central stakeholders could entail the support of business associations or local governments acting as institutional entrepreneurs (Xing et al., 2018). Recent evidence from Uyarra et al. (2020) also suggests that such institutional entrepreneurs who build networks at various scales, mobilize resources and upgrade the regional skills base have contributed to the successful creation and maintenance of institutional structures in the context of S3.

Second, more informal coordination mechanisms could be employed to strengthen multi-regional engagement. In support of this argument, Henderson and Roche (2020) put forward place-based informal coordination efforts in the last mile to support broadband deployment. A third policy implication arises from our results suggesting that bottom-up governance practices support inclusive stakeholder interaction. Although evidence on such bottom-up civil society engagement efforts is still sparse in the context of S3 (e.g., Barzotto et al., 2019; Uyarra et al., 2020), more place-based policy efforts could be targeted towards civil

society engagement to overcome governance weaknesses (Aranguren et al., 2019; Mäenpää & Lundström, 2019). Such policy efforts hold promise, since a functioning civil society with strong social capital can partly substitute for a region's weak institutional capacity (Madsen et al., 2017; Rodríguez-Pose et al., 2014).

Our paper faces several limitations, which deserve further work. First, although our survey has investigated the importance of extra-regional relationships, our SNA focuses on intra-regional networks, so that we have not been able to fully assess the extent of external collaboration networks (Belussi & Trippl, 2018; Santoalha, 2019). Second, although our analysis has identified the lack of entrepreneurial discovery to be likely the greatest governance issue, we have been neither able to provide insights into such discovery processes nor assessed how the very mechanisms of entrepreneurial discovery relates to the institutional framework in which these take place. As work on institutional entrepreneurship suggests (Battilana et al., 2009; Uyarra et al., 2020; Xing et al., 2018), there is further scope for analysis in the context of peripheral SPA. Third, since our analysis has been confined to one peripheral SPA only, questions of transferability apply. Nevertheless, previous works have shown significant similarities of Lapland relative to other such areas, including abundant natural resources yet limited human capital and agglomeration economies (Sörvik et al., 2019).

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DISCLOSURE STATEMENT

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NOTES

1. For a review of theories of governance in the context of S3, see Aranguren et al. (2019).
2. The governance practices we investigate have also been referred to as governance mechanisms with respect to multi-actor, multi-sectoral and multilevel practices (Sörvik et al., 2019).
3. See https://arcticsmartness.eu/.
4. We defined informal collaboration as the 'informal support through the exchange of advice and/or information (e.g., informal knowledge exchange during conferences or training)', and formal collaboration as 'a mandatory formal agreement, through contracts or other legal instruments, aimed at the production of a specific outcome (e.g., the creation of a new organization)'.
5. For a detailed description of ERGM estimation and simulation, see Koskinen and Snijders (2013) and Wang et al. (2006).

6. For the graphical visualization of such network configurations, see Lusher et al. (2013) and Wang et al. (2006).
7. We use PNet software for the univariate models and XPNet software for the bivariate model (Wang et al., 2006); model fit is assessed using statistics proposed by Robins et al. (2009).
8. See https://arcticsmartness.eu/.
9. Although the questionnaire responses are representative with respect to the stakeholder types surveyed, the response rate by question varied across respondents. The lowest response rate was observed for questions addressing governance issue 'entrepreneurial discovery', with 71%, while the median response rate across all questions was 80%.

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