

Methodologies for Smart Specialisation Strategies: a view across the EU regions

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Abstract

Smart specialisation (S3) is a key idea, underpinning the EU Cohesion Policy framework in the field of innovation, constituting an *ex-ante* conditionality for EU Member States (MS) for receiving Structural Funds' support. S3 requirement fosters an in-depth analysis of the EU regional characteristics, focusing on helping MS to promote a transformation of their economic structure, through an 'entrepreneurial discovery process' (EDP). The emerging S3 concept, appears to have remained largely ill-understood by regional policy-makers [1], whereas various contributions and RIS3 evaluation reports have highlighted the difficulties in designing and implementing this strategic framework [2]-[5]. We argue that these difficulties can largely be attributed to the lack of clear methodological guidance, as well as to the inefficiency of adopting place-sensitive policy-support methodologies, capable to define key aspects of the RIS3 process, such as related variety, priority setting, intervention logic etc. We do this first, by mapping the methods that have been used for the design of RIS3 policies, and second, by comparing these with suggested methodologies, identified in an extended literature review, covering key aspects of the RIS3 process. The analysis reveals a significant discrepancy between the theoretical description of RIS3 methodologies and their practical implementation during RIS3 strategic planning, due to high level of technical complexity. This paper elaborates on the results of the ONLINE S3 project, funded under Horizon 2020.

Keywords: RIS3, regional development, Smart Specialisation

1. Introduction

Smart specialisation (S3) is a key idea underpinning the EC Cohesion Policy for the period 2014-2020 in the field of innovation and it constitutes an *ex-ante* conditionality for EU Member States (MS) for receiving Structural Funds support. S3 requirement fosters an in-depth analysis of the characteristics of each European region and MS to promote a transformation of the economy, through a process of 'self-discovery'. The S3 concept has emerged only recently and in the first years appears to have remained largely ill-understood by regional policy-makers [1].

More analytically, smart specialisation is being promoted as a place-based policy approach that foresees channelling of public and private investments in carefully selected priority areas, through an 'entrepreneurial discovery process' (EDP) that allows learning from both policy-makers and entrepreneurs" [6]. It concerns the prioritisation of investment based on an inclusive stakeholder engagement and attention to national and international market dynamics. In fact, the EDP can be

used beyond the prioritisation process helping to fine-tune S3 priorities also during the implementation and monitoring phases [7].

Within the smart specialisation concept, policy decisions have to be based on knowledge that is very emergent and exist scattered across stakeholders. This calls for access to more real-time data gathering methods, as well as data visualisation tools that enable more user-friendly data analysis. Regional specificities are the starting point for EDP, hence it is of key importance that RIS3 design, implementation and monitoring employs custom-made policy intelligence that draws upon a wide array of data through web-enabled tools for more ambitious, accurate and timely analysis encouraging more experimentation and discoveries.

To date, various contributions and preliminary RIS3 evaluation reports have highlighted the difficulties in designing and implementing such a smart specialisation strategy [2],[3],[5],[8]. The initial European Commission's RIS3 planning documents provided little guidance to regional policy makers in the rather complex process of S3 design policy [3],[9]. Furthermore, even though entrepreneurs are in better place to identify opportunities, still, the bottom up process of EDP requires conscious moderation and careful guidance [3],[4],[10]. Both [3] and [11] explain different methodological ways to overcome the theoretical vagueness of the RIS3 guide in selecting priority sectors, while [10] discuss how technological relatedness can provide significant input to the EDP process. Finally, we recently see the offering of online tools through the JRC S3 platform offering the opportunity to scope the emerging landscape of specialisations and benchmark regions for improved cross-border learning.

Aligned with the above literature and activities, we argue that the observed difficulties in designing the regional and national RIS3 strategies [5],[8] can largely be attributed to the lack of a clear methodological guidance and to the inability to adopt place sensitive policy-support methodologies that define key aspects of the RIS3 process, such as related variety, priority setting, intervention logic etc. We do this first, by investigating the different methods that have been used during the design of the RIS3 policies and second, by comparing these with suggested methodologies identified in an extended literature review covering key aspects of the RIS3 process. The analysis reveals a significant discrepancy between the existing theoretical description of RIS3 methodologies and their practical implementation during RIS3 strategic planning, due to high level of technical complexity.

This paper is structured as follows: after the literature review presented in the introductory section, Section 2 presents the mapping exercise of applied methodologies in 30 European regional and national RIS3 strategies. Section 4 illustrates the main findings of an extended literature review on S3 good practices while, key conclusions are presented in Section 4.

2. Mapping regional strategies

In this section, we review the RIS3 design process of 30 European regions¹ (9 at national level and 21 at regional level). According to the Regional Innovation Scoreboard (RIS) 2016

¹ **Leaders:** Bayern (DE), Niedersachsen (DE), Helsinki-Uusima (FI), Zuid-Holland (NL), East Sweden (SE), Stockholm (SE). **Strong:** Austria, Wallonia (BE), Aquitaine (FR), Midi-Pyrenees (FR), Ireland, Noord-Holland (NL), Northern Ireland (UK), Scotland (UK), Wales (UK), **Moderate:** Cyprus, Estonia, Central Macedonia (EL), Andalucia (ES), Hungary, Emilia-Romagna (IT), Puglia (IT), Latvia, Lithuania, Mazowieckie (PL), Centro (PT), Slovenia, Slovakia. **Modest:** Eastern Macedonia-Trace (EL), Warminsko-Mazurskie (PL).

classification [12], the selected sample of regions includes 6 Innovation Leaders, 9 Strong Innovators, 13 Moderate Innovators and 2 Modest Innovators, a distribution which broadly reflects the overall situation across European regions as mapped by RIS 2016.

During this exercise, we encountered several problems that made difficult to delineate between 'pure' RIS3 methods and the wider research and innovation policy intelligence gathering routines. First, there is a rather limited availability of documentary sources that could be used as a source of in-depth information, for understanding the ways in which the RIS3 design process was carried out in each region. Secondly, in many instances, it was impossible to detect how robust, deep and comprehensive the implementation of these methods had actually been in practice. Thirdly, many regions have undertaken analytical exercises independently from RIS3 process, as part of their general research and innovation policy framework, which made difficult to identify the used methodologies.

The mapping exercise revealed that regions did not follow the RIS3 steps [13] as a rulebook for the design of methodological approaches. In practice, analytical methods employed under Steps 2, 3 and 4 are highly intertwined making their separation somehow artificial. Overlapping methodologies throughout the S3 strategies include working groups/focus groups, stakeholder interviews, online surveys, benchmarking, peer-review, SWOT analysis, regional profiling and road mapping. The results also revealed that regions did not seem to apply all steps linearly, but rather use the RIS3 theoretical framework holistically. Overall, the robustness of methodological approaches varied and in many regions, even the key concepts of the various RIS3 steps were not fully understood.

The mapping results also point out that there is no real link between the level of innovativeness of a region and methodological sophistication of RIS3 design. Hence, it cannot be claimed that moderate and modest innovator regions generally use fewer and less rigorous methods, than leading innovation regions. In fact, it was surprising to see leading and strong innovation regions to have put little effort into their RIS3 strategic design, rather than accepting it as a serious basis for regional economic transformation. At the same time, regions with much more modest innovation performance and little experience in RDI strategy design seem to have undertaken comprehensive RIS3 exercises.

According to Table 1, the main methodologies employed in each of the RIS3 steps are the following:

- *Step 1:* regional profiling, comprising key statistical analysis and qualitative assessment, SWOT analysis and working groups are the main methodologies used in this step, while various stakeholder consultation techniques are rather widespread.
- *Step 2:* stakeholder engagement and information dissemination methods are the key approaches used. Around one third of the mapped regions have also set up dedicated networking cluster platforms to drive/ support RIS3 governance. However, little is mentioned about the demand-side of the governance systems, especially in relation to enhancing and increasing transparency of the RIS3 process, as long as providing accountability to all regional stakeholders of the process itself.
- *Step 3:* most frequent methods used here are working groups and SWOT analysis, although this step has been largely integrated with other analytical steps.
- *Step 4:* most regions have used working groups/focus groups, while participatory deliberation and collaborative writing, as well as annotation opportunities have been exploited in some cases.
- *Step 5:* Apart from working groups, road mapping also emerges as a prevalent technique used in the design of policy mix, although it was hard to assess how sophisticated and

thought-through the approaches of regions have been, in applying this method. Surprisingly, the charting of intervention logic is implemented only by less than 40% of regions. Given this fact, it seems that there is some lack of understanding regarding what steps are necessary throughout the context design of RIS3.

- *Step 6:* It appears that regions have struggled with the definition of structural change and context indicators, as the chosen approaches are simplistic, when compared to the complexity of monitoring requirements. Yet, it should be bear in mind that, in many cases details of monitoring frameworks remain only in the design phase, without being able to capture the progress of RIS3 implementation.

Table 1 Methodologies employed in each of the RIS3 steps.

Step 1: Analysis of regional/national context	Step 2: Governance	Step 3: Shared Vision	Step 4: Identification of priorities	Step 5: Policy mix	Step 6: Monitoring and evaluation
Regional profiling (100%)	Working groups /focus groups (97%)	Working groups/ focus groups (90%)	Working groups/ focus groups (93%)	Working groups/ focus groups (83%)	Definition of implementation, output and result indicators (90%)
SWOT analysis (87%)	Information events (73%)	SWOT analysis (60%)	Stakeholder reports (20%)	Road mapping (63%)	Definition of structural change and/or context indicators (70%)
Working groups/focus groups (87%)	Information dissemination (60%)	Statistical analysis (53%)	Participatory deliberation/ collaborative writing (17%)	Peer review (40%)	Various evaluations of RDI system components (60%)
Benchmarking (63%)	Expert and/or peer review of RIS3 process (50%)	Literature review (47%)	Ideas competition (7%)	Charting intervention logic of policy mix (30%)	Peer-review (43%)
Bibliometric analysis (57%)	Online survey(s) (40%)	Scenario building (40%)	Web-based crowdsourcing (3%)	Ex-post evaluation of policy mix (30%)	Balanced scorecard (23%)
Stakeholder interviews (47%)	Stakeholder interviews (40%)	Stakeholder reviews (37%)		Benchmarking (30%)	Benchmarking (20%)
Collaboration and networking analysis (37%)	Set-up of dedicated networking/ cluster platforms (33%)	Benchmarking (30%)		Stakeholder interviews (20%)	Online survey(s) (13%)
Online survey(s) (37%)	Online forums/ discussion boards (27%)	Foresight (30%)		Pilot projects to test effectiveness of policy mix (13%)	Research assessment exercise (13%)
Cluster analysis (27%)	Communication through social media (17%)	Horizon scanning (27%)		Inventory survey (10%)	Best practice case studies (10%)
Value chain analysis (27%)		Road mapping (23%)			
Gap analysis (20%)		Online survey(s) (20%)			
Social network analysis (13%)		PEST analysis (13%)			
Product space modelling (7%)		VRIO analysis (7%)			
		Delphi survey(s) (3%)			
		Risk assessment (3%)			

It should be noted that the highest variety of applied methodologies is observed in steps 1- *Analysis of Regional/National Context* and 3-*Shared Vision*, with large overlapping characteristics. Most of the regions used over 4 different methods to define their regional/national contexts. At the same time, step 4-*Identification of Priorities* is found to be the less developed step, as it illustrates a low methodological diversification, only 1 or 2 different methods have been used in each case. High level of complexity, characterizing methods that could be applied in this

step, such as extroversion and related variety analysis, did not allowed policy-makers to go one step further and use them.

3. A review of good practices

There are several additional methodologies that could be used throughout a RIS3 strategic design process, apart from those identified in the mapping exercise. This section reviews analytical practices and state-of-the-art data application methods, for knowledge-based policy advice applied in RIS3 design, to provide a broader methodological landscape. This review will help identify gaps between what is currently used in RIS3 design, and potential methods that could be applied in the future, for expanding the effectiveness of a RIS3 design process.

Analysis of regional and national context

Literature review on good practices has indicated several emerging trends, regarding the analysis of the regional context. These include foresight exercises and diagnostic tools to identify new activities, possible synergies and complementarities that may arise within the regional context [14]. Profiling the regional assets and assessing the potential of emerging activities for specialisation, require the use of a variety of quantitative and qualitative data, regarding science and technology indicators, regional sectoral employment distribution, export indicators, road-mapping, SWOT analyses and foresight approaches. However, official statistical data has the disadvantage of being static and confined with the standard industrial and occupational codes (i.e. use of NACE codes), as well as being mostly geared towards past and present specialisations, without capturing the cross-sector and cross-technology dimension of emerging activities [14].

From a benchmarking perspective, advanced indicators, regarding mapping of science-technology nexus, citation analysis, and analysis of co-authorship and co-inventorship patterns, as well as relative indicators, such as the Activity Index (AI) for scientific activities, the Revealed Technological Advantage (RTA), and the Revealed Comparative Advantage (RCA) for economic activities [14], are essential for expanding its effectiveness. Also, affiliation and co-affiliation data from scientific publications can infer mobility patterns [15], while data from Thomson Reuters Web of Science (WoS) or Scopus can be used to conduct diachronic network analysis to identify mobility patterns among locations over time. Unstructured data can be used to identify emerging areas of technological and economic activity in a more accurate way [16], with their methods of analysis ranging from a simple search of keywords of interest, to complex unsupervised machine learning methods and text mining.

Governance: ensuring participation and ownership

Most of the focus on literature concerns the structures themselves, the ways in which they are designed and how they can facilitate the RIS3 process. The development of governance structures is very context specific and is expected to vary largely among regions. The use of community monitoring and community scorecards for giving feedback and increasing accountability to all regional stakeholders of the RIS3 process, could be largely beneficial for other steps of the RIS3 process, in particular for the RIS3 update. Opinion mining and sentiment analysis through the use of social media data and technologies can also support public engagement and provide decision support. Equally, the use of online participatory planning tools can enhance the active involvement of all stakeholders in the process.

Shared vision

Very little emerges from the literature regarding methods that regions are using to achieve a shared vision for the future of the region. Scenario building and foresight are the natural choices

for building a shared vision for the future. Methods like participatory foresight are interesting ways of involving all regional stakeholders in the construction of the RIS3 vision. Participatory foresight is demand-side driven, and is meant to directly involve beneficiaries and users of the RIS3, providing insight into the demand for societal challenges. It usually involves public consultation feed-in, steered with expert recommendations, which in many cases are facilitated through web-tools to carry the information flow. Within the foresight methods' family, the use of horizon scanning processes also helps decision-makers to take a longer-term strategic view and make present choices more resilient to future shocks and uncertainty [17].

The gap in this case, between the mapping exercise and the review on good practices, is likely to exist not because regions do not use any methods referring to these aspects, but because most of them involve participatory deliberation and consensus building, characteristics which are likely to be documented as parts of methods belonging to other phases of the RIS3 process.

Priority Setting

Participatory deliberation, in the form of focus groups, web-based public consultations, workshops and interviews with key stakeholders, is certainly the most common method used by regions for the identification of RIS3 priorities, as reflected in the mapping exercise. The choice of priority areas often happens based on broad participation of all relevant stakeholders within the regional ecosystem. However, this exercise could be enriched using crowdsourcing priority setting methods, offering flexibility to implement factual evidence in the RIS3 process. The overall objective is to assess the stakeholders' views and priorities. In general, this involves running a cross-sectional online public survey to understand the challenges faced by stakeholders and their views as to which areas of specialisation are of high priority to the region. Crowdsourcing is generally cost-effective, flexible and a fast way to establish a systematic dialogue between stakeholders, as well as to seek for feedback in relation to priority areas for policy intervention [18].

Another method might be the use of unstructured data to identify emerging areas of technological and economic activity in a more accurate and timely way [16]. Finally, the use of quantitative methods to inform the prioritisation process, as well as a better articulation of the use of data analysed and collected in step 1 of the RIS3 process is another identified gap.

Definition of coherent policy mix, roadmaps and action plans

As in the case of Step 3, very little emerges from literature as to what regions use as tools for the definition of a coherent policy mix, roadmaps and action plans. Most of what appears in the literature refers to qualitative exercises, based on participatory discussions with key stakeholders, including policy workshops and strategic regional partnerships that work as steering groups or expert groups for the development of action plans.

The development of online policy support tools has been explored recently for specific sectors. Tools for tracking data referring to projects and initiatives, that are publicly funded, are not widely used. Good practices regarding this issue, include the open data storehouse of Tekes in Finland, which allows to search for projects and beneficiaries having been funded through Tekes programmes². UK follows similar approaches to open data: the Gateway to Research database³ includes data referring to all publicly funded projects by Innovate UK and the Research Councils. Ongoing studies related to the use of open data regarding EU Structural Funds indicate that data being currently published by the EU national and regional authorities are in most cases not compatible, yet, with some of the fundamental requirements of the open data paradigm [19]. Data is rarely complete, accessible, timely, machine-processable and non-proprietary. Using open data on public support, would allow to track project themes and topics, as well as to see how they

² https://extranet.tekes.fi/ibi_apps/WFServlet?IBIF_ex=o_projekti_htm1&IBIAPP_app=openraho&YKIELI=E

³ <http://qtr.rcuk.ac.uk/>

match with the overall S3 approach. This kind of data could be highly valuable not only for tracking progress towards objectives and visions, but also for informing the RIS3 update process.

Monitoring and evaluation

Finally, with respect to the last step, most of the examples cited in the literature concern the definition of a monitoring system for the RIS3, with different levels of complexity and technicality. Some of the most essential gaps in this case, concern policy intelligence, as long as lack of tools and methods reflecting the ways in which the monitoring process could be used in the revision of priorities and policy mix, with a view of a RIS3 update.

4. Conclusions and discussion

The mapping exercise performed during this study, revealed that regions did not follow exactly the RIS3 steps as set out in [7], for the design of their RIS3 strategies. The regional correspondents in charge of mapping, struggled to 'fit' the evidence on methods found to the theoretical RIS3 context. In practice, there were cases where methods employed under different steps were highly intertwined, making the steps' separation very artificial. The evidence also highlights a varying robustness of the methodological approaches, as well as the fact that key concepts of the RIS3 steps were not fully understood.

Literature review on good practices has revealed a series of interesting issues, focusing mostly on the need to promote evidence-based decision-making processes, regarding the development of RIS3 strategic planning. More specifically, a broader communication of the vision, the objectives and the results, as well as the use of new methods targeting to a more effective stakeholder engagement, could be considered as good practices for increasing transparency of the RIS3 process. Methods should be able to promote a better understanding of the overall RIS3 framework, as well as available funding opportunities, to identify policy measures coherent with the regional vision and objectives.

A crucial step towards these improvements could be achieved using new datasets and sets of common indicators, advocating coherent computational and benchmarking analyses. Novel analytical concepts include: better understanding of the knowledge production and endowments, strengthening of scenario building practices and identification of emerging areas of technological and economic activities. Increased effectiveness, regarding the assessment and exchange of experience, related to the RIS3 implementation, could be also considered as an additional benefit of the promotion of an evidence-based decision-making process.

Starting from the *analysis of regional and national context*, emphasis should be given on a more effective and innovative use of the existing datasets, to achieve a comprehensive understanding of the regional assets and ecosystems, not only from a descriptive point of view, but also using a comparative analysis perspective. At the same time, *governance* should focus on the promotion of better stakeholder engagement techniques, that could enhance citizens' participation, as well as accountability, whereas expanding foresight methods' family, through horizon scanning exercises, could help policy-makers to extract longer-term strategic views, in the case of *shared vision*.

Steps 4-*Priority setting* and 5-*Policy mix & Action plan implementation* have been found as the most methodologically poor phases, throughout the mapping exercise. Their high degree of overlapping with other phases, as well as their highly demanding input data for analysis, constitute two of the main reasons for this. However, an essential number of good practices have been identified through the literature review, promoting a more effective identification of emerging areas

of technological and economic activity, as well as identifying policy measures coherent to the regional RIS3 vision and objectives. Methods for defining and enhancing step 6—*Monitoring & Evaluation* focus on different levels of complexity and technicality. Given the fact that monitoring and evaluation are essential parts of the overall RIS3 design process, it is crucial for their outputs to be used as feedback for revising RIS3 priorities and policy mix, in cases where the desired results are far from being achieved.

Finally, it is important to notice that selected methods in each case, should be able to be backed up by novel instruments/tools, offering to policy-makers the opportunity to use them, regardless their level of complexity. Thus, the development of a set of potential tools that could be used in each case, could be considered as a further step of this research, in order to connect innovation and digital growth strategies [20].

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