Title of the method: **2.1 Regional assets mapping**
Applicable to the RIS3 phase: **2. Analysis of regional/national context**

Background and rationale

This method and online dashboard puts together information on key regional assets. The objective is to support data transparency that enables gap analysis in relation to regional assets. It works as a dynamic library that includes a short description of each of the assets (e.g. research services, equipment, etc.) and service portfolio documentation. It could also include details on scientific identification and scientific description, access and use, scientific activities, collaborations, human resources and training, data policies, impact, innovation, costs and funding.

Regional profiling is the most prevailing RIS3 method applied essentially by all regions, but with varying degrees of sophistication. Generally, regions use a variety of sources to map out a comprehensive 'picture' of regional assets. Integrating all relevant sources into a web-based dashboard could help RIS3 stakeholders to access basic information in a quick manner.

Description of the method

Regional policies aimed at promoting knowledge-driven growth and development and RIS3 in particular, should be underpinned by a thorough understanding of the regional economic structure and competitive position of the economy in the national and international context (Gianelle et al., 2014). In this regard, according to the Guide to Research and Innovation Strategies for Smart Specialisation (onwards 'RIS3 Guide'), *"RIS3 needs to be based on a sound analysis of the regional economy, society, and innovation structure, aiming at assessing both existing assets. […] The analysis should cover […] regional assets, such as technological infrastructures"* (Foray et al., 2012).

In terms of definition, regional profiling and assets mapping refers to *"the set of analyses that should be implemented and the associated evidence that should be collected in order to construct a source of knowledge to inform strategic choices and actions" (Gianelle et al., 2014)*. Profiling indicators could be defined as *"the set of statistical indicators covering demographic, socio-economic, institutional and connectivity features of territories with the purpose of shaping the relevant characteristics of regional economies in terms of smart growth"* (Martínez, 2013).

In the RIS3 Guide it is made clear that, although the assessment of existing regional assets implies looking 'inside' the region, for the development of a substantial smart specialisation strategy, it is essential to also gauge its position relative to other EU regions, for the purposes of maximizing complementarities, transferring know-how and avoiding 'blind' investments' duplication. This implies that the RIS3 approach requires looking beyond the regional administrative boundaries, accounting for the external context (national and international), paying attention to inter-regional and international cooperation in innovation policies and ultimately keeping a focus on what kinds of inter-regional cooperation frameworks can be established with the goal of enhancing regions' ability to compete in the global economy (Foray et al., 2012, Gianelle et al., 2014).

Regarding the application of the Regional Mapping method, from the RIS3 literature we extract the following principles:

- Mapping/Profiling indicators should be used in a way that adds constructive insights about the determination of niches of competitive advantages, rather than simply describing the current state of innovation (Martínez, 2013)
- Mapping/Profiling indicators need to be selected having in mind that they should be able to be used as monitoring and evaluation indicators, too; hence they should use information that is constantly monitored and is routinely made available across a maximum number of regions

- The sum of necessary information to build a regional assets profile includes numerical (quantitative) indicators, categorical/ordinal (qualitative) indicators, as well as qualitative descriptive data that altogether map the general assets profile of the Region. Examples of descriptive data include institutional components, such as the number and features of knowledge-based organisations (universities, research centres, etc.) within the region.

A number of researchers have developed more advanced methods that can be used in a Regional Mapping/Profiling exercise. Kroll et al. (2011), for example, developed an advanced methodology for the profiling of regional economies. Beginning with a large set of regional economy indicators, the authors performed a factor analysis to reduce them to a final set of recommended indicators which capture the most important regional characteristics.

Usability and impact

The profiling or baseline indicators that are used in RIS3 development are especially important, because they establish both the features of the regional economy which are relevant to the policy decision-making process and also the baselines from which any subsequent policy interventions will be evaluated (Nauwelaers et al., 2015). Regional Mapping, being the very first exercise to take place in the context of the development of a RIS3 strategy, sets the tone upon which the succeeding methods and applications will unfold. Hence it should be comprehensive and integrated enough to provide food for thought regarding the Benchmarking, Related Variety, SWOT and other analyses to follow. For the Regional Mapping method that will be developed for ONLINE S3, all of the above imply that we need to account for data and indicators that are measurable and available –and hence comparable- across the maximum possible number of Regions.

Required data

In examining the actual use of indicators in a random sample of eight existing S3, we observed the usage of indicators and qualitative information in the following categories: Table 1 Categories of used indicators in a sample of eight RIS3 (author's elaboration)

Region	Category					
	Geography	Demography & Society	Economy & Labour	Sectoral structure	Business Characteristics	Innovation System
Oulu, FI			X	X		
South Ostrobothnia, FI	X	X	X	X	X	X
Luxemburg, LU			X	X		X
Northern Netherlands, NL		X	X	X		X
Western Netherlands, NL			X			X
Estonia, EE			X			X
Flanders, BE			X			X
Galicia, ES		X	X		X	

Information and indicators related to the regional economy and labour, as well as indicators about the regional innovation system are considered essential. Information about the regional demography and economic sectorial structure are also common. Less common are indicators related to the local characteristics of businesses and the business sector in general, as well as regional geography.

From the above analysis, we consider the following key areas of interest relevant to the Regional Mapping exercise:

- **Geography:** They point to the indicators that reflect the basic regional characteristics that are essential to develop a region's profile; they are also determining factors in terms of regional attractiveness (Kroll et al., 2011). They hint to the existing regional assets that can be used as a basis for promoting smart growth (Martínez, 2013). They also provide evidence on the connectivity potential of the region, due its current geomorphology, administrative boundaries and major built structures.
- **Demography and Society:** Population characteristics and density are determining factors for regional growth (McGuire, 2013). They point to the indicators that reflect the basic regional characteristics that are essential to develop a region's profile (Kroll et al., 2011).
- **Economy and Labour:** Baseline indicators for economic specialisation are essential in profiling a region (OECD, 2013). Labour force mobilization and employment indicators are important innovation-related factors, contributing to regional growth. Human capital and skills, such as education, for example, are also important (McGuire, 2013). They point to the indicators that reflect the basic regional characteristics that are essential to develop a region's profile (Kroll et al., 2011).
- **Sectoral structure:** Provides information on the intensity of the service-based economy, and the rate of the de-industrialisation of the region.
- **Business Characteristics:** Provides information on regional entrepreneurial activity, especially activity that is related to the birth of innovation ideas, and whether and how they are converted into profitable businesses (Martínez, 2013). They point to the indicators that reflect the basic regional characteristics that are essential to develop a region's profile (Kroll et al., 2011).
- **Innovation System:** Baseline indicators for science and technology are essential in profiling a region (OECD, 2013). Technological infrastructures and regional assets related to regional innovation are key (Foray et al., 2012). Profiling indicators must provide information on the intensity of regional entrepreneurial activity, especially those related to the birth of innovation ideas and how they are converted into profitable businesses (Martínez, 2013). They point to the indicators that reflect the basic regional characteristics that are essential to develop a region's profile (Kroll et al., 2011). Each of the above areas are analysed further into indicators that could serve the Regional mapping exercise, provided in the tables at the end of this section.

Nevertheless, one should keep in mind that all regions have specific characteristics that render them unique. These characteristics may call for special handling and techniques. Low-density regions are a characteristic example of the sort; some useful implications for the design of RIS3 in low-density regions are mentioned by McGuire (2013).

In our case, we will focus on the core areas of interest to the Regional Mapping method and the most representative indicators within them, so that we provide a broadly applicable tool. The indicators with respect to each area are included in the following tables:

1. Geography			
Sub-category	**Variable Name**	**Recency**	**Link**
1.1 Typology (NUTS3)	Urban-rural including remoteness	2015	http://ec.europa.eu/eurostat/statistics-explained/index.php/Regional_typologies_overview
	Metro Region	2015	http://ec.europa.eu/eurostat/statistics-explained/index.php/Regional_typologies_overview
	Border Region	2015	http://ec.europa.eu/eurostat/statistics-

			explained/index.php/Regional_typologies_overview
	Mountain Region	2015	http://ec.europa.eu/eurostat/statistics-explained/index.php/Regional_typologies_overview
	Island Region	2015	http://ec.europa.eu/eurostat/statistics-explained/index.php/Regional_typologies_overview
	Sparsely-populated Region	2015	http://ec.europa.eu/eurostat/statistics-explained/index.php/Regional_typologies_overview
1.2 Major infrastructure	Air Transport: Major commercial airports	-	
	Air Transport: Passengers carried per annum	2013	http://ec.europa.eu/eurostat/web/transport/data/database
	Maritime transport of passengers	2013	http://ec.europa.eu/eurostat/web/transport/data/database
	Maritime transport of freight	2013	http://ec.europa.eu/eurostat/web/transport/data/database

2. Demography and Society			
Sub-category	**Variable Name**	**Recency**	**Link**
2.1 Population Size and dynamism	Total Population	2015	http://ec.europa.eu/eurostat/web/regions/data/database
	Population aged 20-34 years	2015	http://ec.europa.eu/eurostat/web/regions/data/database
	Population aged > 65 years	2015	http://ec.europa.eu/eurostat/web/regions/data/database
	Crude rates of natural change of population	2014	http://ec.europa.eu/eurostat/web/population-demography-migration-projections/population-data/main-tables
	Dependency Ratio, Elderly (% 65+ over population 15-64)	2014	http://stats.oecd.org/Index.aspx?datasetcode=REG_DEMO_TL2
2.2 Education	Population completed tertiary education	2015	http://ec.europa.eu/eurostat/web/regions/data/database

3. Economy and Labour			
Sub-category	**Variable Name**	**Recency**	**Link**
3.1 Economy	Gross Domestic Product (GDP)	2014	http://ec.europa.eu/eurostat/web/regions/data/database
	Gross value added	2014	http://ec.europa.eu/eurostat/web/regions/data/database
3.2 Labour	Economically active population	2015	http://ec.europa.eu/eurostat/web/regions/data/database
	Employment	2015	http://ec.europa.eu/eurostat/web/regions/data/database
	Unemployment	2015	http://ec.europa.eu/eurostat/web/regions/data/database
	Growth rate of employment (%)	2014	http://ec.europa.eu/eurostat/web/regions/data/database
	Human resources in science and technology (HRST)	2015	http://ec.europa.eu/eurostat/web/science-technology-innovation/data/database
	Employment in medium-high and high tech manufacturing and knowledge-intensive services as percentage of total employment	2014	manually from http://ec.europa.eu/DocsRoom/documents/17824

4. Sectoral structure			
Sub-category	**Variable Name**	**Recency**	**Link**
4.1 Agricultural Statistics	Agriculture (A-Div.01), Production value at basic price	2014	http://ec.europa.eu/eurostat/web/agriculture/data/database
4.2 Structural Business Statistics	Mining and quarrying (B), Number of persons employed	2014	http://ec.europa.eu/eurostat/web/structural-business-statistics/data/database
	Mining and quarrying (B), Number of local units	2014	http://ec.europa.eu/eurostat/web/structural-business-statistics/data/database
	Manufacturing (C), Number of persons employed	2014	http://ec.europa.eu/eurostat/web/structural-business-statistics/data/database
	Manufacturing (C), Number of local units	2014	http://ec.europa.eu/eurostat/web/structural-business-statistics/data/database
	Electricity, gas, steam and air conditioning supply (D), Number of persons employed	2014	http://ec.europa.eu/eurostat/web/structural-business-statistics/data/database
	Electricity, gas, steam and air conditioning supply (D), Number of local units	2014	http://ec.europa.eu/eurostat/web/structural-business-statistics/data/database
	Water supply; sewerage, waste management and remediation activities (E), Number of persons employed	2014	http://ec.europa.eu/eurostat/web/structural-business-statistics/data/database
	Water supply; sewerage, waste management and remediation activities (E), Number of local units	2014	http://ec.europa.eu/eurostat/web/structural-business-statistics/data/database
	Construction (F), Number of local units	2014	http://ec.europa.eu/eurostat/web/structural-business-statistics/data/database
	Construction (F), Number of persons employed	2014	http://ec.europa.eu/eurostat/web/structural-business-statistics/data/database
	Wholesale and retail trade; repair of motor vehicles and motorcycles (G), Number of persons employed	2014	http://ec.europa.eu/eurostat/web/structural-business-statistics/data/database
	Wholesale and retail trade; repair of motor vehicles and motorcycles (G), Number of local units	2014	http://ec.europa.eu/eurostat/web/structural-business-statistics/data/database
	Transportation and storage (H), Number of persons employed	2014	http://ec.europa.eu/eurostat/web/structural-business-statistics/data/database
	Transportation and	2014	http://ec.europa.eu/eurostat/web/structural-business-

	storage (H), Number of local units		statistics/data/database
	Accommodation and food service activities (I), Number of persons employed	2014	http://ec.europa.eu/eurostat/web/structural-business-statistics/data/database
	Accommodation and food service activities (I), Number of local units	2014	http://ec.europa.eu/eurostat/web/structural-business-statistics/data/database
	Information and communication (J), Number of persons employed	2014	http://ec.europa.eu/eurostat/web/structural-business-statistics/data/database
	Information and communication (J), Number of local units	2014	http://ec.europa.eu/eurostat/web/structural-business-statistics/data/database
	Financial and insurance activities (K), Number of persons employed	2014	http://ec.europa.eu/eurostat/web/structural-business-statistics/data/database
	Financial and insurance activities (K), Number of local units	2014	http://ec.europa.eu/eurostat/web/structural-business-statistics/data/database
	Real estate activities (L), Number of persons employed	2014	http://ec.europa.eu/eurostat/web/structural-business-statistics/data/database
	Real estate activities (L), Number of local units	2014	http://ec.europa.eu/eurostat/web/structural-business-statistics/data/database
	Professional, scientific and technical activities (M), Number of persons employed	2014	http://ec.europa.eu/eurostat/web/structural-business-statistics/data/database
	Professional, scientific and technical activities (M), Number of local units	2014	http://ec.europa.eu/eurostat/web/structural-business-statistics/data/database
	Administrative and support service activities (N), Number of persons employed	2014	http://ec.europa.eu/eurostat/web/structural-business-statistics/data/database
	Administrative and support service activities (N), Number of local units	2014	http://ec.europa.eu/eurostat/web/structural-business-statistics/data/database

5. Business Characteristics			
Sub-category	**Variable Name**	**Recency**	**Link**
5.1 Enterprise demography	Population of active enterprises	2013	http://ec.europa.eu/eurostat/web/regions/data/database
	Number of employees in the population of active enterprises	2013	http://ec.europa.eu/eurostat/web/regions/data/database
	Avergage company size: "Number of employees in the population of active	2013	

	enterprises" divided by "Population of active enterprises"		
	Net business population growth	2013	http://ec.europa.eu/eurostat/web/regions/data/database
5.2 High growth and innovating enterprises	Number of high growth enterprises measured in employment (growth by 10% or more)	2013	http://ec.europa.eu/eurostat/web/regions/data/database
	SMEs introducing product or process innovations as percentage of SMEs	2015	http://ec.europa.eu/eurostat/web/microdata/community-innovation-survey
	SMEs introducing marketing/organisational innovations as percentage of SMEs	2015	http://ec.europa.eu/eurostat/web/microdata/community-innovation-survey

6. Innovation System			
Sub-category	**Variable Name**	**Recency**	**Link**
6.1 Critical Institutions	Knowledge Organisations (Universities, Research centers etc)	-	
6.2 R&D	Human resources in science and technology	2015	http://ec.europa.eu/eurostat/web/regions/data/database
	Employment in high-tech sectors	2015	http://ec.europa.eu/eurostat/web/regions/data/database
	Total intramural R&D expenditure	2013	http://ec.europa.eu/eurostat/web/regions/data/database
	Researchers, all sectors	2013	http://ec.europa.eu/eurostat/web/regions/data/database
6.3 Patents	PCT Patent Applications	2011	http://stats.oecd.org/Index.aspx?datasetcode=REG_DEMO_TL2
	Patent applications to the European patent office	2012	http://ec.europa.eu/eurostat/web/regions/data/database
	High-tech patent applications to the European patent office	2012	http://ec.europa.eu/eurostat/web/regions/data/database

Relevant data sources

For the appointment of the most relevant indicators within selected sections (see Step 2 below), data needs come down to the indicators that are required to describe a region's (i) Geography, (ii) Demography & Society, (iii) Economy & Labour, (iv) Sectoral structure, (v) Business Characteristics and (vi) Innovation System (NUTSII level). The foremost data sources include:

1. Eurostat's Regional Statistics indicators (http://ec.europa.eu/eurostat/web/regions/data/database)
2. the Regional Innovation Scoreboard 2016 indicators (http://ec.europa.eu/growth/industry/innovation/facts-figures/regional_en)
3. the Regional Demographics Statistics of OECD (http://stats.oecd.org/Index.aspx?datasetcode=REG_DEMO_TL2)

For the description and explanation of results (see Step 3 below), data needs are region-specific. Potential sources of information include policy documents and other literature sources, as well as consultation with key persons, which will help the RIS3 designer to assess the analytical results of Step 2 and reach sensible and cohesive conclusions.

Implementation roadmap

Step 1. Appointment of most relevant sections among the sections (i) Geography, (ii) Demography & Society, (iii) Economy & Labour, (iv) Sectoral structure, (v) Business Characteristics and (vi) Innovation System.
Remarks:

- It is advised to use as many sections as possible –if possible, all of them- in order to get the most complete view of the regional assets profile
- At least sections (iii) Economy & Labour, and (vi) Innovation System should be selected, as they are by definition the most relevant to RIS3.

Step 2. Appointment of most relevant indicators within selected sections. The Regional Mapping tool of Online-S3 offers the capability to select a subset from approximately 100 indicators across all sections. In creating the regional assets profile, one will be called to select the most relevant ones, depending on the strategic priorities of the RIS3 (if they have been already set) and the particular characteristics, strengths and weaknesses of the region. The Regional Mapping tool will provide the results with respect to the selected indicators.
Remarks:

- the appointment of indicators also depends on data availability (some indicators may not be available for all regions)
- although the majority of indicators are quantitative, some of them are qualitative.

Step 3. Description and explanation of results. Building on the results related to the indicators, the RIS3 developer will be called on to provide qualitative and quantitative explanatory information, for example in identifying major strengths and weaknesses or explaining major indicator fluctuations across years in combination with policy decisions or major economic events. Descriptions and explanations may either regard each section individually or several section at a time.
Remarks:

- this step requires critical thinking and interpretation on the side of the RIS3 developer
- this step may require research in literature, policy documents and databases in order to interpret the results.

Step 4. Regional Profile Overview. Using the results of steps 2 and 3, the RIS3 developer will be called on to provide an overview of the region's profile. In doing so, they will combine the collected and worked out information about the region, and point strengths and weaknesses with regards to the profile.
Remarks:

- this step requires critical thinking and interpretation on the side of the RIS3 developer

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