



UNIMORE
UNIVERSITÀ DEGLI STUDI DI
MODENA E REGGIO EMILIA

Dipartimento di Economia
Marco Biagi

DEMB Working Paper Series

N. 145

RIS3 in macro-regional strategies:
tools to design and monitor integrated territorial development paths

Margherita Russo¹, Francesco Pagliacci²,
Pasquale Pavone³, Anna Giorgi⁴

June 2019

¹ University of Modena and Reggio Emilia, Department of Economics Marco Biagi and CAPP, Center for the Analysis of Public Policies
Address: Viale Berengario 51, 41121, Modena, Italy
E-mail: margherita.russo@unimore.it

² University of Padua, Dipartimento Territorio e Sistemi Agro-Forestali and CAPP
E-mail: francesco.pa-gliacci@unipd.it

³ Sant'Anna School of Advanced Studies, Department of Excellence, Economics and Management in the Era of Data Science (EM-beDS), and CAPP
E-mail: fpasquale.pavone@santannapisa.it

⁴ University of Milan, Leader AG1 EUSALP Lombardy Region representative, and Gesdimont Research Centre

DEMB Working paper 145

**RIS3 in macro-regional strategies:
tools to design and monitor integrated territorial development paths**

Margherita Russo^{*•}, Francesco Pagliacci^{♦•}, Pasquale Pavone^{^•}, Anna Giorgi^{**}

rev January 2018

Forthcoming in the *Proceedings of the ESPON Scientific Conference 2018*
"Building the next generation of research on territorial development",
London, 14 November 2018

- * Dipartimento di Economia Marco Biagi, Università degli Studi di Modena e Reggio Emilia, Italy, margherita.russo@unimore.it
- ^ Department of Excellence, Economics and Management in the Era of Data Science (EMbeDS), Sant'Anna School of Advanced Studies, Italy, pasquale.pavone@santannapisa.it
- ♦ Dipartimento Territorio e Sistemi Agro-Forestali, Università di Padova, Italy, francesco.pagliacci@unipd.it
- CAPP (Centro Analisi Politiche Pubbliche), Università degli Studi di Modena e Reggio Emilia, Italy
- ** Leader AG1 EUSALP Lombardy Region representative, and Gesdimont research centre, University of Milan, Milano, Italy

ABSTRACT

Building on the broad and diverse picture of strategic interventions on regions' research and innovation strategies for smart specialisation (RIS3) and on macro-regional strategies, this paper outlines a comparative framework to analyse regions' RIS3 priorities (to outline the intended development path that regions aim at) and socioeconomic conditions (to describe the structural features, as they emerge from Eurostat data). The paper integrates results developed in two companion papers, by Pavone et al. (2018) and by Pagliacci et al. (2018), thus providing a multidimensional perspective on similarity across regions. Identifying which are the similarities is essential in a comparative analysis that aims to measure and monitor the impact of integrated investments on the development of the territory across sectors. Implications of the methodology proposed in the paper are discussed with suggestions for policy makers.

KEYWORDS: Integrated territorial development; EU macro-regional strategies; RIS3; Data classification with non-supervised techniques

JEL CODES: R58-Regional Development Planning and Policy; Q58-Government Policy; C38-Classification Methods, Cluster Analysis, Principal Components, Factor Models

ACKNOWLEDGMENT

This paper builds on Pagliacci et al. (2018) and Pavone et al. (2018). It is part of the Work Package Nr: T-3 "Enhancing shared Alpine Governance project" of the Project "Implementing Alpine Governance Mechanism of the European Strategy for the Alpine Region" (AlpGov) of the Interreg Alpine Space Programme - Priority 4 (Well-Governed Alpine Space), SO4.1 (Increase the application of multilevel and transnational governance in the Alpine Space). For their comments and suggestions on the topics presented in the paper, the authors wish to thank all the EUSALP's Action Group 1 members and the participants at the Espon Conference 2018 "*Building the next generation of research on territorial development*", London, 14 November 2018.

1. INTRODUCTION

In the current debate on post 2020 European Cohesion Policy, it would be important to capitalize on two pillars of the ongoing policy programmes: the macro-regional strategies (MRS) (COWI, 2017) and the research and innovation strategies for smart specialisation (RIS3) (Foray et al., 2012; Foray, 2015; McCann, 2015; McCann & Ortega-Argilés, 2015). If the EU macro-regions are considered as relevant territorial units to enhance bottom-up policy planning in support of development policies across sectors, how can be its integrated territorial development supported?

The EU Macro-Regional Strategies (MRSs), initially launched in the 2007-2013 programming period, align with the EU goals of inclusive and sustainable development, which would be obtained by enhancing synergies among neighbouring regions. So far, four MRSs have been designed for regions in the Baltic area (EUSBSR), along the Danube (EUSDR), surrounding the Adriatic and Ionian Sea (EUSAIR) and in the Alpine area (EUSALP), respectively approved in 2009, 2011, 2014 and 2015¹.

The core of all four strategies is to enhance complementarities and synergies among regions in the macro-region, with a bottom up regional policy design across the many countries involved (COWI, 2017). MRSs provide opportunities for cross-fertilizations across countries and domains of interventions, from education to health or social innovation. “The added value of macro-regional strategies is characterised by its cross-sectoral approach, its transnational dimension (including the participation of non-EU countries) and its contribution to better multi-level governance. But this is an ambitious concept that needs time to be consolidated and to bear fruit”². With significantly different durations so far, the four strategies have experienced different levels of maturity in elaborating policy programmes. This appears to be a critical issue in the further implementation of the strategy in the next 2021-2027 programming period of the cohesion policy, which will aim at “investing in all regions” with “a tailored approach to reduce disparities and help low-income and low-growth regions catch up”, with “locally-led development strategies”³.

The development path of such policy design might leverage on the RIS3s elaborated by the regions, characterised by the identification of strategic areas for intervention, based both on the analysis of the strengths and potential of local economy and on an Entrepreneurial Discovery Process (Foray, 2015).

Building on this broad and diverse picture of strategic interventions at regional and at meso-level (i.e. the macro-regions), this paper aims to answer the following research questions. Is it possible to outline a comparative framework that could help policy makers and stakeholders in improving their innovative performance by learning from other regions? What can we learn from that comparative analysis in order to single out which synergies and complementarities can be enhanced within the MRSs?

¹ Official documents are available on line at https://ec.europa.eu/regional_policy/it/policy/cooperation/macro-regional-strategies/

² http://ec.europa.eu/regional_policy/en/information/publications/factsheets/2017/what-is-an-eu-macro-regional-strategy, 15.12.2017, accessed on 01/08/2018

³ http://ec.europa.eu/regional_policy/en/newsroom/news/2018/05/29-05-2018-regional-development-and-cohesion-policy-2021-2027, accessed on 01/08/2018

To answer these questions, we suggest to endow policy makers with a set of comparative tools, respectively on RIS3 priorities (to outline the intended development path that regions aim at) and on socioeconomic conditions (to describe the structural features, as they emerge from Eurostat data). Taken together, these tools, developed in two companion papers by Pavone et al. (2018) and by Pagliacci et al. (2018), help in addressing the multidimensional perspective on similarity across regions. Identifying which are the similarities is essential in a comparative analysis that aims to measure and monitor the impact of integrated investments on the development of the territory across sectors.

Given the limited space for a survey on the literature on RIS3 and on MRS, which we have presented in Pagliacci et al. (2018), the paper summarizes the tools and the results, respectively, on RIS3 data and on socioeconomic data, in Sections 2 and 3. Section 4 returns main results that combine RIS3 priorities and socioeconomic characteristics of regions, focusing on EUSALP area. Section 5 discusses the implications of the methodology proposed in the paper, with suggestions for policy makers.

2. CLASSIFICATION OF RIS3 PRIORITIES

Information about RIS3 can be accessed with the online tool: "Eye@RIS3: Innovation Priorities in Europe", EC-JRC⁴ (2018). Although it is not intended to be used as a source of statistical data, the broad coverage in terms of territorial entities and the large homogeneity of information at sub-national level suggest that information in the Eye@RIS3 platform can be treated as a collective effort to support a robust comparative analysis of RIS3s' priorities across EU-28. Considering this information⁵, Pavone et al. (2018) classify RIS3s' priorities by using both the descriptions provided in free text format and the series of related codes of economic domains, scientific domains and policy objectives. With regard to regions, similarities are not identified by browsing the words in the descriptions entered in the database nor by the exact combination of codes: each category of descriptions refers to a statistically significant semantic domain, in which the words used by regions are associated to, and each category of codes embraces a statistically significant combination of the different sets of codes. The dictionaries associated to each category help in checking for nuances (but also in controlling for ambiguity and misinterpretation). As a result of this priority classification, we have not only categories and related dictionaries to name them, we are also able to automatically classify regions according to the identified categories of priorities.

The cross tabulation of the two classifications reveals that regions show a coherent attribution of codes to descriptions (Table 1). In particular, categories of codes in the cluster "Agrofood, forestry and tobacco" elaborate descriptions also in other related domains (such as: bio economy, tourism, leisure, sustainable energy), while categories in

⁴ <http://s3platform.jrc.ec.europa.eu/map>. As stated in the website, "The tool has been fully upgraded in September 2018. Data are continuously updated based on inputs from European regional and national authorities and their stakeholders (also called the "entrepreneurial discovery process" in the literature on smart specialisation)".

⁵ In Eye@RIS3 platform, regions entered their own record descriptions, from a minimum of one to a maximum of 15 priorities.

the macro groups of codes referring to “Health & Life Science”, “New economy & Leisure industry”, “Logistic & Manufacturing” largely elaborate within the same domain of descriptions. In the case of the macro category “Bio Economy, Blue Economy & Energy”, these groups of records cross many diverse descriptions, with a significant overlapping with descriptions in the macro group of “Production & Transport, Manufacturing & Energy”⁶. In general, the results of cross tabulation provide hints on the specific priorities emerging both within and outside the overlapping of the same categories of descriptions and codes⁷.

Table 1. Eye@RIS3 records by category of RIS3’ priorities: descriptions and codes

		categories of codes												
		Agrofood, forestry and tobacco	Health & Life Science	New Economy & Leisure industry			Bioeconomy, Blue Economy & Energy			Logistic & Manufacturing				
		Agrofood, forestry and tobacco	Health & Life Science	Creative industry, Tourism & cultural and recreative services	ICT & digital transformation	Social innovation & education	Bioeconomy & Waste collection, treatment etc	Blue Economy	Energy Production, Efficiency & Sustainability	Aeronautics, Aerospace & Automotive industry	Manufacturing	Transport & logistics		
categories of descriptions	Agrofood	7.92	0.16				0.57		0.08	0.16			8.90	
	Healthy Food	1.22	0.16										1.39	
	Health & Life science	Health	0.16	5.63	0.08	0.16	0.16	0.33			0.24			6.78
		Life Science	0.08	5.71										5.80
	New Economy & Leisure industry	Bioeconomy	0.57	0.33	0.41	0.33	0.98	1.14	0.41	0.08	1.22	0.24		5.71
		Creative industry			0.16	1.22								1.39
		Digital & ICT	0.08	0.65	8.08	0.33	0.57	0.57	0.08		0.41	0.08	0.16	11.02
		Fashion				0.08						0.73		0.82
		Growth & Welfare	0.08	0.65	0.41	0.33	1.22	0.24	0.08		0.49	0.08	0.08	3.67
		ICT & Tourism			0.08	1.96	0.08	0.08			0.08			2.29
		Tourism	0.41	0.33	0.33	4.49	0.16	0.16						5.88
	Prod. & Transp. Manufact. & Energy	Automotive & Aerospace	0.08		0.16		0.16	0.73	0.16	0.08	3.59	1.06	1.06	7.10
		Energy Production						0.49	2.69	0.08	0.16			3.43
		Manufacturing	0.33	0.08				0.65	0.08		4.24	0.33	0.08	5.80
		Marine & Maritime						0.41	0.65	1.39	0.41	0.41		3.27
		Mechatronics		0.08	0.08			0.16	0.08		2.78	0.16	0.08	3.43
		Optics		0.08				0.08			0.24			0.41
		Photonics		0.08	0.41			0.16		0.08	1.88		0.16	2.78
		Sustainable Energy	0.49					6.69	4.33		0.57	0.24		12.33
		Transport & Logistics			0.16			0.16	0.08		0.73	2.78	0.73	4.65
Water jet cutting										0.08			0.08	
No Description	0.33	0.08	0.08		0.57	0.16	0.24	0.16	1.31	0.16		3.10		
	11.76	14.04	10.45	8.90	3.92	12.82	8.90	1.96	19.35	5.55	2.37	100.00		

Data refer to 1225 records (covering 206 territorial entities), entered in the database Eye@RIS3, 01/10/2018. Source: Pavone et al. (2018).

Each cell of the cross tabulation of categorization of priorities descriptions and codes returns either no region or one or more regions associated with those priorities. Regions are characterized also by other features, but the ones summarized in the table may guide regions in exploring which other regions have similar priorities.

⁶ This result is due to the highest cut-offs in clustering the two classifications, the one referring to descriptions and the other one referring to codes: a similar set of macro groups emerges, but in the case of codes a better cut-off is with five macro groups, instead of four (as in the case of descriptions), with a split of “Bio Economy & Energy” from “Logistic & Manufacturing”.

⁷ For instance, in the case of NL2-Eastern Netherlands, the text description “development of robotics for transcranial Magnetic Stimulation” is classified as “Mechatronics” in Description Classification and as “Health & Life Science” in Codes Classification.

3. SOCIOECONOMIC COMPARISON OF REGIONS

Building on Eurostat data, Pagliacci et al. (2018) adopt both a principal component analysis to reduce the dimensions under analysis and a cluster analysis to single out groups of EU regions with relatively similar socioeconomic features. Their methodology returns a significant picture in terms of regional heterogeneity of socioeconomic features. They propose a classification of socioeconomic features of NUTS2 EU-28 regions⁸, grounded on a set of 31 input variables that cover three domains: Population and other demographic features (6 variables); Regional economy and the labour market (3 variables); Sectoral structure, by covering both sections (agriculture, industry, construction, wholesale and Trade) and division of the manufacture (22 variables).

As far as the four existing macro-regions are concerned, Figure 1 displays the maps of the resulting 19 clusters of regions.

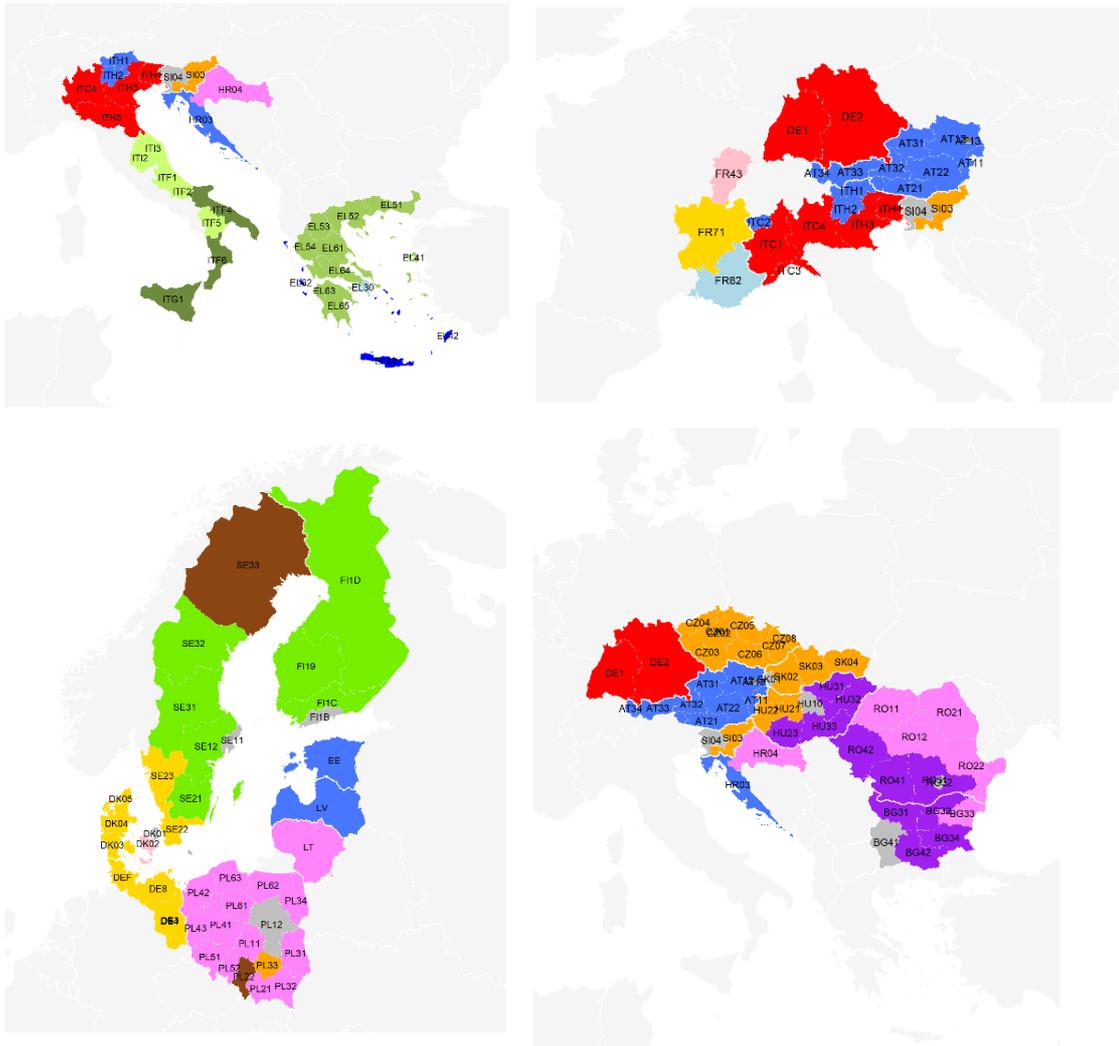
4. FOCUS ON EUSALP

The application of cross tabulation with regard to EUSALP, in Table 2, is an example for supporting a comparative analysis of specific policy measures and projects implemented by regions within the same domain of priority. For instance, let us consider the "New technologies for health" (third category of codes on columns) that is relevant for 10 territorial entities in four countries, with a specific focus on health and life science, but also tourism. What matters in this comparison is the potential provided by comparing projects in these priorities, in regions with similar or different socioeconomic conditions. In learning from other regions, it is important to tailor policy interventions on the awareness of structural differences, as they emerge from socioeconomic benchmarking.

This tool would be of particular help, for instance, in Action Group 1, namely the group elaborating on actions "To develop an effective research and innovation ecosystem". The ingredients for such actions are within the RIS3s already implemented by the regions in the MRS, some paths of orienting the activities are now at hand for starting a selection of projects and making progress on decisions for further implementation of smart specialisation strategy in the MRS.

⁸ The analysis uses data at NUTS 2 level according to the EU classification. The authors are aware that, for some countries (e.g. the Baltic states), this level overlaps with the national one.

Figure 1. Maps of socioeconomic clusters of regions, by macro-region



North-Western EU regions

- Very-high income; financial centres; foreigners
- Very-high income; capital city-regions; diversified services
- Very-high income; large urban regions; high-employment; highly educated
- Very-high income; high-density city-regions; high-employment; highly educated; touristic
- Urban regions; high-income; poorer employment conditions; touristic
- Very-high income; manufacturing; population imbalances
- High-income; high-employment; low-manufacturing; services & public sector
- Medium-income; employment imbalances; low-manufacturing; services & public sector
- Medium-income; high-employment; manufacturing & private services
- Medium-income; high-employment; highly educated; manufacturing: mining & quarrying
- High-income; low-population density; tourism
- High-income; sparsely populated; public sector; highly educated

Eastern manufacturing regions

- Low-income; high-employment; manufacturing; no foreigners; very highly educated
- Very low-income; manufacturing; no foreigners; highly educated
- Very low-income; agricultural; manufacturing: textile, electric, transport; low-population density

Mediterranean traditional-economy regions

- Medium-income; employment & population imbalances; manufacturing: textile, basic metal, transp.; very-low educated
- Low-income; high-density; high unemployment; agriculture; food&drinks; very-low educated
- Very-low income; agriculture; sparsely populated; very high unemployment; traditional services (G-I)
- Low-income; high-unemployment; touristic; food & drinks; traditional services (G-I); very-low educated

Source: Authors' elaboration

5. DISCUSSION

This paper proposes an analytical framework of the several dimensions, characterising both socioeconomic features of regions in the EU-28 and their RIS3s' priorities. This multidimensional perspective has been adopted to highlight similarities across regions.

The resulting set of information can be used by local stakeholders interested in further implementation of their own RIS3s and to position their territory in a comparative perspective, finding potential partners for collaboration (EC-JRC (2018)). To enhance an effective use of the two sets of results, on the priorities of RIS3 and on socioeconomic features of regions, their implementation in the Platform of Knowledge (EUSALP, 2018)⁹ as well as in the Eye@RIS3 platform (EC-JRC, 2018) is advocated.

In addition, this methodology may strongly support instances participating in the coordination and implementation of macro-regions (e.g., national coordinators, policy area coordinators, policy area focal points, thematic steering groups, action groups) in designing more integrated territorial strategies, which could take advantage from the capitalization of both intra- and inter-MRS multidimensional comparison of the RIS3s (the intended development path that the regions aim at) and socioeconomic conditions (summarising the current structural features).

As soon as that type of query will be implemented online, in the JRC platform or in the EUSALP Platform of Knowledge, regions within the same macro-region could start elaborating more focused analyses and a more effective dialogue on potential synergies or complementarities when considering same priorities, as they are outlined in the strategic documents of the regions.

⁹ <https://www.alpine-region.eu/p/dashboard>

Table 2. Classification of EUSALP regions*, by RIS3 priorities and socioeconomic features

RIS3 priorities: categories of descriptions on rows; categories of codes on columns

Socioeconomic clusters highlighted by colours (see the legend below)

		Categories of codes												
		Agrofood, forestry and tobacco	Health & Life Science	New Economy & Leisure industry			Bioeconomy, Blue Economy & Energy			Logistic & Manufacturing				
		Agrofood, forestry and tobacco	Health & Life Science	Creative industry, Tourism & cultural and recreative services	ICT & digital transformation	Social innovation & education	Bioeconomy & Waste collection, treatment etc	Blue Economy	Energy Production, Efficiency & Sustainability	Aeronautics, Aerospace & Automotive industry	Manufacturing	Transport & logistics		
Categories of descriptions	Agrofood	AT12, AT31, FR43, ITC1, ITC4, SI					AT12							
	Healthy Food	ITH1, ITH2, ITH3, ITH4												
	Health & Life science	AT11	AT12, AT33, DE1, ITC3, ITC4, SI		AT34	AT34								
	Life Science		AT13, AT31, AT32, DE2, FR71, FR82, ITC1, ITH, ITH4											
	Bioeconomy		AT22											
	Creative industry			ITC4										
	Digital & ICT		ITH2	AT32, FR82	AT21, AT32, AT33, DE2, FR43, FR71, ITC2, ITH1			DE1, ITH1				ITC2, ITH3, ITH4		
	Fashion												AT34	
	Growth & Welfare							AT33					AT13	
	ICT & Tourism			AT33, ITH1, ITH4									ITH3	
	Tourism		AT33	AT13, FR71		SI								
	Automotive & Aerospace					FR82, SI		AT32, ITC3, SI			ITC1, ITC4	AT21, DE2, ITC1, ITH3, ITH4, SI	FR82	
	Energy Production							FR71		FR71				
	Manufacturing											AT12		
	Marine & Maritime											ITC3		
Mechatronics											AT11, AT12, AT21, AT31, AT33, DE2, ITC1, ITC4, ITH2, SI			
Photonics		AT12					FR71				AT32, FR43			
Sustainable Energy							AT12, AT22, FR43, ITC1, ITC2, ITH2, SI		AT11, F93, AT21, AT34, DE1, FR82, ITH1		AT31			
Transport & Logistics					FR43		FR43						AT22, AT31, DE1, FR71, ITC4	
NO DESCRIPTION							DE2			ITC4		AT34		

Legend of regions' socioeconomic features, NUTS codes and names of regions

- AT11 Burgenland (AT) High-income; low-population density; tourism
- AT12 Niederösterreich High-income; low-population density; tourism
- AT13 Wien Very-high income; high-density city-regions; high-employment; highly educated; touristic
- AT21 Kärnten High-income; low-population density; tourism
- AT22 Steiermark High-income; low-population density; tourism
- AT31 Oberösterreich High-income; low-population density; tourism
- AT32 Salzburg High-income; low-population density; tourism
- AT33 Tirol High-income; low-population density; tourism
- AT34 Vorarlberg High-income; low-population density; tourism
- DE1 Baden-Württemberg Very-high income; manufacturing; population imbalances
- DE2 Bayern Very-high income; manufacturing; population imbalances
- FR43 Franche-Comté Medium-income; employment imbalances; low-manufacturing; services & public sector
- FR71 Rhône-Alpes High-income; high-employment; low-manufacturing; services & public sector
- FR82 Provence-Alpes-Côte Urban regions; high-income; poorer employment conditions; touristic
- ITC1 Piemonte Very-high income; manufacturing; population imbalances
- ITC2 Valle d'Aosta/Vallée d'Aoste High-income; low-population density; tourism
- ITC3 Liguria Very-high income; manufacturing; population imbalances
- ITC4 Lombardia Very-high income; manufacturing; population imbalances
- ITH1 Provincia Autonoma di Bolzano High-income; low-population density; tourism
- ITH2 Provincia Autonoma di Trento High-income; low-population density; tourism
- ITH3 Veneto Very-high income; manufacturing; population imbalances
- ITH4 Friuli-Venezia Giulia Very-high income; manufacturing; population imbalances
- SI Slovenia

* 22 regions under analysis; no information in Eye@RIS3 platform for Switzerland and for Slovenian regions (only nation-level RIS3 is available for Slovenia)

Source: Authors' elaboration on Pagliacci et al. (2018) data and on Pavone et al. (2018) data

REFERENCES

- COWI (2017). Study on Macroregional Strategies and their links with Cohesion Policy. Final Report. Luxembourg: Publications Office of the European Union.
- EC-JRC (2018). Eye@RIS3: Innovation Priorities in Europe. Available at: <http://s3platform.jrc.ec.europa.eu/map>, last access on January 4th 2019.
- EUSALP - EU Strategy for the Alpine Region (2018). Platform of Knowledge. Available at: <https://www.alpine-region.eu/p/dashboard>, last access on January 4th 2019.
- Foray, D. (2015). Smart specialization: Opportunities and challenges regional innovation policy. London: Routledge.
- Foray, D., et al. (2012). Guide to research and innovation strategies for smart specialisation (RIS3), S3 Smart Specialisation Platform. Seville: IPTS Institute for Prospective Technological Studies, Joint Research Centre of the European Commission.
- McCann, P. (2015). The regional and urban policy of the European Union: Cohesion, results-orientation and smart specialisation. Cheltenham: Edward Elgar.
- McCann, P., & Ortega-Argilés, R. (2015). Smart specialization, regional growth and applications to EU cohesion policy. *Regional Studies*, 49(8), 1291–1302.
- Pagliacci, F., Pavone, M. Russo, A. Giorgi (2018). Should we consider regional structural heterogeneity in learning from RIS3? Evidence and policy implications for macro-regional strategies. Working paper under submission.
- Pavone, P., F. Pagliacci, M. Russo, A. Giorgi (2018). Perspectives on RIS3s: a classification of priorities emerging from automatic text analysis. Working paper under submission.