



Guide to Research and Innovation Strategies for Smart Specialisations (RIS 3)



May 2012

Guide to Research and Innovation Strategies for Smart Specialisation (RIS 3)

May 2012

Authors (in alphabetical order)

Dominique Foray

John Goddard

Xabier Goenaga Beldarrain

Mikel Landabaso

Philip McCann

Kevin Morgan

Claire Nauwelaers

Raquel Ortega-Argilés

Disclaimer

The responsibility for the accuracy of the analysis and for the judgements expressed lies with the authors alone. This document does not constitute the policy positions of the EU Commission.

The authors of this guide would like to thank for their contributions to the members of the Steering Team supervising the Smart Specialisation Platform established at the JRC-IPTS, including representatives of DG REGIO, JRC, RTD, ENTR, INFSO, EAC, SANCO, EMPL, AGRI, CLIMA and the Committee of the Regions, as well as the valuable input provided by the members of the Mirror Group of the Smart Specialisation Platform chaired by Christian Saublens.

Steering Team Members

Guido Acchioni, Peter Baur, Dirk Beernaert, Elisa Boelman, Claire-Lyse Chambron, Dimitri Corpakis, Ciaran Dearle, Rostislava Dimitrova, John Doyle, Ken Ducatel, Jean-Pierre Euzen, Ricardo Ferreira, Ales Gnamus, Ignacio González Vázquez, Christophe Guichard, Marek Havrda, Claus Kondrup, Alberto Licciardello, Anthony Lockett, Frank Mather, Sophie Mueller, Fulvio Mulatero, Bart Neerscholten, Nivelin Noev, Nikos Pantalos, Paolo Pasimeni, Nathalie Pasquier, Alessandro Rainoldi, Katja Reppel, Marielle Riché, Luisa Sanches, Claus Schultze, as well as John Edwards, Carlo Gianelle, Inger Midtkandal, Ruslan Rakhmatullin.

Mirror Group Members

Mike Coyne, Gabriel Crean, Hubert Delorme, Dominique Foray, Michel Ganoote, John Goddard, Vesa Harmaakorpi, Christian Ketels, Jerzy Langer, Susanna Longo, Markku Markkula, Philip McCann, Kevin Morgan, Claire Nauwelaers, Mikel Navarro, Marc Pattison, Damien Perissé, Felipe Romeras Lubias, Christian Saublens, Jean Severijns, Richard Tuffs, Philippe Vanrie, Roger Williams.

TABLE OF CONTENTS

INTRODUCTION	6
PART I: THE POLICY CONTEXT OF SMART SPECIALISATION	8
PART II: THE RATIONALE OF SMART SPECIALISATION	12
What: Concentrating knowledge resources for economic specialisation	12
Why: Learning lessons from the past.....	12
Who: Putting entrepreneurial knowledge to work	13
How: Setting in motion regional change	13
Where: A role for every region.....	15
In summary.....	16
PART III: RIS3 DESIGN IN A NUTSHELL.....	18
Step 1 - Analysis of the regional context and potential for innovation	19
Step 2 - Governance: Ensuring participation and ownership.....	22
Step 3 - Elaboration of an overall vision for the future of the region.....	23
Step 4 - Identification of priorities.....	23
Step 5 - Definition of coherent policy mix, roadmaps and action plan	24
Step 6 - Integration of monitoring and evaluation mechanisms	25
ANNEXES.....	27
ANNEX I: A STEP-BY-STEP APPROACH TO RIS3 DESIGN.....	28
Six key steps to design RIS3.....	28
Step 1 - Analysis of the regional context and potential for innovation	29
Step 2 - Governance: ensuring participation and ownership	35
Step 3 - Elaboration of an overall vision for the future of the region.....	46
Step 4 - Identification of priorities.....	52
Step 5 - Definition of coherent policy mix, roadmaps and action plan	54
Step 6 - Integration of monitoring and evaluation mechanisms	60
ANNEX II: DELIVERY INSTRUMENTS AND HORIZONTAL APPROACHES	65
Clusters and smart specialisation.....	67
Innovation friendly business environments for SMEs.....	70
Research infrastructures, centres of competence and science parks.....	74
Universities	78
Digital Agenda for Europe.....	81
Key enabling technologies.....	86
Cultural and creative industries	88
Internationalisation	92
Financial engineering instruments	95
Innovative public procurement	100
Green growth	105
Social innovation	109
ANNEX III: REGIONAL RESEARCH AND INNOVATION STRATEGIES FOR SMART SPECIALISATION: GUIDANCE FOR EXPERT ASSESSMENT	113

LIST OF BOXES

<i>Box 1 – Definition of RIS3</i>	9
<i>Box 2 - Key Enabling Technologies</i>	14
<i>Box 3 - The four Cs of smart specialization</i>	18
<i>Box 4 - A stepwise approach for RIS3 design</i>	28
<i>Box 5 - Examples of elements for (self-) assessment</i>	32
<i>Box 6 - Distinctive features of smart specialisation for (peer) review</i>	63
<i>Box 7 - ICT measures in RIS3</i>	84

LIST OF TABLES

<i>Table 1 - Methods used for Foresight</i>	34
<i>Table 2 - Differentiated knowledge base: a typology</i>	36
<i>Table 3 - Innovation strategies for different types of region according to knowledge intensity of productive fabric</i>	49
<i>Table 4 - Innovation strategies for different types of regions according to internal and external connectivity</i>	50
<i>Table 5 - Regional innovation delivery instruments: a taxonomy</i>	55
<i>Table 6 - Innovation delivery instruments targeting SMEs</i>	55
<i>Table 7 - 'Building on current advantages': examples of regional strategies and associated policy mixes</i>	56
<i>Table 8 - 'Supporting socio-economic transformation': examples of regional strategies and associated policy mixes</i>	57
<i>Table 9 - 'Catching up': examples of regional strategies and associated policy mixes</i>	58
<i>Table 10 - Examples of programme objectives, outputs and expected results and possible related indicators</i>	61

LIST OF FIGURES

<i>Figure 1 - The regional knowledge ecology</i>	37
<i>Figure 2 - A Place-based leadership development programme</i>	41
<i>Figure 3 - The Disconnected Region</i>	43
<i>Figure 4 - The connected region</i>	44
<i>Figure 5 - Analysis of funding for RIS3</i>	45
<i>Figure 6 - Europe 2020 dimensions: integrated regional typologies</i>	48
<i>Figure 7 - The 'trunk and branches' structure</i>	66
<i>Figure 8 - Matrix of business functions and international services</i>	93

LIST OF REGIONAL EXAMPLES

<i>Example 1 - Analysis of the regional context — Skåne's innovation capacity</i>	20
<i>Example 2 - International benchmarking in a Top Technology Region – Provinces of Limburg in the Netherlands and Belgium, Noord-Brabant (Netherlands) and Vlaams-Brabant (Belgium), Province of Liège (Belgium) and parts of North Rhine Westphalia(Germany)</i>	21
<i>Example 3 - Public-private cooperation in West Midlands</i>	22
<i>Example 4 - The vision of Flanders</i>	23
<i>Example 5 - Focus on priorities in Berlin/Brandenburg</i>	24
<i>Example 6 - OECD/European Commission guidance</i>	24
<i>Example 7 - Integrated monitoring and evaluation in Lower Austria</i>	25
<i>Example 8 - Fine-tuning RIS3 through Peer-Review</i>	26

INTRODUCTION

This guide has been conceived as a methodological guidance for policy-makers and implementing bodies on how to prepare for and how to design, draft and implement a national/regional research and innovation strategy for smart specialisation (RIS3).

Rather than an all-encompassing, prescriptive document, the guide is to be understood as a general orientation document which will evolve as the concept develops. Indeed, the document will be improved and updated on a regular basis.

Most of the concepts developed here are based on the previous experience that the European Commission has gained over the years by working with the regions through initiatives such as STRIDE and the PRAIS, as well as the former RIS. It also gained from comparative studies by the OECD in this field.

This guide intends to highlight new features and aspects that improve the previous knowledge and make innovation strategies and policies more effective. Countries and regions that already have gained experience in designing and implementing innovation strategies should now support activities for revisiting and upgrading them, while for the others the challenge is to engage in this process and develop their own innovation strategies for smart specialisation.

Part I of the guide defines the policy context of smart specialisation. Part II presents the concept, its rationale and economic fundamentals. In particular, it addresses the issue of the entrepreneurial process of discovery, which is a key feature of smart specialisation, and provides guidance on how to develop distinctive and original areas of specialisation.

The guide sets out a number of practical steps to design a national/regional RIS3, namely:

1. the analysis of the national/regional context and potential for innovation,
2. the set-up of a sound and inclusive governance structure,
3. the production of a shared vision about the future of the country/region,
4. the selection of a limited number of priorities for national/regional development,
5. the establishment of suitable policy mixes, and
6. the integration of monitoring and evaluation mechanisms.

These steps are presented in Part III and further detailed and developed in Annex I.

The guide also presents, in Annex II, an array of delivery instruments at the disposal of national and regional policy makers for the development of the strategy and also advice on horizontal approaches, such as sustainable growth, social innovation and skills development. The document contains examples of different experiences on the development of innovation strategies.

Consistently, this guide is to be interpreted as the 'trunk' establishing the skeleton structure from which a number of 'branches' develop and grow. These branches are delivery instruments and

horizontal approaches. These were identified in Annex II based on their relevance for Structural Funds co-financing, and in particular for the ERDF and the ESF.

Finally, those who are interested in self-assessing their RIS3 process and strategy should be interested in Annex III, which offers a fiche with relevant questions.

The elaboration of the guide has been channeled through the Smart Specialisation Platform (S3 Platform). This platform was created by the European Commission in 2011 to provide assistance to Member States and regions in developing and reviewing their national/regional RIS3 strategies.¹

¹ <http://s3platform.jrc.ec.europa.eu>

PART I: THE POLICY CONTEXT OF SMART SPECIALISATION

Europe is facing major economic challenges that require an ambitious economic policy for the 21st century. The EU has set out its vision for Europe's social market economy in the *Europe 2020 strategy*,² which aims at confronting our structural weaknesses through progress in three mutually reinforcing priorities:

- smart growth, based on knowledge and innovation;
- sustainable growth, promoting a more resource efficient, greener and competitive economy;
- inclusive growth, fostering a high employment economy delivering economic, social and territorial cohesion.

Investing more in research, innovation and entrepreneurship is at the heart of Europe 2020 and a crucial part of Europe's response to the economic crisis. So is having a strategic and integrated approach to innovation that maximises European, national and regional research and innovation potential.

As José Manuel Barroso highlighted in his preface to the Europe 2020 strategy, '*Europe needs to get back on track. Then it must stay on track. That is the purpose of Europe 2020. It's about more jobs and better lives. It shows how Europe has the capability to deliver smart, sustainable and inclusive growth, to find the path to create new jobs and to offer a sense of direction to our societies*'³.

That is why as part of the Europe 2020 strategy, the Commission adopted the 'Innovation Union'⁴ flagship initiative. It sets out a comprehensive innovation strategy to enhance Europe's capacity to deliver smart, sustainable and inclusive growth and highlights the concept of smart specialisation as a way to achieve these goals. The 'Digital Agenda for Europe'⁵ flagship initiative is also part of Europe 2020 and aims to deliver sustainable economic growth and social benefits from Information and Communication Technologies (ICT). The Digital Agenda for Europe initiative is therefore relevant to all regions and cities, as it focuses on a key element for the design of smart specialisation strategies.

The concept of smart specialisation has also been promoted by the Communication 'Regional Policy contributing to smart growth in Europe 2020'.⁶ In this document the Commission encourages the design of national/regional research and innovation strategies for smart specialisation as a means to deliver a more targeted Structural Fund support and a strategic and integrated approach to harness the potential for smart growth and the knowledge economy in all regions.

² http://ec.europa.eu/europe2020/index_en.htm

³ See previous footnote.

⁴ http://ec.europa.eu/research/innovation-union/index_en.cfm

⁵ http://ec.europa.eu/information_society/digital-agenda/

⁶ http://ec.europa.eu/regional_policy/sources/docoffic/official/communic/comm_en.htm

Smart specialisation has also been strongly advocated by the Synergies Expert Group established by the Commission's Directorate-General for Research and Innovation. It argues that the concept is an important instrument for ensuring synergies between Horizon 2020⁷ and the Structural Funds in the interest of capacity building and providing a stairway to excellence.

In the context of Europe 2020, smart specialisation emerges therefore as a key element for place-based innovation policies, and can be defined as presented in *Box 1* below. This definition will be further developed in the rest of this guide.

Box 1 – Definition of RIS3

National/regional research and innovation strategies for smart specialisation (RIS3) are integrated, place-based economic transformation agendas that do five important things

- They focus policy support and investments on key national/regional priorities, challenges and needs for knowledge-based development, including ICT-related measures;
- They build on each country's/region's strengths, competitive advantages and potential for excellence;
- They support technological as well as practice-based innovation and aim to stimulate private sector investment;
- They get stakeholders fully involved and encourage innovation and experimentation;
- They are evidence-based and include sound monitoring and evaluation systems.

The RIS3 approach is relevant to all three priorities of Europe 2020 i.e. smart, sustainable and inclusive growth. First of all, smart specialisation matters for the future of Europe because the development of an economy based on knowledge and innovation remains a fundamental challenge for the EU as a whole. Secondly, smart specialisation is relevant to achieve sustainable growth, as an important innovation effort and considerable investment is required to shift towards a resource-efficient and low carbon economy, offering opportunities in domestic and global markets. Finally, smart specialisation contributes to inclusive growth between and within regions by strengthening territorial cohesion and by managing structural change, creating economic opportunity and investing in skills development, better jobs and social innovation.

This embedded role of smart specialisation in the Europe 2020 policy framework has been highlighted by the Council of the EU in its conclusions on the Innovation Union. The Council underlined *'the concept of 'smart specialisation', with each region building on its own strengths, to guide priority-setting in national and regional innovation strategies, as well as cross-border cooperation where appropriate'* and invited the Commission *'to advise Member States on*

⁷ http://ec.europa.eu/research/horizon2020/index_en.cfm?pg=h2020-documents

possible improvement of the performance of their national innovation systems and with the implementation of smart specialisation strategies'.⁸

The RIS3 approach is also consistent with the aims and tools of the EU cohesion policy, promoting growth and jobs across EU countries and regions.⁹ It suggests a strategy and a global role for every national and regional economy, including both leader and less advanced territories. It embraces a broader concept of innovation, not only investment in research or the manufacturing sector, but also building competitiveness through design and creative industries, social and service innovation, new business models and practice-based innovation. All regions have a role to play in the knowledge economy, provided that they can identify comparative advantages and potential and ambition for excellence in specific sectors or market niches.

The concept of smart specialisation is also consistent with and supports the main reform goals of the proposals for the EU Cohesion Policy 2014-2020, published in October 2011¹⁰:

- delivering the Europe 2020 objectives of smart, sustainable and inclusive growth,
- reinforcing policy performance and focus on results,
- maximising the impact of EU funding through thematic concentration.

Indeed, smart specialisation has a strategic and central function within the new Cohesion Policy being a key vehicle for ensuring Cohesion Policy's contribution to the Europe 2020 jobs and growth agenda.

Within the new Cohesion Policy, smart specialisation has been proposed as an 'ex-ante conditionality'. This means that every Member States and region have to have such a well-developed strategy in place, before they can receive EU financial support through the Structural Funds for their planned innovation measures. This conditionality applies specifically for two of the 11 thematic objectives of the ERDF:¹¹

- strengthening research, technological development and innovation (R&I target),
- enhancing access to and use of quality of ICT (ICT target).

Likewise, the same conditionality applies to theme one ('Fostering knowledge transfer and innovation in agriculture, forestry and rural areas') of the European Agricultural Fund for Rural Development (EAFRD).¹²

In this context it is of crucial importance to understand the strong process element of smart specialisation and the eminent role the various innovation stakeholder and entrepreneurs are

⁸ Council Conclusions on Innovation Union for Europe, 3049th Competitiveness Council meeting. Brussels, 26 Nov. 2010.

⁹ Article 174 of the Treaty on the Functioning of the European Union (TFEU) – Treaty of Lisbon.

¹⁰ Brussels, 6.10.2011 COM(2011) 615 final 2011/0276 (COD)

See: http://ec.europa.eu/regional_policy/what/future/proposals_2014_2020_en.cfm

¹¹ Annex IV of the general SF draft regulation, COM (2011) 615.

¹² http://ec.europa.eu/agriculture/cap-post-2013/legal-proposals/com627/627_en.pdf

asked to play within that process in each Member State and Region. Their knowledge and commitment is key to identifying those priority areas and knowledge-based investments that are most likely to deliver growth and jobs in the regions. And it is not only a reinforced stakeholder involvement and strong internal connectivity that counts but smart specialisation is also pointing regions towards more strategic cross-border and trans-regional cooperation to achieve more critical potential and related variety.

Last but not least, the importance of monitoring and evaluation within these strategies should be particularly highlighted, providing the link between smart specialisation and the goal of reinforcing results orientation of the Structural Funds in general. It is not accidentally that the smart specialisation conditionality refers explicitly to the need for RIS3 strategies to include a monitoring and review system.

To choose appropriate results indicators already at the level of the smart specialisation strategy is extremely important for the cohesion policy, as it is the one of the essential keys for ensuring that all stakeholder incentives and behavioural responses are correctly aligned and that the policy can be monitored accordingly and adjusted where necessary, creating a virtuous policy learning cycle¹³. As the Fifth Cohesion Report states, '*the starting point for a result-oriented approach is the ex-ante setting of clear and measurable targets and outcome indicators*'.

¹³ Barca, F., and McCann, P., 2011, *Methodological note: Outcome Indicators and Targets – Towards a Performance Oriented EU Cohesion Policy* and examples of such indicators are contained in the two complementary notes on outcome indicators for EU2020 entitled *Meeting climate change and energy objectives* and *Improving the conditions for innovation, research and development*.

See: http://ec.europa.eu/regional_policy/sources/docgener/evaluation/performance_en.htm

See also Barca, F., McCann, P. et. al., 2011, *Outcome Indicators and Targets – Towards a New System of Monitoring and Evaluation in EU Cohesion*". Available at:

http://ec.europa.eu/regional_policy/sources/docgener/evaluation/doc/performance/outcome_indicators_en.pdf

Other relevant documents on this issue can be found at:

<http://www.europarl.europa.eu/document/activities/cont/201203/20120301ATT39624/20120301ATT39624EN.pdf>

<http://www.europarl.europa.eu/document/activities/cont/201203/20120321ATT41418/20120321ATT41418EN.pdf>

PART II: THE RATIONALE OF SMART SPECIALISATION

What: Concentrating knowledge resources for economic specialisation

The underlying rationale behind the Smart Specialisation concept is that by concentrating knowledge resources and linking them to a limited number of priority economic activities, countries and regions can become — and remain — competitive in the global economy. This type of specialisation allows regions to take advantage of scale, scope and spillovers in knowledge production and use, which are important drivers of productivity.

Furthermore, strategies that combine innovation with specific strengths of the national/regional economy offer a much greater chance of success. Imitating other regions by trying to create 'miracle growth' in headline industries such as semiconductor or biotechnology not only lessens the chances for the imitating region to succeed, but also perpetuates patterns of market dominance with leaders and followers. In short, Smart Specialisation is about generating unique assets and capabilities based on the region's distinctive industry structures and knowledge bases.

Why: Learning lessons from the past

Previous regional innovation strategies have often suffered from one or more of the following weaknesses¹⁴:

- They lack an international and trans-regional perspective, i.e. the regional innovation and economic system is often considered in isolation.
- They are not in tune with the industrial and economic fabric of the region; there is too much public involvement in R&D which is not sufficiently business driven.
- A sound analysis of the region's assets is missing.
- There is a 'picking winner's syndrome'.
- The best performing regions are copied without consideration of the local context.

As a result, regional innovation policies have often demonstrated a lack of efficiency in identifying priorities and forms of practical cooperation between regions. This issue is even more critical in the current economic crisis where public and private financial resources are scarce.

The smart specialisation concept therefore promotes efficient, effective and synergetic use of public investments and supports countries and regions in strengthening their innovation capacity, while focusing scarce human and financial resources in a few globally competitive areas in order to boost economic growth and prosperity.

¹⁴ For more information about previous innovation activities funded by the EU, please see the Commission Working Document 'Innovative strategies and actions: Results from 15 Years of Regional Experimentation' at http://ec.europa.eu/regional_policy/archive/funds/2007/innovation/guide_innovation_en.pdf

Who: Putting entrepreneurial knowledge to work

Smart specialisation addresses the difficult problem of prioritisation and resource allocation decisions by allowing entrepreneurial actors to demonstrate the most promising areas for future regional development through what has been described as an '*entrepreneurial process of discovery*'.¹⁵ This process can reveal what a country or region does best in terms of R&D and innovation because entrepreneurial actors are best placed to know or discover what they are good at producing. This typically happens through trial and error and experimentation in new activities. Regions therefore need to pro-actively involve entrepreneurial actors in strategy design and offer more incentives for risk taking.

Entrepreneurial knowledge involves much more than science and technology. Rather, it combines and relates this to knowledge of market growth potential, likely competitors and the entire set of input and services required for launching a new business activity. The synthesis and integration of this previously dispersed and fragmented knowledge should help to create a vision for opportunities in existing or new sectors. It is this type of knowledge that needs to be activated, mobilised and supported as the main ingredient in a process of smart specialisation.

However, who has the entrepreneurial knowledge in the regional economy? It may be held by firms, which is often the case in 'advanced' regions rich in entrepreneurial experiments and discoveries. In this case, the process of smart specialisation is likely to be more evident. Yet in many other cases where industry structures and entrepreneurial capabilities are weak, it is crucial that knowledge is identified and activated elsewhere, such as in universities or public research institutes. Collaborative projects with local firms can help to reveal information about the future value of certain specialisations.

Entrepreneurial actors must therefore be understood in a broad sense to include inter alia firms, higher education institutions, public research institutes, independent innovators; whoever is best placed to discover the domains of R&D and innovation in which a region is likely to excel given its existing capabilities and productive assets. Given the importance of entrepreneurial experiments and discovery, there is no contradiction between a smart specialisation policy and one to encourage entrepreneurship. On the contrary, these two policies are mutually reinforcing; without strong entrepreneurship, the strategy of smart specialisation will fail because of a deficit in the entrepreneurial knowledge needed to feed and nurture this strategy.

How: Setting in motion regional change

Smart specialisation strategies will usually require some sort of structural change, which could follow from one of the following not mutually-exclusive processes:

¹⁵ This idea was introduced and is elaborated by Foray et al (2009) in 'Smart Specialisation – The Concept', a Policy Brief of the Knowledge for Growth Expert Group advising the then Commissioner for Research, Janez Potočnik.

- Firstly, a *transition* from an existing sector to a new one based on cooperative institutions and processes, i.e. the collective R&D, engineering, and manufacturing capabilities that form the knowledge base for development of the new activity. For example, entrepreneurs in Austria discovered a transition path from fine mechanical and optical engineering to medical technologies; the initial set of inventions in medical technologies emerged from the industrial capabilities and competences which were already strong in mechanical engineering.
- Secondly, *modernisation* is the technological upgrading of an existing industry, involving the development of specific applications of a Key Enabling Technology (see Box 2 for more information) to improve efficiency and quality in an existing (perhaps traditional) sector. For example, the Finnish pulp and paper industry views nanotechnology as a promising source of valuable applications and its firms are taking steps to assess this potential. Some companies are responding to these opportunities by increasing their overall internal R&D investment, which is aimed not only at implementing available technologies but also at exploring recent advances in areas of nanotechnology and biotechnology.

Box 2 - Key Enabling Technologies

The deployment of Key Enabling Technologies (KETs) can be an important component of a smart specialisation strategy because of their horizontal nature and transformative potential. Many future goods and services will be driven by KETs such as semiconductors, advanced materials, photonics and nanotechnology. Moreover, these goods and services will be crucial in addressing the 'grand societal challenges' facing the EU, including energy supply, public health, ageing and climate change. Whilst Europe has very good research and development capacities in some key enabling technology areas, it has not been as successful in translating research results into commercialised manufactured goods and services.

Smart Specialisation strategies can help to address this gap between innovation and commercial application. Not all Member States and regions can be leaders in developing KETs, but they can benefit in different ways, including upstream and downstream links in value chains. An example of the successful use of KETs is the Slovenian automotive sector which has developed specialised products to supply the main European car manufacturers. This was achieved through the identification of niche areas in KET related fields and the development of strategic research agendas in priority technologies such as biosensors, hydrogen & lithium batteries, plastic materials and nuclear magnetic resonance studies.

- Thirdly, *diversification*: In such cases the discovery concerns potential synergies (economies of scope and spillovers) which are likely to materialise between an existing activity and a new one. Such synergies make the move towards the new activity attractive and profitable. For example, the region of Toulouse exhibits smart specialisation in aeronautics (Airbus valley). This has led to an extension of entrepreneurial activities and higher education and research infrastructure to new areas such as satellites and GPS technologies.

- Finally, *radical foundation of a new domain*: The discovery here is that R&D and innovation in a certain field can make previously low growth activities suddenly become attractive. Such radical foundation involves the co-emergence of R&D / innovation and related entrepreneurial activity. For example, the development of IT applications for the management and maintenance of the archaeological and historical heritage in Italy (Florence) is a good example of the co-emergence of an R&D / innovation area and a niche market.

Smart specialisation is not about creating technology monoculture and uniformity; on the contrary, it is likely to promote greater diversity. Indeed, regions can sustain multiple lines of smart specialisations (priorities). Most of the above structural changes generated by smart specialisation strategies actually involve the creation of variety, such as the transition to new activities or the diversification of existing sectors.

In particular, strategies aimed at fostering cross-sectoral or cross-border cooperation have proven to be successful in generating ideas for new innovative applications and integrated solutions. Cross-sectoral links can provide a region with the degree of originality and specialisation to differentiate itself and provide a competitive advantage vis-à-vis other regions.

Where: A role for every region

The smart specialisation concept can be used in all regions, even though some are more advanced in terms of knowledge production. However, the application of the concept in a regional context has to be approached with care because the economic and institutional context varies considerably between and within European regions.

This means that a Smart Specialisation strategy needs to take into account several geographically specific characteristics to help generate growth in regions. In this respect the following points need to be considered when applying smart specialisation to the regional context,¹⁶ as explained also in Part III and Annex I of this document:

- *The entrepreneurial process of discovery will work differently in every region*: In some places the process will be quite evident due to the high density of innovators and entrepreneurs (usually core-cities). However, the process will be much harder in other regions characterised by low population, a small number of sectors and large dominant firms but with few external links. In this case, links between local universities and strong public-private partnerships are the types of strategies that may be essential for smart specialisation to work.
- Identifying sectors that can achieve critical mass should take into account the 'principles of regional embeddedness and relatedness'. The first principle of 'embeddedness' refers to the

¹⁶ These points are based on a working paper by Phillip McCann and Raquel Ortega-Argilés (2001), 'Smart Specialisation, Regional Growth and Applications to EU Cohesion Policy', Groningen University.

existence of industries that are in tune with the relevant socio-economic conditions and can rely on a trained local labour force and a history of cooperative relations with other regional actors. Evidence shows that without displaying these characteristics, industries are much more likely to be unsuccessful in the medium term. However, by concentrating only on embeddedness, a regional development strategy may risk increasing vulnerability to changing economic conditions. Therefore, it is crucial that the second principle of 'relatedness' is also taken into consideration. This principle describes the diversification of firms into related areas based on new innovative techniques or processes. In other words, it is a strategy of diversifying within a specialisation. This allows firms to build on the skills, assets and capabilities within a region while adapting and improving on them through innovation.

- *Connectivity*: Smart Specialisation should link emerging knowledge based industries to other actors within and outside the region, but it does not always lead to good outcomes so needs to be assessed. Firstly, we know that face to face interaction in particular places can be crucial in nurturing innovation and there are many examples of regions that have used what can be described as social capital to create knowledge based growth. Nevertheless, local interaction can also be negative when it creates protectionism and rent seeking. Interaction is most beneficial between different groups and across classes and power structures. Secondly, connections to outside the region are only beneficial when ideas are internalised to the benefit of local firms. Being connected to the outside, both digitally (with ICTs) and physically (with transport infrastructure) may lead to a flow of human capital out of the region (in a process labelled 'brain-drain').
- *Integration of policies at regional level*: Sector-based policies alone do not address the need for links between different interventions. For example, increasing human capital through a programme to enhance skills should match the needs of emerging industries. Similarly, a strategy to increase the attractiveness of a place for investors has to take into account social, cultural and legal issues in addition to purely economic considerations. A successful strategy would therefore integrate policies that are formulated with demand side considerations, through approaches such as public-private partnerships.

Smart Specialisation as a tool for regional policy has to be carefully considered and must follow the 'place based approach' to economic development that has been promoted by both the European Commission and the OECD. The strategies on their own will not bring about change if they are not translated into delivery instruments considered in the Operational Programmes of Cohesion Policy.

In summary...

The concept of Smart Specialisation is 'smart' for two main reasons:

- Firstly, it links research and innovation with economic development in novel ways such as the entrepreneurial process of discovery and the setting of priorities by policy makers in close cooperation with local actors.

- Secondly, this process is carried out with an eye on the outside world, forcing regions to be ambitious but realistic about what can be achieved while linking local assets and capabilities to external sources of knowledge and value chains.

However, while each regional or national strategy will share common features, the place based approach shows us that understanding the local context is crucial in their successful design.

The process of shaping and implementing a strategy is now considered in Part III and Annex I of this guide.

PART III: RIS3 DESIGN IN A NUTSHELL

A national/regional research and innovation strategy for smart specialisation can be seen as an economic transformation agenda based on four general principles summarised in four 'Cs' (Box 3).

Box 3 - The four Cs of smart specialization

- *(Tough) Choices and Critical mass:* limited number of priorities on the basis of own strengths and international specialisation – avoid duplication and fragmentation in the European Research Area – concentrate funding sources ensuring more effective budgetary management
- *Competitive Advantage:* mobilise talent by matching RTD + I capacities and business needs through an entrepreneurial discovery process
- *Connectivity and Clusters:* develop world class clusters and provide arenas for related variety/cross-sector links internally in the region and externally, which drive specialised technological diversification – match what you have with what the rest of the world has
- *Collaborative Leadership:* efficient innovation systems as a collective endeavour based on public-private partnership (quadruple helix) – experimental platform to give voice to un-usual suspects

These four 'Cs' are the leading elements of a RIS3 process that incorporate its main novelties when compared to past experiences and inspire the strategy design.

In the following pages a simple six-step approach to RIS3 is sketched out, where the mentioned leading elements are re-composed around a logical design structure for a RIS3. The six steps are defined as follows:

1. Analysis of the regional context and potential for innovation,
2. Set up of a sound and inclusive governance structure,
3. Production of a shared vision about the future of the region,
4. Selection of a limited number of priorities for regional development,
5. Establishment of suitable policy mixes,
6. Integration of monitoring and evaluation mechanisms.

These six steps can be implemented in sequence, following the order in which they are presented above. However, it is important to point out that they are likely to overlap in time as new actors enter the process, new analysis uncovers unrealised potential, or ongoing projects deliver results that can modify the fundamental context during the process.

Therefore, they should not be thought of as separate and autonomous stages in the process, but as interacting components of a comprehensive design scheme whose implementation pattern depends on the specificity of the regional context.

For those regions that are already advanced along the way of defining and adopting an Innovation Strategy, the purpose of a RIS3 is not to restart a new process from scratch. Rather, it is to build on achievements and bring them further to reinforce those components that are not yet sufficiently developed: the outward-looking perspective, the focus on a few priorities, the evaluation component associated with policy learning capabilities, etc.

This section presents each of the steps as defined above, including boxes with practical examples for each step. Further details and useful references about each step can be found in Annex I of this guide.

Step 1 - Analysis of the regional context and potential for innovation

As highlighted in Part II, RIS3 needs to be based on a sound analysis of the regional economy, society, and innovation structure, aiming at assessing both existing assets and prospects for future development. The common principle that is central to such analyses is the adoption of a wide view of innovation that spans across economic activities and involves many sectors of the civic society.

The analysis should cover three main dimensions:

- regional assets, such as technological infrastructures,
- linkages with the rest of the world and the position of the region within the European and global economy, and
- dynamics of the entrepreneurial environment.

Regional assets: a strategy rooted in the regional specificities

First, it is necessary to focus on the regional specific context, assessing the existing assets, evaluating major regional strengths and weaknesses, identifying any bottlenecks of the innovation system and key challenges both for the economy and the society.

Economic differentiation is one of the central principles behind smart specialisation. The key to successful differentiation is to exploit *related variety*, which suggests that a regional economy can build its competitive advantage by diversifying its unique, localised know-how into new combinations and innovations which are close or adjacent to it. The key point is that these new combinations must be feasible or accessible given the existing assets, so as to exploit the experience accumulated by regional actors. Therefore, it is important to capture during the analysis phase any existing differentiation patterns, in particular by looking at those activities that are emerging at the interception of existing and well-established ones.

Tools suitable for this kind of analysis can include SWOT analysis, regional profiling studies, targeted surveys and expert assessments.

Example 1 - Analysis of the regional context — Skåne's innovation capacity

Skåne carried out a self-assessment in 2009 and has also performed a network analysis, a functional analysis and an international peer review. Together, these form the basis for action plans and ongoing work. The studies try to identify what the weaknesses and strengths of the industrial and innovation system of the region of Skåne are. The studies show that:

- relatively substantial resources are invested in the early stages to pick up ideas that have the potential to become new enterprises, but support structure for businesses is weak,
- structure for picking up service innovations is poor,
- access to risk capital is too limited,
- need for a systematic environmental and market analysis is great and is not satisfied.

The analysis also shows that better coordination of the efforts of the various players is needed, as well as increased internationalisation of the supporting bodies. These findings have been important for Skåne in developing the regional innovation strategy.

Looking beyond regional boundaries: the outward dimension of smart specialisation

An assessment of existing regional assets implies looking 'inside' the region; however, this might be insufficient for a smart specialisation strategy. A major novelty of the smart specialisation approach is that a region has to make its strategic decisions taking into account its position relative to other regions of Europe, which implies that the RIS3 approach requires looking beyond the regional administrative boundaries.

In other words, a region should be able to identify its competitive advantages through systematic comparisons with other regions, mapping the national and the international context in search of examples to learn from, or to mark a difference with, and performing effective benchmarking. Moreover, a region should be able to identify relevant linkages and flows of goods, services and knowledge revealing possible patterns of integration with partner regions. This is particularly important in the case of less developed regions that would often need to source know-how and technology from the rest of the world. The position of regional businesses within international value chains in this respect is a crucial element to be considered.

This type of analysis is important because the concept of smart specialisation warns against 'blind' duplication of investments in other European regions. Such blind duplication of efforts could lead to excessive fragmentation, loss of synergy potential, and ultimately could hamper the reach of the critical mass required for success. On the contrary, interregional collaboration should be pursued whenever similarities or complementarities with other regions are detected.

Tools suitable for this kind of analysis can include comparative studies, rounds of interviews with other regions and interregional work groups.

Example 2 - International benchmarking in a Top Technology Region – Provinces of Limburg in the Netherlands and Belgium, Noord-Brabant (Netherlands) and Vlaams-Brabant (Belgium), Province of Liège (Belgium) and parts of North Rhine Westphalia(Germany)

The public administrators of the Top Technology Region contracted the Swiss research firm BAK Basel to benchmark and map out their economic strengths. The research resulted in an analysis and international benchmark of the region's strengths and weaknesses. It indicates how the Top Technology Region relates on an international level playing field to similar regions such as Oberrhein and Øresund, and what development potential the cross-border region has.

The BAK-based study identified and confirmed a number of the region's strengths, as shown in the BAK Technology Competitive Index. The Index reveals the technological strength of a region based on the scale and growth of the relevant sector, the number of publications and the number of patents. The focus is on sectors (clusters) that are by their nature 'top technological'.

Entrepreneurial dynamics: prospects for a process of entrepreneurial discovery

Smart specialisation requires deep involvement of entrepreneurial actors in the strategy design process. Entrepreneurial actors are not only firms, but also any individuals and organisations who have some entrepreneurial knowledge. This analysis aims to build a systematic understanding of the areas in the economy and society that have the greatest potential for future development, and that are ready to be tapped (or need to be encouraged and extracted).

The analytical effort carried out in order to generate the basic information input for a RIS3 should have a special focus on the regional entrepreneurial environment, assessing whether it is lively and can generate a significant flow of experiments, innovation ideas, or entrepreneurial discoveries, or it is poor in experiments and entrepreneurial proposals and hence such activities should be specifically supported.

Besides using and developing statistics on entrepreneurial activities, an effective appreciation of entrepreneurial dynamic can only be performed if entrepreneurial actors and management and governance bodies responsible of RIS3 engage in direct discussion. A RIS3 should hence provide for a set of consultation and auditing tools, as for instance technology auditing, interviews with cluster management and firms, mixed working groups, setting up of observatories and monitoring organisations.

Step 2 - Governance: Ensuring participation and ownership

The fact that RIS3 is based on a wide view of innovation automatically implies that stakeholders of different types and levels should participate extensively in its design. The perhaps most common, tripartite governance model based on the involvement of industry, education and research institutions, and government (the so-called Triple Helix model), is no longer enough in the context of smart specialisation.

Innovation users or groups representing demand-side perspectives and consumers, relevant non-profit organisations representing citizens and workers should all be taken on board of the design process of RIS3. In other words this means that the governance model includes both the market and the civic society. When it comes to the sensitive moment of deciding on strategic priorities, a truly inclusive RIS3 governance structure should be able to prevent capture by specific interest groups, powerful lobbies, or major regional stakeholders.

In order to secure that all stakeholders own and share the strategy, governance schemes should allow for 'collaborative leadership', meaning that hierarchies in decision-making should be flexible enough in order to let each actor to have a role and eventually take the lead in specific phases of RIS3 design, according to actors' characteristics, background, and capacities.

When actors are many and different, it might be very difficult for them to find their own way to collaborate and manage potential conflicts. In order to tackle this potential problem, RIS3 governance bodies should include 'boundary spanners', that is to say, people or organisations with interdisciplinary knowledge or proven experience in interaction with different actors, and who can hence help moderate the process.

The governance structure should have a dedicated Steering Group or a Management Team, a Knowledge Leadership Group or Mirror Group, and should also allow for thematic or project-specific working groups.

Example 3 - Public-private cooperation in West Midlands

The West Midlands Innovation Strategy project started in 1996, and aimed at fostering innovation by enabling stronger cooperative links between public sector and different elements of the private sector. After a detailed audit of regional capabilities the strategy prioritised the establishment of a team of network brokers aiming to build on the existing sector-based networks and to catalyse new ones. The establishment of three technology centres bridged the gap between science and industry and served the requirements of three to four sector-based networks. A sector-led system of designing and vetting business plans and loan applications was established to close the gap between validation of technology and market assessment.

Step 3 - Elaboration of an overall vision for the future of the region

Analytical evidence should be used to depict a comprehensive scenario of the regional economy, society, and environment shared by all stakeholders. The scenario constitutes the basis for developing a vision about where the region would like to be in the future, what the main goals to achieve are, and why they are important.

Having a clear and shared vision of regional development is crucial in order to keep stakeholders engaged in the process, a task that is particularly challenging, given that a RIS3 is a long-term process.

An element closely intertwined to formulating an effective vision is RIS3 communication. Both during the RIS3 design process and all along the process of implementation of the strategy, it is crucial to have good communication. This is a way of spreading the vision, ultimately generating a positive tension in the regional society towards strategic goals, thus allowing to embark new stakeholders and keep the current ones engaged.

Example 4 - The vision of Flanders

By 2020 Flanders wants to rank among the top five knowledge-intensive regions in Europe. To reach this target, the region has taken steps towards a transformation policy approach. This focuses on value chains, economic clusters, open innovation and 'grand projects', which are selective investments in future-oriented domains with a high innovation and growth potential and large societal impact. The long-term vision about Flanders future development is contained in the plan 'Vlaanderen in Actie' (ViA), a broadly-based initiative consisting of several breakthroughs in the socio-economic domain. ViA conveys a vision that entails more than a moderated improvement or some growth percentage points. Namely, it points to an evolution that fundamentally alters the landscape and society of Flanders.

Step 4 - Identification of priorities

Priority setting in the context of RIS3 entails an effective match between a top-down process of identification of broad objectives aligned with EU policies and a bottom-up process of emergence of candidate niches for smart specialisation, areas of experimentation and future development stemming from the discovery activity of entrepreneurial actors.

It is of crucial importance that RIS3 governance bodies focus on a limited number of innovation and research priorities in line with the potential for smart specialisation detected in the analysis phase that is anchored in entrepreneurial discoveries. These priorities will be the areas where a region can realistically hope to excel.

As mentioned in Part II, in addition to specific technological or sectoral priorities, it is important to pay attention to defining horizontal-type priorities, referring to the diffusion and application of Key Enabling Technologies (KETs), as well as social and organisational innovations (see also Annexes I and II).

Example 5 - Focus on priorities in Berlin/Brandenburg

In 1998/99 a RITTS study laid the foundation for an active innovation policy in Berlin. In 2007 it was decided to bundle forces with the surrounding Brandenburg region. Five joint future Fields of Excellence were identified: Biotechnologies and Medical technologies and pharmacy, Energy technologies, ICT and new Media, Optical technologies, and Transport system technologies. These are underpinned by 4 cross-sectoral priorities: New materials, Production and automation technology, Cleantech, and Security. These fields present the regional strength in regional publicly funded R&D and industrial activity. Innovation support measures concentrate on strengthening private sector R&D and knowledge transfer, especially for SMEs.

Step 5 - Definition of coherent policy mix, roadmaps and action plan

The strategy should be implemented through a road map, with an effective action plan allowing for a degree of experimentation through pilot projects.

An action plan is a way of detailing and organising all the rules and tools a region needs in order to reach the prioritised goals, and it should provide for comprehensive and consistent information about strategic objectives, timeframes for implementation, identification of funding sources, tentative budget allocation.

Pilot projects constitute the main tools for policy experimentation and allow testing unprecedented mixes of policy measures at a small scale, before deciding on implementation at a larger and more expensive scale. In order to serve such a purpose effectively, pilot projects should be coupled with effective evaluation mechanisms leading to sound appraisal of success and feasibility as mainstream RIS3 projects.

Example 6 - OECD/European Commission guidance

Publications such as the joint 2011 OECD/European Commission book 'Regions and Innovation Policy' or the 2011 EC Communication 'Regional Policy for smart growth in Europe 2020' identify taxonomies of delivery instruments and/or offer a catalogue of possible innovation instruments and examples from regions that have successfully used them, which should act as an inspiration to regions to design smart and efficient policy mixes.

Step 6 - Integration of monitoring and evaluation mechanisms

Mechanisms for monitoring and evaluating should be integrated in the strategy and its different components from the very beginning.

Monitoring refers to the need to follow progress of implementation. Evaluation refers to assessing whether and how strategic objectives are met. In order to perform evaluation, it is essential that objectives are clearly defined in a RIS3 in measurable terms at each level of implementation, i.e. from the strategic overall objectives to the specific objectives of each of its actions. A central task of RIS3 design is to identify a parsimonious yet comprehensive set of output and results indicators and to establish baselines for the result indicators and target values for all of them.

The design effort a RIS3 implies does not come to an end when the strategy moves on to the implementation phase. A strategy for smart specialisation should evolve and adjust to changes in economic and framework conditions, as well as to emergence of new evidence during implementation through evaluation and monitoring activities.

Example 7 - Integrated monitoring and evaluation in Lower Austria

The Innovation Assessment Methodology Lower Austria is a comprehensive system of different monitoring and evaluation tools for Lower Austria's innovation policy. Its aim is to gain insight into the results of innovation support services with the aim of improving delivery instruments, justify amounts spent and promote its success.

One of the tools used is the Balanced Scorecard Methodology, a strategic performance management tool, developed and heavily used in the private sector. In Lower Austria it is used to define the objectives and target values for the 6 components of Lower Austria's economic strategy (including innovation) and to break them down at intermediary level as well as at programme level.

A particularly important source of information and indications on how to review a RIS3 is peer review, which is a comprehensive RIS3 examination carried out by peer regions. Engaging in this sort of exercises allows learning lessons from regions that might have already experienced some of the problems the peer-reviewed region is facing and/or establishing direct contact with potential partners for cooperation.

Example 8 - Fine-tuning RIS3 through Peer-Review

Peer-review can provide regional policy-makers with new and important insight into their RIS3 strategy by looking at it from other regions' perspective. As such, peer-review exercises are currently organised by the S3 Platform (IPTS) in order to allow regions to learn from other regions. In general, such a peer-review exercise goes through three stages: preparation, assessment (a review by peer regions and experts) and post-review follow-up.

Stage 1: During the preparation stage, a region has to prepare a structured presentation of their RIS3 strategy following a report template, which addresses a number of areas defined in the RIS3 Guide. The template is provided by the S3 Platform. During this preparatory stage, the representatives of the region under review prepare a review of their region's RIS3 in consultation with the S3 Platform team and experts.

Stage 2: The actual review phase generally takes the form of an interactive workshop. During the workshop, the region under review presents its strategy and has an opportunity to engage in dialogue with peer regions, representatives of the European Commission and independent academic experts working in the field of smart specialisation. Following the peer-review phase, the S3 Platform team prepares a summary report, which includes an outline of the peer-review session, feedback from peer regions, as well as any conclusions and expert recommendations.

Stage 3: During the post-review follow-up stage, the S3 Platform team will then contact the reviewed region to monitor its progress based on the actions listed in the post-workshop report. The region will be asked to complete a follow-up questionnaire twice: three and six months after the peer-review workshop.

ANNEXES

ANNEX I: A STEP-BY-STEP APPROACH TO RIS3 DESIGN

Six key steps to design RIS3

This Annex develops the stepwise path for the design of RIS3 presented in Part III of the Guide. Each of the steps (see *Box 4*) is discussed here in more detail, along with implementation advice, methodological approaches and further useful references.

Box 4 - A stepwise approach for RIS3 design

- STEP 1. Analysis of the regional context and potential for innovation
- STEP 2. Governance: Ensuring participation and ownership
- STEP 3. Elaboration of an overall vision for the future of the region
- STEP 4. Identification of priorities
- STEP 5. Definition of coherent policy mix, roadmaps and action plan
- STEP 6. Integration of monitoring and evaluation mechanisms

Step 1 - Analysis of the regional context and potential for innovation

Differentiation is at the very heart of RIS3. The key to successful differentiation is to exploit *related variety*, suggesting that a regional economy can build its competitive advantage by diversifying its unique, localised knowledge base (existing specialisation) into new combinations/innovations which are close or adjacent to it. Closeness is important because new combinations must be feasible or accessible given the existing assets, precisely in order to exploit the experience accumulated by regional actors (see box below).

Analysing and assessing the potential for innovation-driven differentiation is crucial for creating an evidence base for the prioritisation process in the RIS3. The need to analyse regional innovation potential was a fundamental starting point in the history of regional innovation strategies in Europe. The focus was on dual analysis: an analysis of SME needs and barriers for innovation; and an assessment of the support provided by the infrastructure in place in the region to back innovation.

Comparison of the results of the two analyses leads to a '*gap analysis*', where mismatches between SME latent and implicit needs and demand for support, on the one hand, and the effective value added of the existing support, on the other hand, are identified. Questions such as the visibility, relevance and effectiveness of the support infrastructure are at the heart of these analyses. This then leads to proposals for improvement in the innovation support infrastructure and better use of public funding, and, as a result of more effective support, improved innovation potential in regional firms

Several methods can be used to collect and treat information for such analyses. They are described in a methodological guide using a decade of experience with Regional Innovation Strategies (IRE 2006).¹⁷ The most widely used methods are desk research, large scale questionnaires (web-based or surveys) and personal interviews (face-to-face, telephone, or in working groups). A key feature brought in by these European Union-sponsored exercises was the introduction of *external experts* in this analytical phase.

The benefits of bringing in an external view to address sensitive issues such as redundancies and overlaps, or the lack of efficiency and effectiveness of agencies and programmes in supporting innovation, were particularly demonstrated in the 'supply' analysis. These benefits were greater when the external consultants and experts were truly involved in the exercise, when foreign experts teamed up with national or regional ones, or when they acted as coaches for the regional decision-makers (to ensure a strong legacy from their input, rather than a one-off contribution).

These analyses have the great value of introducing systematic, non-partisan and evidence-based information on innovation and innovation support. In the most successful cases, international comparisons and benchmarking were also used in a smart way to improve regional policy.

¹⁷ Innovative Regions in Europe Network (2006), *RIS Methodological Guide, Stage 1*.

However, despite the major benefits of these structured and strategic approaches for promoting innovation in regions, shortcomings were identified in these methodologies: they reflect a too linear view of innovation, run the risk of autarky, and take a narrow view on the role of policy in the exercise. Within the perspective of a RIS3, it can also be argued that too little emphasis is placed on the *identification of 'niches' or specific domains for (present and future) competitive advantages*, from an international stance. Hence, the work for this analytical step of a RIS3 strategy should combine the above types of analyses with other analyses aiming at shedding light on potential for knowledge-based transformation of the economy, based on information on the positioning of the regional economy in international value chains and on identification of specific key assets.

Several methods can be used to support the identification of potential niches for smart specialisation.

An integrated method that delivers a unique solution to this question does not exist: it is the *combination* of an array of evidence that is most likely to provide a suitable basis for this identification process. The main relevant methods are listed below, ranging from purely quantitative to more qualitative ones. The last two — in-depth cluster case studies and peer reviews, and foresight — provide the opportunity to integrate the field knowledge held and concrete experimentation carried out, by regional actors in the spirit of an 'entrepreneurial discovery process'.

1. *Analysis of (matching) Scientific and Technological specialisation*: analyses of specialisation of R&D investment, publications and citations, and patent applications and citations by 'field'. A region has a comparative advantage in a certain field if it shows an above-average concentration of these indicators compared to the value taken in the country or a group of countries.¹⁸ The advantage of this method is that such data are available in a comparative format (with some restrictions), but the disadvantage is that it reflects S&T potential rather than commercial value or innovation prospects. A major problem is to relate scientific disciplines to technological domains and production sectors, since many disciplines and technologies are generic and find applications in many different sectors.¹⁹ Sector classification is also an important restriction as it is based on rather outdated product definitions which do not match current product mixes (e.g. the difficulty of defining environmental product or services 'sectors'). It is more interesting to calculate changes of indexes over time, indicating specialisation trends which give a perspective on the evolution of a region's S&T specialisation.
2. *Analysis of regional economic specialisation*: quantitative analyses calculate degrees of specialisation of regional economies on the basis of employment (or value-added) data. Location quotients measure whether some sectors are over-represented in a regional economy compared to other regions or countries. This is sometimes equated with 'cluster presence' even if these indicators only capture agglomeration effects, and not interactions, an essential feature of a cluster. Specialisation indexes thus indicate the presence of critical

¹⁸ This was thoroughly carried out, at national level in Europe Innova (2010), National Specialisation report, Sectoral Innovation Watch.

¹⁹ Conversion tables exist which try to address this problem.

masses of activity, but not innovation-driven linkages. They can point to problems when regions remain too specialised in declining non-competitive activities. Hence, it is important to match these specialisation data with performance indicators (value added, exports, etc.) which is one of the main tasks performed by the European Cluster Observatory.²⁰ As with the previous type of analysis, analysis of specialisation changes over time is likely to bring more insightful elements than static analyses.

The elements identified in points 1 and 2 above should be highlighted when conducting a preliminary analysis/(self-)assessment of the regional innovation system and strategy. Further elements are suggested in *Box 5*.

²⁰ www.clusterobservatory.eu

Box 5 - Examples of elements for (self-) assessment

Strategic approach: endorsement of the innovation strategy at the highest political level; prioritisation of public investment in research/education/innovation in the region (by all levels of government); predictability of the innovation policy framework for regional stakeholders; reliance on the consultation and support of regional stakeholders as a basis of innovation policy; degree of control over strategic regional assets.

Policy mix and framework conditions: cooperation between the local, regional, national and EU levels in the relevant policies (R&D, innovation, education, ICT ...); coordination of all the relevant policies within the region; consistency between policies addressing the supply and the demand (take-up) of innovations.

Entrepreneurship: Favourable conditions for equity investment, business angels and venture capitalists; business environment favourable to the creation of new SMEs; existence of policies and instruments to foster the commercialisation of the output of innovation; existence of specific measures to support young innovative companies; appreciation of regional inventions.

Assessment and mapping of digital infrastructures and e-communication services: existing and planned technology infrastructures (broadband networks) and other telecom- and internet-related services are presented in the Digital Agenda Scoreboard.²¹

Human resources: Attractiveness of working conditions for researchers compared with other employment opportunities; facilitated mobility of research and innovation personnel between the public and the private sector.

Public sector: Existence of specific provisions in standard public procurement procedures to foster innovation; the introduction of innovations within public sector organisations.

Education and research: Existence of policies to ensure proper supply and mix of skills; existence and coverage of training on entrepreneurship and creative problem-solving; autonomy and transparency of education and research organisations; existence of policies to support the regular and long-term collaboration of education and research organisations with businesses; explicit consideration of the role of Key Enabling Technologies (KETs).

Evaluation system: Institutionalisation of ex-post assessment of innovation policy and support measures through evaluations; monitoring of the results of innovation policy and support schemes through output indicators; transparent evaluation of research and innovation projects and performers on the basis of their quality.

Finance: Predictability of the budgetary framework; stability of public investment in research, education and innovation; proper balance between institutional and competitive funding for innovation; efficiency of support schemes (value for money); leverage of private financing.

²¹ http://ec.europa.eu/information_society/digital-agenda/scoreboard/index_en.htm

3. *'Cluster' in-depth case studies and peer reviews*: to move beyond the figures that are available for comparison, more qualitative studies can be carried out on activity domains where a region shows relative specialisation. This involves expert work on value chain analysis (undertaken in an international environment and enlightening the spatial division of labour), context conditions for the operation of the cluster, labour market situation, etc. It also involves an analysis of the linkages between the cluster and other clusters or industries, in order to examine whether one can talk about related variety across the areas of regional specialisation. One interesting approach is the 'revealed skill relatedness' (RSR) method (Neffke and Svensson Henning, 2009²²). RSR measures the degree to which industries share similar skill requirements, and this is seen as a very important vehicle for knowledge transfer between clusters (through people mobility). It is based on a network analysis using data on job changes between industries, showing proximity between industries in terms of skill sets.

Sophisticated analyses of clusters such as Henning *et al.* (2010)²³ combine this type of analysis with a functional analysis linking economic structure to cluster challenges and assessing the functions taken by the cluster initiative. The functions analysed are: knowledge creation and knowledge diffusion; identification of opportunities and barriers; stimulation of entrepreneurship/management of risk and uncertainty; market formation; mobilisation of resources; and legitimation. These types of analysis are conducted by experts who study the cases in close cooperation with cluster actors: this helps to take into account innovation opportunities identified by leading actors (companies, universities, intermediaries, etc.) Mixing regional experts with international experts helps to give more weight to the international competitiveness issue. Adding key stakeholders from foreign clusters brings in a useful peer review dimension to the analysis.

4. *Foresight*: the aim of foresight is to capture existing expert intelligence sources on future trends and make them accessible for present decision-making. The role of foresight is to elucidate possible paths for the future in order to open the debate on possible development paths. Foresight has the following characteristics²⁴: Action-oriented; Open to alternative futures; Participatory; and Multidisciplinary. There is a multiplicity of methods that can be used and combined to implement foresight studies, the best known being expert panels and multi-round Delphi surveys. They differ in their expected benefits, conditions of use, time requirement, etc. and their common feature is that they rely heavily on expert knowledge and involve interactions between experts (*Table 1*; see more details on the FOREN website). For RIS3, foresight studies would ideally combine regional expertise with international expertise able to put regional assets in perspective with wider trends.

²² Neffke F. and Svensson Henning M. (2009), *Skill-relatedness and firm diversification*, *Papers on Economics and Evolution* 0906. Jena Evolutionary Economics Group, Max Plank Institute of Economics.

²³ Henning M., Moodysson J. and Nilsson M. (2010), *Innovation and Regional Transformation: from clusters to new combinations*, Region Skane.

²⁴ European Commission (2001), *FOREN Guide - Foresight for Regional Development Network - A Practical Guide to Regional Foresight*. IPTS Seville.

Table 1 - Methods used for Foresight

Methods & Tools	Diagnosis		Prescription		Qualitative		Exploratory		Open
		Prognosis		Quantitative		Normative		Predictive	
Environmental scanning & monitoring	XX			X	X				
System dynamics	XX			X	X		X	X	
Structural analysis	XX			X	X		X	X	
Agent modelling	XX				X		X	X	
SWOT analysis	XX	X			X		X	X	
Trend intra & extrapolation	X	XX		X	X		X	X	
Modelling & simulation	X	XX		X			X	X	
Gaming	X	XX			X		X		X
Creativity methods (brainstorming, mind mapping...)	X	XX	X		X	X	X		X
Expert panels		XX	X		X	X	X		X
Delphi survey	X	X	X	X	X	X	XX	X	
Backcasting		X	XX	X	X	X		X	
S&T roadmapping		X	X		X	XX	X	X	
Critical & key technology study	X	X	XX	X	X	X		X	
Scenario building		XX			X	X	X		X
Morphological analysis & relevance trees		XX	X		X	X			X
Cross-impact analysis		XX		X	X		X		X
Multi-criteria analysis			XX	X	X	X		X	

Source: <http://forlearn.jrc.ec.europa.eu>

Step 2 - Governance: ensuring participation and ownership

At the beginning of a RIS3 design process, it is necessary to define the scope and expected goal, with a view to ensuring participation of the key actors and securing ownership of the approaches defined in the strategy.

With respect to the *ultimate and long-term goal* of the RIS3, the Vision for the future of the region should underpin the whole process: all analyses, debates, participative actions, pilot projects, etc. should be seen as participating towards the long term goal identified in the Vision. Potential actors relevant to the RIS3 process span from public authorities to universities and other knowledge-based institutions, investors and enterprises, civil society actors, and external experts who can contribute to the benchmarking and peer review processes.

Defining the *scope* of the RIS3 is crucial, since different stakeholders will have different expectations and agendas on the question at stake, often restricted to their own areas of action. Since RIS3 aims to achieve more effectiveness in all public action targeting regional transformation, a *wide view of innovation* is to be adopted. This will emphasise that innovation may occur everywhere, in different forms, and not only in the form of high technology development in metropolitan areas:

- Including innovation in services and in the public sector, in addition to innovation in the manufacturing sector which most policies currently target;
- Encompassing innovation based on different types of knowledge bases, leading to different modes of innovation (*Table 2*): 1) the 'STI' (Science, Technology, Innovation) mode, based on analytical knowledge/basic research (science push/supply-driven approach) and synthetic knowledge/applied research (user-driven approach), emphasising product and process innovations; and 2) the 'DUI' (Doing, Using, Interacting) mode, based on synthetic and symbolic knowledge (market/user-driven), emphasising competence building and organisational innovations.²⁵

With respect to *policy areas and organisations* involved, the above wide view means that several policy areas are concerned with the RIS3, beyond the traditional science and technology and economy ministries and agencies. Interministerial Committees are tools to cope with this need for a wide conclusion of stakeholders.

A RIS3 is an exercise that deals with policies developed by local, regional and national authorities (as well as EU Cohesion policy and EU research policy). This *multi-level* dimension of policy implies that governance mechanisms need to include stakeholders and decision-makers from these various levels. It also involves that links must be established between strategies for research (usually decided upon at national level) and strategies for innovation (usually under the responsibility of or developed in coordination with regional authorities). They use different

²⁵ Lorenz P. and Lundvall B.A. (2006), *How Europe's Economies Learn. Coordinating Competing Models: Different modes of innovation.*

delivery instruments but need to look at common results. This process also enables the identification of the most adequate policy-mix to use.

Table 2 - Differentiated knowledge base: a typology

Analytical (science-based)	Synthetic (engineering-based)	Symbolic (art-based)
Developing new knowledge about natural systems by applying scientific laws; know why	Applying or combining existing knowledge in new ways; know how	Creating meaning, desire, aesthetic qualities, affection, intangibles, symbols, images; know who
Scientific knowledge, models, deductive	Problem-solving, custom production, inductive	Creative process
Collaboration within and between research units	Interactive learning with customers and suppliers	Experimentation in studios and project teams
Strong codified knowledge content, highly abstract, universal	Partially codified knowledge, strong tacit component, more context-specific	Importance of interpretation, creativity, cultural knowledge, sign values, implies strong context specificity
Meaning relatively constant between areas	Meaning varies substantially between areas	Meaning highly variable between area, and gender
Drug development	Mechanical engineering	Cultural production, design, brands

Source: Cooke, P. *et al.* (2006)²⁶

The governance of a RIS3 strategy

No matter who is involved, the RIS3 process needs to be interactive, regionally-driven and consensus-based. This is because, far from the stereotype of heroic individuals in labs and garages, the innovation process is increasingly a collective social endeavour in which success, for regions as well as firms, depends on the inter-organisational capacity to absorb, generate and exchange knowledge in a timely and cost-effective manner. Although regional development is also a collective social endeavour in which national and supra-national levels play their part, the regional level is the most important part of the process, not least because no one has a greater commitment to or knowledge of a region than the individuals and organisations that are based there.

The governance structures and processes that are described and recommended here should not be seen as a rigid template that must be applied in all regions regardless of local circumstances. On

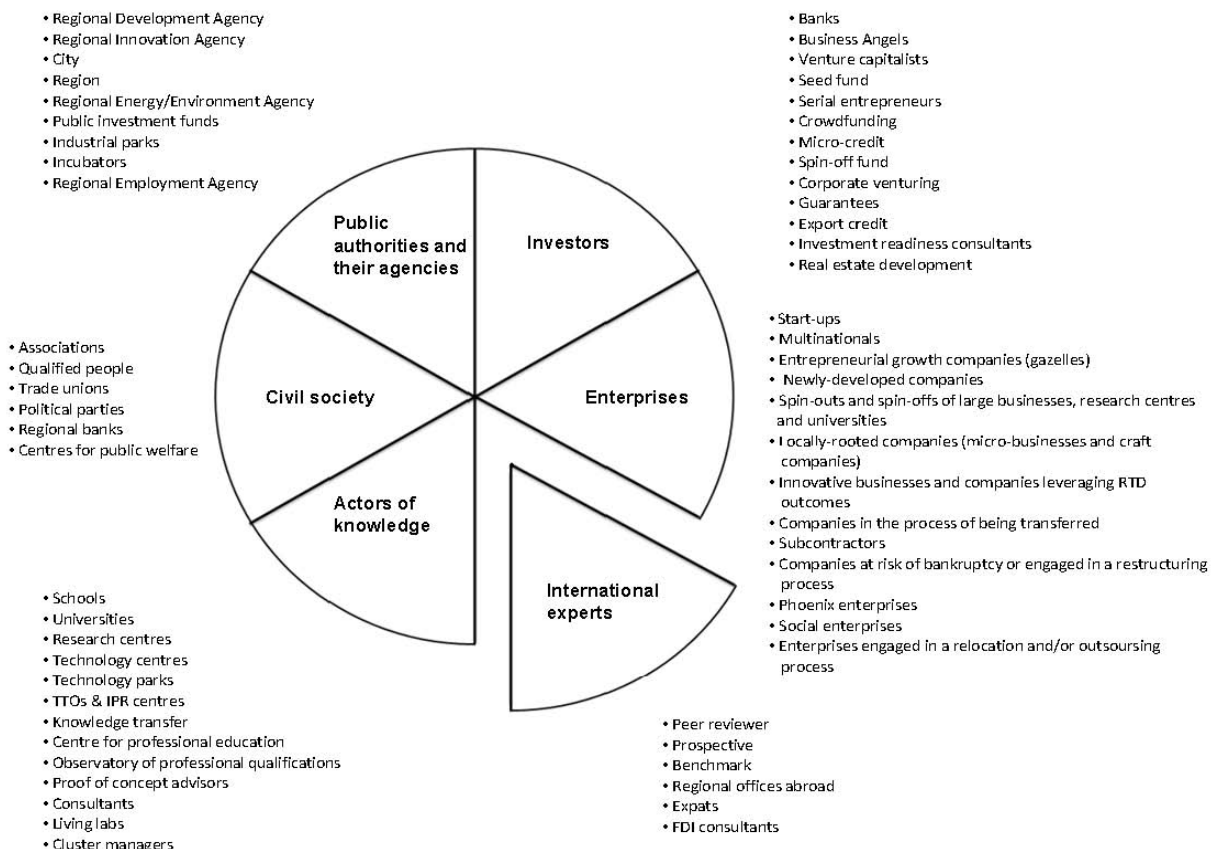
²⁶ Cooke P., Asheim B., *et al.* (2006), *Constructing Regional Advantage: principles, perspectives, policies*. Report to the European Commission.

the contrary, they are offered as general guidelines that need to be assessed and applied in particular regional contexts, each of which has its own unique combination of problems and possibilities. In other words, the regional context will help to determine the precise mix of organisations that need to be involved in the RIS3 process. The regional context is also the appropriate context in which to decide who is best placed to lead the RIS3 process.

In terms of *process*, RIS3 design involves analyses, experimentation, debates and decision-making, with a wide participation of actors and experts from within and outside the region. This needs to be communicated, understood and acknowledged: it is a time-consuming process that should be seen as an investment rather than a burden.

The most important types of organisation that need to be involved in the RIS3 process are public authorities, universities and other knowledge-based institutions, investors and enterprises, civil society actors, and international experts who can offer benchmarking and peer review services, for example. *Figure 1* exemplifies a number of organisations belonging to each of the previous categories, as identified by EURADA.

Figure 1 - The regional knowledge ecology



Source: EURADA

A criticism that was sometimes levelled at the RIS process was that it was prone to being 'captured' by traditional interest groups in the region, groups that were more interested in preserving the regional status quo than transforming the regional economy through innovation. Although this criticism can be overdone (because regional governments, for example, had to be involved in the RIS process), the design of the RIS3 architecture needs to anticipate the risk of capture and make it more difficult for traditional groups to frustrate the process.

In the Open Innovation era, where social innovation and ecological innovation entail behavioural change at the individual and societal levels if the challenges of health, poverty and climate change are to be addressed, the regional governance system should be opened to new stakeholder groups coming from the civil society that can foster a culture of *constructive challenge* to regional status quo.

In particular, in order to guarantee a livelier and truly place-based entrepreneurial process of discovery that generates intensive experimentation and discoveries, it is imperative that new *demand-side* perspectives, embodied in innovation-user or interest groups of consumers, are represented along with intermediaries who offer a knowledge-based but *market-facing* perspective. This means that the traditional, joint-action management model of the *triple helix*, based on the interaction among the academic world, public authorities, and the business community, should be extended to include a fourth group of actors representing a range of innovation users, obtaining what is called a *quadruple helix*.²⁷ This is the necessary organisational counterpart of an open and user-centred innovation policy, because it allows for a greater focus on understanding latent consumer needs, and more direct involvement of users in various stages of the innovation process. RIS3 processes can develop environments which both support and utilise user-centred innovation activities also with the aim of securing better conditions to commercialise R&D efforts.

The quadruple helix allows for a variety of innovations other than the ones strongly based on technology or science, in the spirit of the wide concept of innovation at the basis of RIS3, but it requires significant flexibility, adaptation of processes, acquisition of new skills, and potential re-distribution of power among organisations. This in turn calls for collective leadership and moderation of the process as necessary practices for achieving successful governance.

Leadership assumes many forms. Three different, but equally important forms of leadership are the following: political leadership (the people who are chosen by the electorate to represent us and to lead our governments); managerial leadership (the people who manage the 'enterprise function' in the public, private and third sectors); and intellectual leadership (the people who play a leading role in connecting their universities to the worlds in and beyond their regions). The Guide does not presume to suggest which form of leadership is the best or the most appropriate, because this is a decision that needs to be made at the regional level, where the choice can be informed by local knowledge of competence, credibility and character, the essential attributes of a leader.

²⁷ Arnkil R., *et al.* (2010), *Exploring Quadruple Helix. Outlining user-oriented innovation models*. University of Tampere, Work Research Center, Working Paper No. 85 (Final Report on Quadruple Helix Research for the CLIQ project, INTERREG IVC Programme).

Although a leader needs to have certain personal attributes, like the ones identified above, leadership research has taken a ‘relational turn’ in recent years. Rather than being a static ‘thing’ that a minority of people possess, leadership is now understood as a dynamic relationship between leaders and led in which both sides play an active role in finding joint solutions to common problems. In this context, a way to secure understanding and ownership of the main strategic orientations is to allow for effective *collaborative leadership* among the key actors involved in the process. When innovation processes embrace many different areas of the society, as in the case of RIS3, collaboration among stakeholders holds the key to successful implementation of innovative practices, implying that leadership has to be shared and exercised across organisations. Collaborative leadership requires the emergence of collaborative practices, as actors must find ways of managing conflict themselves.

In order to moderate the RIS3 design process, actors playing the role of *boundary spanners* between the organisations are needed. These are actors endowed with an interdisciplinary knowledge or experience of interaction with several different types of organisations; hence they can facilitate new connections across sectors, foster new conversations between disciplines, and inject novelty into the process. This in turn helps to overcome the sectoral and disciplinary silos that reproduce old habits and routines, locking regional economies into their traditional paths of development.

Boundary spanning skills tend to emerge from activities that straddle sectors, disciplines and professions and they are invariably fashioned in action learning environments where there is a high degree of novelty associated with the activity. Examples of such activities include technology transfer, knowledge exchange, venture funding, regional economic development, business services, and management consultancy, all of which afford an overview of the regional economy. Formal recognition of the boundary spanning role, and its significance for universities, businesses and the regional economy, would do much to promote a skill set that is critically important to the moderation of the RIS3 process, particularly of the entrepreneurial process of discovery, which lies at the heart of the process.

As far as the structure of the management body is concerned, it will clearly vary according to local circumstances, it must be supported by robust governance arrangements. The RIS experience is instructive here because it shows that local diversity can exist within a generic *governance system*. The governance system of a typical RIS project revolved around three elements — Steering Group, Management Team and Working Groups — and they worked in the following way:

- *Steering Group*: the SG was responsible for the overall performance of the project and it normally included members of the business community, local and regional government, and key innovation actors, all of whom were expected to embed the project in their respective fields of activity. The size of the SG was always carefully considered: too few members could compromise the consensus-building process, while too many members could be a recipe for a bureaucratic and unwieldy process. An appropriate balance was a membership of around fifteen people meeting as a group every two or three months. The main tasks would typically include the following: setting objectives and monitoring activities, selecting the members of the Management Team, supervising the work

programme, political and institutional support, and liaising with the European Commission. The chair of the SG was invariably a local notable drawn from the business community, academia or the public sector;

- *Management Team*: the MT was responsible for implementing the RIS project under the general guidance of the SG. The composition of the MT varied a lot between the regions, though all regions had a Project Manager who was supported by a small team of up to three people. The main tasks of the MT often included the following: liaising with the EC and providing progress reports, providing a secretariat to the SG, launching and coordinating the study assessment tasks of the project, and fostering regional consensus around the project, acting as a focal point for networking with other RIS regions to draw on their experiences. Choosing the location of the MT was an important decision because *how* the project was perceived was largely a function of *where* it was physically situated;
- *Working Groups*: the WG mechanism fulfilled two purposes: it helped to build regional consensus for the RIS project throughout the region and it provided a means to engage the business community, especially if the Working Groups were sector-based, as they were in regions with strong sectoral specialisations. Where they were most effective, Working Groups had clearly defined terms of reference and a credible timetable for the delivery of results. The conclusions of the Working Groups were supposed to inform the strategic discussions in the Steering Group.

Many regions will be able to draw on their unique RIS experience when they embark upon their RIS3 strategies because these two processes have a good deal in common. It is important to remember that regions are not being asked to do something totally new when they begin the RIS3 journey of discovery. The original RIS experience also offers some instructive lessons with regard to the *involvement of the business community* in the process:

- *Communications*: a clear communications strategy was deemed to be of enormous importance, especially for the business community. The businesses actually involved in RIS projects also required honest and timely feedback;
- *Management*: the Management Team and Steering Group personnel often played a key role in maintaining effective communication, especially where the chair of the Steering Group or the leader of the Management Group was a prominent local business leader or a well-connected local networker (as they were in Yorkshire and Humber and Dytiki Macedonia respectively);
- *Sector Champions*: Sector champions can help to engage the local business community in traditional sectors as well as in new or emerging sectors, both of which need to embrace innovation;
- *Local Media*: the involvement of local media helped to raise the profile of the RIS exercise, especially in RIS Aragon, where two journalists from daily newspapers were involved in the RIS process from the outset. Frequent coverage in the media helped the project to resonate in the local business community;
- *Pilot Projects*: To overcome the criticism of the RIS process being no more than a ‘talking shop’, it was found that pilot projects led by local business leaders were an effective form of action learning which generated useful information as well as helped to maintain the active engagement of the business community.

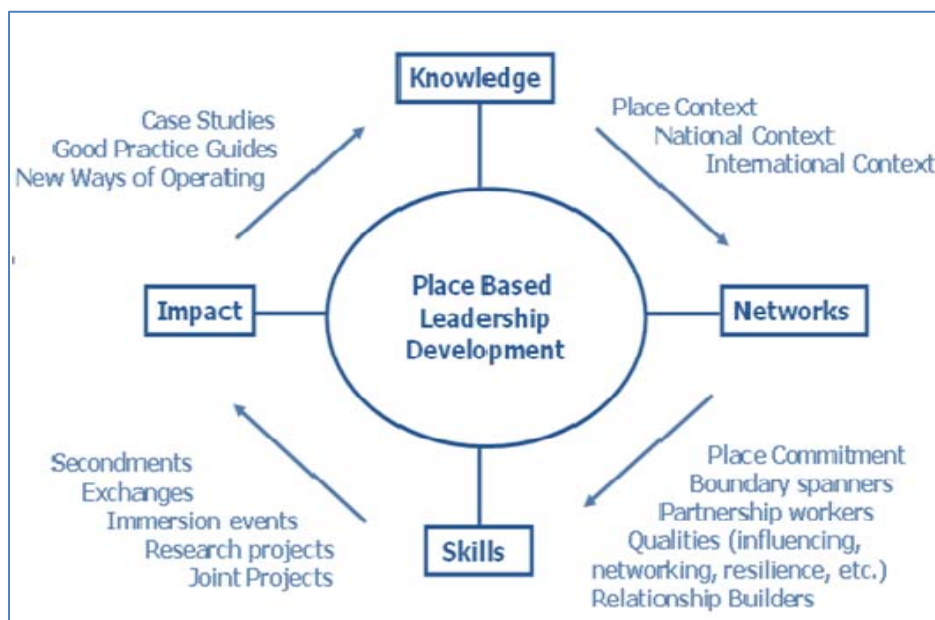
Some or all of these engagement mechanisms will be relevant to the RIS3 exercise because the latter involves an even deeper and more iterative relationship with the business community. But innovation is increasingly a collective social endeavour, and the business community should not be expected to carry the full burden of innovation on its own shoulders. Success in the innovation stakes will increasingly go to countries and regions that transcend the sterile ideological debate about private versus public and embrace the fact that innovation is a collective social endeavour, at the heart of which is a judicious private + public partnership.

Getting *firms, universities, development agencies and regional governments* to accept that innovation is a collective social endeavour — where participants freely acknowledge that working in concert can deliver far more than working in isolation — is arguably the most important ingredient in the ‘recipe’ for purposeful entrepreneurial search. This does not displace the firm from the forefront of the search process; but it does mean that the costs and risks associated with entrepreneurial search are shared and therefore do not become too prohibitive for the firm that is leading the search process.

To tap the potential of related variety, regional authorities and development agencies will need to behave less like traditional public bureaucracies and more like innovation animateurs, brokering new connections and conversations in the regional economy. New opportunities are emerging in old regions as a result of connections and conversations that are now occurring but which never occurred in the past despite the parties being co-located in the same region (proving that cognitive proximity is far more important than mere physical proximity).

The onus of responsibility for creating such iterative processes rests primarily with public sector bodies, especially universities, development agencies and regional governments. Learning by doing will help these public sector bodies to appreciate the needs of firms, but more formal action learning programmes will also be needed. A good example of such a programme is the Place-Based Leadership Development Programme, which regions may wish to adapt and adopt to help them acquire the iterative skills needed in the RIS3 exercise (see *Figure 2*).

Figure 2 - A Place-based leadership development programme



Under such a programme, universities, development agencies and regional governments could jointly identify a project to explore the prospects for related variety in the regional economy. Collaborative leadership development expertise would be developed through each actor bringing substantive knowledge ('know what'), professional networks ('know who') and skills ('know how') to the initiative and explicitly sharing their knowledge and experience with other members of the project team. The participants are then encouraged to introduce these collaborative leadership skills back into their respective public bodies to help the latter to behave less like traditional bureaucracies and more like animateurs of innovation and development. The formation of a Knowledge Leadership Group would give an institutional expression to the alliance between universities, development agencies and regional governments.

Finally, as the original RIS programme took *consensus-building* seriously, it is worth distilling the lessons from that experience as a starting point for the RIS3 exercise. In the best cases, the consensus-building process focused on three inter-related themes, namely awareness-raising, priority-shaping and fostering a sense of ownership, each of which merits attention. Awareness-raising was achieved in a number of different ways, including: (i) a project launch event such as a high profile seminar or conference (ii) a series of presentations throughout the region to key sectors, especially to the business community and the higher and vocational training institutions (iii) publicity through radio, television and newspaper coverage (iv) the distribution of customised brochures (v) the creation of a specialised project web site and (vi) the use of iconic companies in the region as ambassadors for the project. Awareness-raising needs to be measured and also needs to be calibrated with action, otherwise there is a danger that expectations will be raised too early in the process, leading to disillusionment before the project has had time to show some tangible results.

Enabling key actors to shape the priorities of the programme proved to be an important way of retaining their commitment. Each actor will have a keen sense of their own priorities, as well as their own diagnosis of the strengths and weaknesses of the regional economy, and these views were subjected to critical review through a combination of SWOT analyses and collective debate. Giving all participants the opportunity to shape the policy priorities is the key point to establish because this process of open deliberation spawned a sense of ownership.

A sense of ownership was a natural outcome of the consensus-building process when the latter was properly conducted. A sense of shared ownership among the Steering Group members proved to be particularly important and this intangible asset was enhanced by regular consultation with participants and by securing concrete outputs, proving that the RIS exercise was about results as well as processes, more than just a 'talking shop' in other words.

Multi-level/multi-fund approach to RIS3

The process of innovation and the policies that shape it operate at multiple levels, from the global to the local. For many key actors involved in the region, notably private firms and leading universities, the development of the region will not be their primary focus. While regional public authorities do have a territorial responsibility, innovative public services are increasingly being delivered by external organisations. At the same time, although many national government agencies and the European Union itself operate a range of innovation-orientated policies that do

not have an explicit territorial dimension, these supposedly space-neutral policies have a profoundly uneven spatial impact. This is not to deny the importance of an active regional dimension to innovation. On the contrary, for both corporate strategy and public policy the region can be a living laboratory for new, more sustainable ways of working and living, contributing to local, national and European development objectives. It is therefore vital that the regional Knowledge Leadership Group includes stakeholders operating both outside and in the region. In this respect, universities can be critical actors.

How does regional funding fit into this multi-level system? As a first step the region should use technical assistance funding to build capacity to tap into the knowledge base of what is happening outside the region, enhancing the connectivity of the region to the wider world. Such knowledge needs to be shared amongst the regional stakeholders, as all too often partnerships fail because of a lack of understanding of the other's business drivers.

A powerful mechanism for achieving this common understanding is properly resourced regional foresight and scenario-planning exercises involving the public, private and higher education sectors, the chief aim of which would be to produce a regionally-attuned smart specialisation strategy.

Figure 3 and Figure 4 suggest this may reveal how well-connected the key regional actors are both internally and externally, and how structural funds can be used to overcome barriers and strengthen connections within and outside the region.

Figure 3 - The Disconnected Region

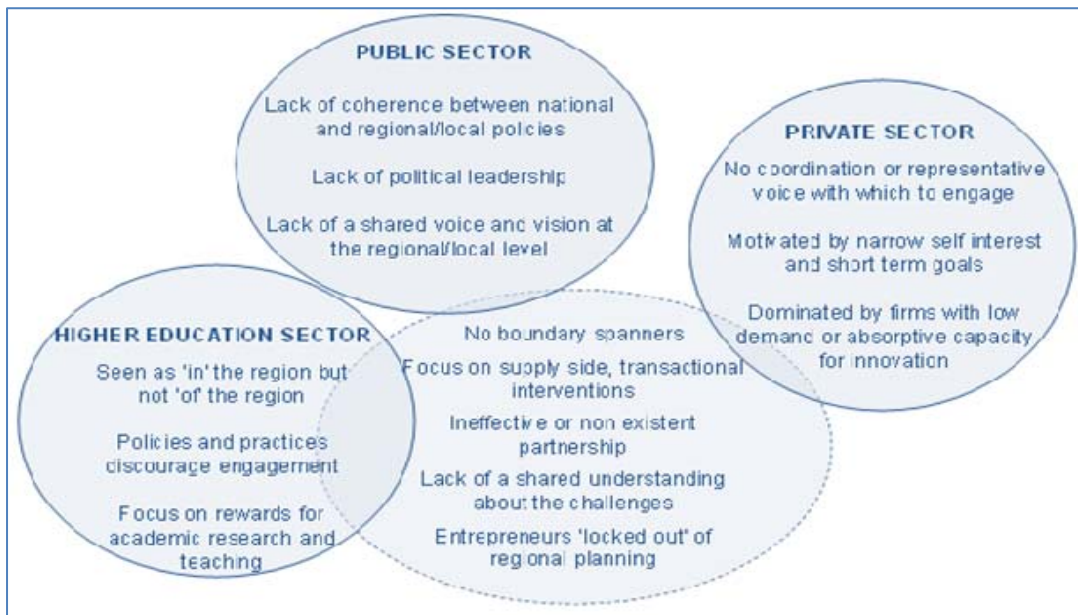
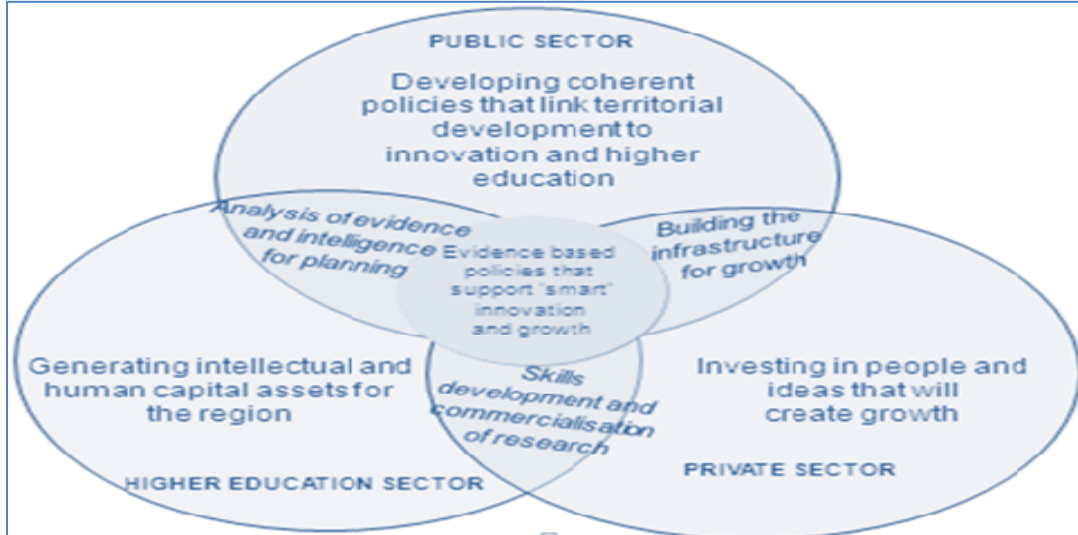


Figure 4 - The connected region



While the RIS3 conditionality in the Structural Funds regulations for 2014-2020 applies to the ERDF for thematic priorities 1 and 2, RIS3 is a strategic process that should be set before the actual analysis of which funds to use for implementing the strategy. From its inherent logic and the fact that one of its key tenants is to increase synergies between different funding streams and policies, it is clear that RIS3 is to be oriented towards a multi-level/multi-fund approach as regards the delivery of its delivery instruments and projects.

Furthermore, regional research and innovation strategies for smart specialisation will have to be aligned with national strategies for innovation and research, where these exist. In a few Member States this process is already advanced and the approach taken in this guide follows those good examples. But in most Member States, research and education policies are in the exclusive competence of the nation state. And that is the case even for those countries that have a devolved administrative and political set-up. For the latter this alignment is needed.

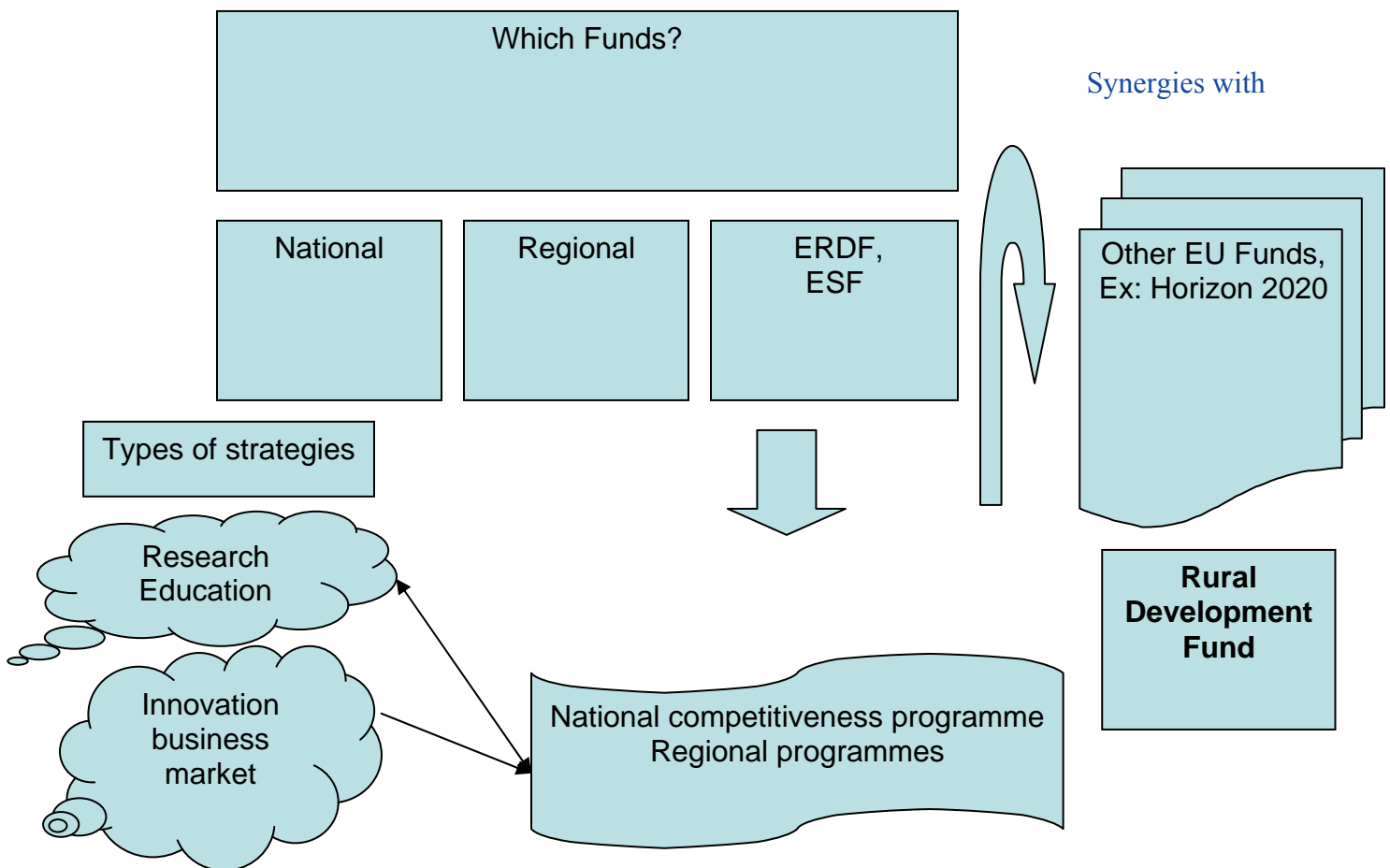
These strategies are therefore to be the backbone of operational programmes of cohesion policy, i.e. the managing authorities will select from the range of delivery instruments and projects identified to implement the strategy those which will be included in the operational programmes. The structure and dimension of the latter depends on the Member State. In most Member States Regional Programmes exist alongside Sectoral ones. The smaller Regional Programmes (in terms of budget) cover a mixture of territorial priorities, while the larger ones can have separate parts for innovation and research. In the majority of Member States both cases exist, with small regional programmes covering all types of thematic issues including research and innovation (support to business and SMEs) and national programmes divided into large themes such as competitiveness, environment, transports, etc.

When developing RIS3 strategies, Member States and regions need to take into account/be involved in the discussions on which types of operational programmes will be presented in the partnership contract.

Each country and region will, of course, have to make their own analysis of funding needs and opportunities for their RIS3 strategies. This includes private investments, as one explicit goal of RIS3, included in the criteria for the conditionality, is to leverage private RTD investments.

If such an analysis has not yet been initiated, RIS3 presents an opportunity to do so and will enable regions and their innovation actors to identify and articulate funding needs for their strategies. *Figure 5* illustrates these issues.

Figure 5 - Analysis of funding for RIS3



Step 3 - Elaboration of an overall vision for the future of the region

This step is the development of a shared and compelling Vision on the economic development potential of the region and the main direction for its international positioning. It is a highly political step. Its value mainly rests on getting the *political endorsement* for the subsequent steps, particularly for the implementation of the strategy.

The main quality of a Vision is its *mobilising power*: it should attract regional stakeholders around a common bold project, a dream, which many feel they can contribute to and benefit from. It will be easier to run this step when a regional 'grand figure' (a politician, an industrialist, a leading academic, a well-known artist...) pushes the Vision forward on a large scale. Times of crisis often provide a good opportunity to generate such new Visions, starting from the well-acknowledged need to escape the crisis. The main difficulty for a Vision is to be *ambitious but still credible*: few regions can realistically claim that they want to become the 'most innovative region of the EU'. Over-ambitious claims might undermine a RIS3 from the start, if the Vision cannot be taken seriously by regional stakeholders.

At this stage, the purpose is to reach the willingness to act towards the transformation of the regions and support the regional consensus necessary to perform the other steps.

The 'dream' should be *bold and wide enough* to accommodate realistic priorities and specific development paths. The Vision should pinpoint possible paths for the *economic renewal and transformation* of the region. It may, for example, present the region as a new technology hub, based on the high density of technology-driven public and private actors; it may stress its potential as the central node in a cross-border area and emphasise its connectivity assets; it may make the link between exceptional natural assets and innovation potential; it may build on the skill sets of the population as the main driving force for future development, it may use flagship projects in cultural and creative industries to develop the innovative image of the region, etc.

Finally, the Vision should also include justifications for its relevance in terms of *meeting societal challenges*, such as providing more healthy living conditions for its citizens, reducing outmigration, providing new employment opportunities for specific categories of the population, combating social divide, etc. These justifications go much beyond the alleged classical benefits of innovation for job and economic value creation.

The elaboration of the overall vision for the future requires the identification of the *combined* place-specific features of a region. In order to help policy-makers and managing authorities to identify the dominant characteristics of their own administrative regions, it is possible to construct a three-dimensional box diagram, within which *individual administrative* regions can be positioned or situated (see *Figure 6*). The sides of the box reflect the three priorities of Europe 2020, and each side of the box provides the typology which most concisely captures the major features associated with each of the individual Europe 2020 challenges.²⁸

²⁸ The regional categories depicted by the sides of the box diagram here with regard to the smart growth, sustainable growth and inclusive growth dimension of Europe 2020, are exactly the same categories as those used in the

For the purposes of this guide, the classification scheme used here is intended to be indicative rather than definitive and schematic rather than exhaustive, and in particular cases other classification schemes may be more appropriate.

For the Europe 2020 *smart growth typology*, the most concise framework is provided by the OECD (2011) regional innovation typology in which regions are grouped into three broad types, namely *knowledge regions*, *industrial production zones*, and *non-Science & Technology-driven regions*, within which there are various sub-categories. These three broad categories reflect the major observed differences in terms of the relationships between knowledge, innovation and regional characteristics. EU regions can be classified into one of these broad *smart growth* groupings in terms of the role played by knowledge in fostering their local innovation processes.

For the Europe 2020 *sustainable growth typology*, the classification scheme which most concisely captures the different combinations of environmental and energy challenges is based on the relationship between the built environment and the natural environment. At its most fundamental level, this gives us four types of region, namely regions which in nature are primarily *rural* regions, *rural near urban* regions, *urban* regions, and *urban-coastal* regions.²⁹

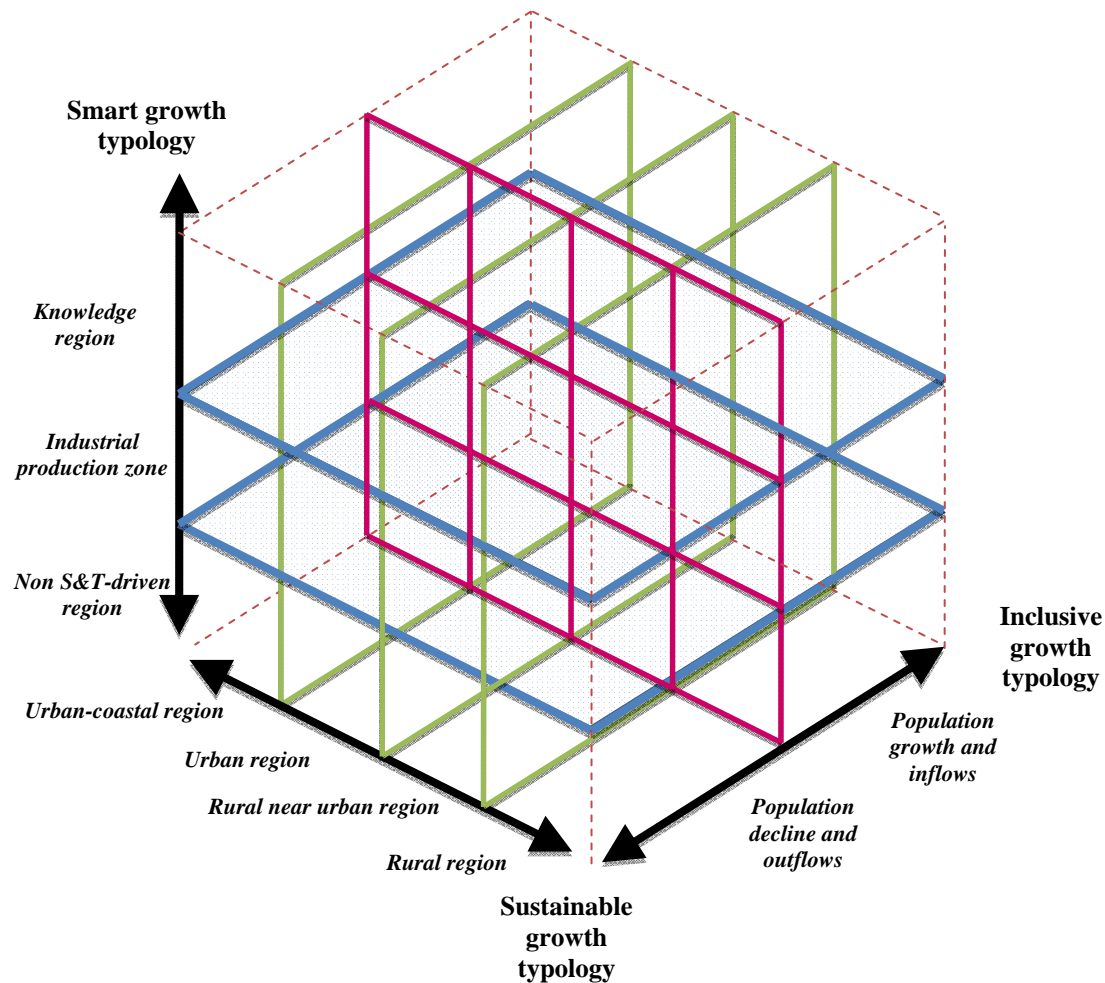
For the Europe 2020 *inclusive growth typology*, the classification scheme which most concisely captures the very different social inclusion issues faced by regions is that which is also adopted by the ESPON (2010) DEMIFER project. This has two broad types of region, namely regions facing *population decline and population outflows* and regions facing *population growth and population inflows*. Migration is a highly selective phenomenon and mobility is highly correlated with skills and income. Population outflow regions generally face a combination of more rapid population ageing and economic decline, which in turn have significant adverse impacts on both innovation and environmental issues.

In *Figure 6*, each individual axis represents one of the three Europe 2020 agenda dimensions. The combination of the *smart growth*, *sustainable growth* and *inclusive growth* typologies allows for twenty-four possible tripartite types of place characteristics, each of which is depicted by a different cell in the three-dimensional box of regions.

results/outcome indicators classification scheme on the use of results/outcome indicators within a reformed Cohesion Policy adopted by the international panel of experts advising the EU Commissioner for Regional Policy Johannes Hahn, Directorate General for Regional Policy.

²⁹ This sustainable growth classification scheme of primarily *urban*, primarily *rural near urban*, primarily *rural* and primarily *urban and coastal*, closely resembles the OECD (2011b) regional typology based on the dominant built environment and natural environment features, which uses three types of regions, namely *predominantly urban regions*, *predominantly intermediate regions*, and *predominantly rural regions*, respectively. The additional category of *urban and coastal* region has been used here, as it is very common in Europe.

Figure 6 - Europe 2020 dimensions: integrated regional typologies



Based on the analyses of regional features and innovation potential, broad scenarios are developed and proposed for discussion to a wide regional audience (including national representatives as well as foreign experts at relevant points). It is important at this stage to take a *realistic view of the region's position in an international perspective*. Past and present experience of OECD regions (OECD 2011³⁰) shows that, according to their type (knowledge hubs, industrial production zones, or non S&T-driven regions), regions will need to adopt different menus across three families of strategies (*Table 3*):

- Building on current advantages (science push/technology-led or a mix);
- Supporting socio-economic transformation (reconversion or identification of a new frontier); and
- Catching up: towards the creation of knowledge-based capabilities.

Another important dimension along which to discuss possible regional transformation scenarios is the degree of *connectivity* of the regional innovation system (*Table 4*). Methods to be used for

³⁰ OECD (2011), *Regions and Innovation Policy*. OECD Publishing, Paris.

preparation and discussion of scenarios belong to the menu of foresight methods. In practice, in many innovation strategies thematic or 'sector' working groups have been established to discuss scenarios based on analyses, and many lessons of good practice have been learned through these experiences (see Innovative Regions in Europe Network 2006).³¹

These groups were useful to discuss, validate and enrich the analyses underpinning the scenarios. They also brought in ideas for policy implementation and pilot projects, which are used to refine the scenarios. They bring in expertise in monitoring and evaluation indicators and practice, which is useful for the preparation of the policy mix and associated targets. Among the lessons learned were: the necessity for a clear mandate and timetable for delivery of results; the obvious need for strong leadership and good connection with decision-making circles; the key point on including private sector in the debates, which is often very difficult to achieve; the relevance of cross-group interactions (notably between groups focusing on clusters); and the benefit of including external expertise and benchmarking.

Table 3 - Innovation strategies for different types of region according to knowledge intensity of productive fabric

Type of region	Main strategy		
	Building on current advantages (science push/technology-led or a mix)	Supporting socio-economic transformation	Catching-up: Towards the creation of knowledge-based capabilities
Knowledge hubs			
Knowledge and technology hubs	●	◐	○
Knowledge-intensive city/capital districts	●	◐	○
Industrial production zones			
S&T intensive production regions	●	◐	○
Skill intensive regions	●	●	○
Medium-tech manufacturing and service providers	◐	●	○
Traditional manufacturing regions	○	◐	●
Non-S&T-driven regional systems			
Service-led and natural resource-based regions	◐	◐	●
Structural inertia or de-industrialising regions	◐	●	◐
Primary sector intensive regions	○	◐	●

Legend: ● main priority; ◐ strategic choice; ○ low priority.

Source: OECD 2011

³¹ Innovative Regions in Europe Network (2006), *RIS Methodological Guide, Stage 1*.

Table 4 - Innovation strategies for different types of regions according to internal and external connectivity

	Connecting globally	Sustaining momentum	Cluster building	Deepening pipelines
Types of regions	Peripheral regions lacking strong research strengths and international connections	Regions with strong local cluster organisations well-networked with policy actors	Small groupings of competitive businesses with limited local connectivity	Regions dependent on limited number of global production networks/ value chains
Key challenge	Building a global pipeline	Building up new regional hinges connected to regional firms — building critical mass	Improving local networking connecting more local actors to growing regional network	Extending connectivity and networks around hub
Main policy option	Helping regional actors take first steps in international cooperation	Bringing outside actors in, and helping to collectively shape future trends	Channelling innovation support to stimulate growth through regional clusters	Helping second-tier innovators become market leading and shaping
Example of regions	Madeira, Tallinn, Tartu, Attica, Sardinia	Ile-de-France, Baden-Württemberg, Flanders, Toronto	Skane, Navarra, Auckland, Nord-Pas-de-Calais	Piemonte, Eindhoven, Seattle, North East of England

Source: Regional Innovation Monitor,³² based on Benneworth and Dassen 2011³³

An element closely intertwined to formulating an effective vision is RIS3 communication. Good communication of the RIS3 is essential to ensure its endorsement by all stakeholders of the region, and beyond. Communication is needed *all along the process*, adapting the content to the stage reached (adoption of a vision, adoption of policy priorities, endorsement of an action plan, implementation of key projects, etc.. The implementation of RIS across Europe has delivered the following lessons regarding the crucial components of a communication strategy, which are also valid in the RIS3 context (Innovating Regions in Europe Network 2005)³⁴:

1. *Definition of goals*: the main goal should be to place the RIS project in a national and European context, to inform and create an attractive image for the identified target group of the project. But it can also pursue the goal of identifying and extending this target group by embarking stakeholders that are not yet part of the process. And it may serve the wider purpose of informing public opinion about the need to support the development of knowledge-based business in the region;

³² www.rim-europa.eu.

³³ Benneworth P. and Dassen A. (2011), *Strengthening global-regional connectivity in regional innovation strategies*. Report for the OECD.

³⁴ Innovative Regions in Europe Network (2005), *RIS Methodological Guide, Stage 0*.

2. *Identification of the stakeholder groups and their motivation:* different target groups have different needs and should be reached with different tools. Traditional SMEs, high-tech companies, universities, transfer institutions, business intermediaries, local and regional authorities, national bodies, the media, etc. have a different understanding and expectations of an RIS. The goal of the strategy should be to make sure that they all endorse and contribute to the strategy from their perspective. To this end, appropriate communication methods and expected results need to be spelled out for each target group;
3. *Definition of traditional communication tools:* the tools include the use of a logo which builds and reinforces the regional identity and puts innovation at its core; attractive and dynamic web pages, including parts in English for wider dissemination; newsletters and leaflets to complete the information with traditional communication tools; specific publications on certain aspects of the RIS (key analyses, peer review reports, etc.); conferences and seminars, including participation in international conferences, which give the opportunity to diffuse synthetic material on the RIS; and press and TV campaigns. The content of the communication should include strategic lines and priorities but also communication and demonstration on flagship projects;
4. *Definition of active communication tools:* active tools mainly include pro-active activities such as targeted visits to stakeholders or concerted workshops and seminars. Examples of active tools are: visiting the sites, marketing of the participants to the project; press conferences (various with different scenarios); round table discussions; meetings with local and regional politicians; etc. Conferences and seminars are frequently used: launch conferences ease the awareness and stimulate the participation of the actors in the exercise, but it is not easy to decide on the content of the message to be passed on. Conferences in the middle of the process stimulate the participation of regional actors in the construction of the strategy and validation of analyses. An end conference is necessary since all stakeholders in the region are supposed to adhere to the strategy and implement it in their own area.

Step 4 - Identification of priorities

Smart specialisation involves making smart choices. In fact, smart specialisation is all about facilitating that choice, selecting the right priorities and channelling resources towards those investments that have the potentially highest impact on the regional economy. The priority setting for national and/or regional research and innovation strategies for smart specialisation should consist of the identification of a limited number of innovation- and knowledge-based development priorities in line with existing or potential sectors for smart specialisation, on the basis of the elements and steps presented in this guide.

Priorities in RIS3 need to:

- Define concrete and achievable objectives. These objectives should be based on present and future competitive advantage and potential for excellence, as derived from the analysis of regional potential for innovation-driven differentiation;
- In addition to technological, sectoral or cross-sectoral priority areas, horizontal priorities need to be defined. These could involve the diffusion and/or application of Key Enabling Technologies (see Annex II), aspects related to social innovation, or the financing of the growth of newly established companies, which is often a bottleneck in many regions that have prioritised the creation of new technology-based firms but fail to see these firms grow and create jobs.

As has been explained in previous sections, the selection process needs to be based on quantitative as well as qualitative information on the different possible domains for a national/regional smart specialisation. The key criteria for filtering the range of possible priority areas down to only a few priorities are:

- the existence of key assets and capabilities (incl. specialised skills and labour pools) for each of the areas proposed and, if possible, an original combination of these (cross-sector; cross-cluster),
- the diversification potential of these sectors, cross-sectors or domains,
- critical mass and/or critical potential within each sector,
- the international position of the region as a local node in global value chains.

All this relevant information is to be examined by decision/policy-makers in order to select a few priorities focusing on the existing strengths of the economy but also on emerging opportunities. A good smart specialisation strategy will catalyse structural change and the emergence of critical clusters so that agglomeration externalities, economies of scale, economies of scope and local spillovers can be fully realised in the process of knowledge production and distribution.

A regional economy clearly provides the appropriate dimensional framework for such processes of decision, strategic implementation, agglomeration of resources and materialisation of spillovers. However, national economies might also be a good framework, particularly in the case of small countries.

But how to present the prioritised areas? If the areas are presented in a too generic way, such as eco-innovation, green energy, sustainable mobility or healthcare, most regions will fail to point out their unique competitive strengths. To be credible, effective and suitable for a concrete action plan (see next step), the priorities need to be expressed more precisely, such as ICT-based innovation for active ageing, innovative solutions to reduce city congestion, wood-based solutions for eco-construction, etc.

Prioritisation always entails risks for those who have to select those few domains that, as a result, will get privileged access to public funding. Common approaches followed in the past, which should not be repeated, were:

- spreading the money across the most powerful lobbies with the frequent outcome that there were too many priorities aimed at preserving the status quo rather than looking at future opportunities; or
- imitating other regions. In that case, if the choice proved to be a mistake, at least this was a mistake others have made as well. At the end of the day regions contributed to producing a system with too many small sites doing the same things and where agglomeration externalities were dissipated.

These approaches failed to take into account the essential knowledge in this matter, which is entrepreneurial knowledge. Research and innovation strategies for Smart Specialisation should address the difficult problem of prioritisation and resource allocation based on the involvement of all stakeholders in a process of entrepreneurial discovery, which should secure a regionally- and business-driven, inclusive and open prioritisation process.

There are different methodologies for organising such processes, e.g. surveys, seminars with participatory leadership methods, crowdsourcing, etc.

Such an open, participatory process, together with reliance on robust evidence based on regional assets, are the best guarantees to avoid both the risk of capture by interest groups and the risk of lock-in into traditional activities. Once the priorities are adopted it is important that the strategy is validated and endorsed by a broad regional constituency (in the form of a representative Council or Forum, or through top-level events).

Step 5 - Definition of coherent policy mix, roadmaps and action plan

Experience with Regional Innovation Strategies throughout Europe has shown that it is good practice to combine the adoption of strategies with an agreement on an *Action Plan* and even the simultaneous launch of *pilot projects* (IRE 2007).³⁵ Analytical and Strategic phases tend to remain invisible to many field actors. Strategies that stop before this step run the risk of remaining unimplemented and/or not credible. Pilot projects, once their success is proven, can be used as flagships of the RIS3, to demonstrate that they go beyond rhetoric and involve concrete action.

As priority areas for the region's transformation are defined in the previous step, a coherent multi-annual Action Plan should be elaborated by the RIS3 management bodies, including:

- Definition of the broad action lines corresponding to the prioritised areas and the challenges faced within these areas;
- Definition of delivery mechanisms and projects;
- Definition of the target groups;
- Definition of the actors involved and their responsibilities;
- Definition of measurable targets to assess both results and impacts of the actions;
- Definition of timeframes;
- Identification of the funding sources, targeted to the several groups and projects (developing and completing *Figure 5*).

This planning process involves both the incorporation of existing programmes and instruments, *on the basis of evidence on their effectiveness and relevance for the prioritised areas*, and inclusion of new instruments, justified according to their contribution to the overall strategy goals. There is a wide menu to choose from in order to compose a balanced and appropriate policy mix. It is useful to use taxonomies, such as those presented in *Table 5* and *Table 6*, to determine whether these instruments are likely to address, collectively, the strategic goals of the RIS3.

Table 5, Table 6, Table 7, Table 8 and *Table 9* present examples of strategies and associated mixes of action lines and instruments, according to regional types and to the institutional power of the region: this latter element underlines the necessity to embed national-level policies into the policy mix, seen from a regional perspective. Each action line and instrument needs to be accompanied by measurable indicators reflecting results achieved, according to the mission and objective, but also impacts reached, assessed through evaluations.

³⁵ Innovative Regions in Europe Network (2007), *RIS Methodological Guide, Stage 2*.

Table 5 - Regional innovation delivery instruments: a taxonomy

	Knowledge generation	Knowledge diffusion	Knowledge exploitation
Traditional instruments	Technology funds, R&D incentives/supports/grants Support to scientific research and technology centres Support to infrastructure development Human capital for S&T	Science Parks Technology Transfer Offices and schemes Technology brokers Mobility schemes, talent attraction schemes Innovation awards	Incubators Start-ups support innovation services (business support and coaching) Training and awareness-raising for innovation
Emerging instruments	Public private partnerships for innovation Research networks/poles	Innovation voucher Certifications/accreditations	Industrial PhDs Support to creativity Innovation benchmarking
	Competitiveness poles Competence centres New generation of scientific and technological parks and clusters Venture and seed capital Guarantee schemes for financing for innovation		
Experimental instruments	Cross-border research centres	Open source-Open science Markets for knowledge	Regional industrial policy; Innovation-oriented public procurement

Source: OECD 2011

Table 6 - Innovation delivery instruments targeting SMEs

Target of support	Form and focus of innovation support services for SMEs	
	Reactive tools providing input for innovation	Proactive tools focusing on learning to innovate
Global connections	Excellence poles Cross-border technology centres Funding for international R&D or innovation projects	International technology transfer schemes Mobility schemes Support for global networking of firms Cross-border innovation vouchers Lead market initiatives
Regional system	Collective technology or innovation centres	Cluster policies Proactive brokers, match-makers Innovation vouchers Support for regional networking of firms Schemes acting on the culture of innovation
Individual firms	Incubators with 'hard' support Traditional 'reactive' technology centres Seed and venture capital funds R&D subsidies or tax incentives	Management advice Incubators with 'soft' support 'Proactive' technology centres Audits, monitoring of needs Innovation coach/ innovation management training Techno-economic intelligence schemes

Source: OECD 2011, expanding from Asheim *et al.* (2003)³⁶ and Technopolis (2011)³⁷

³⁶ Asheim B., Isaksen A., Nauwelaers C. and Tödtling F. (2003), *Regional innovation policy for small-medium enterprises*, Edward Elgar, Cheltenham, UK and Lyme, US.

³⁷ Technopolis (2011), *Review of innovation promotion instruments at regional level*, unpublished report for OECD.

Table 7 - 'Building on current advantages': examples of regional strategies and associated policy mixes

Type of OECD region by economic profile	Degree of regional STI policy competences		
	High	Medium	Low
Knowledge and technology hubs Leading regions in science and technology	Strategy: reinforcing excellence in knowledge creation and developing new high-tech industries		
	<ul style="list-style-type: none"> • Co-funding of universities: institutional and competitive • Funding research and technology centres • Public-private partnerships for innovation • Targeted research funds, for private and public actors, and for co-operative projects • Participation in national and international competitive research programmes • Research spin-off promotion schemes (e.g. regional seed and venture capital funds) • Regional high-tech clusters, S&T Parks, incubators • Global talent attraction in targeted new sectors • Strategic intelligence exercises (regional foresight) 	<ul style="list-style-type: none"> • Complement national investments in research infrastructure • Participation in national competitiveness poles/centres programmes (co-funding) • Public-private partnerships to develop high-tech products • S&T parks, incubators • Entrepreneurship stimulation packages • Global talent attraction in targeted new sectors • Promotion of participation of public and private actors in international technology networks 	<ul style="list-style-type: none"> • Lobby national government for public investments in large S&T infrastructure linked to regional advantages • Participation in national competitiveness poles/centres programmes (limited regional funding) • Attracting FDI of knowledge-intensive companies and MNCs (infrastructure, labour force) • S&T parks and incubators • Promoting national talent attraction schemes • Knowledge vouchers • Platforms to define development visions for high tech niches
S&T-intensive production regions Industrial production regions including second-tier hubs in knowledge-intensive countries	Strategy: strengthening synergy between S&T developments and production activities		
	<ul style="list-style-type: none"> • Investments in scientific or technology niches, complementary to national science hubs • Technology transfer instruments (university technology transfer offices, technology brokers at research centres) • Talent attraction (from country and abroad), research grants for young graduates • Cluster policies, linked to S&T infrastructure investments • Competence centres and competitiveness poles relevant for regional industry • Entrepreneurship and spin-off support (business plans competitions, regional venture capital funds) 	<ul style="list-style-type: none"> • Incentives for regionally-relevant public research • Entrepreneurship support (networks of individuals, training courses, brokerage with business angels, specialised seed capital funds, etc.) • Infrastructure for business creation (incubators) and S&T parks • Support for firms to hire qualified graduates 	<ul style="list-style-type: none"> • Support to regional actors in international public-private knowledge partnerships • Support to internationalisation of business clusters • Promotion of innovation in services • Technology parks and incubators • Innovation vouchers in selected specialisations • Place-branding activities

Source: OECD 2011

Table 8 - 'Supporting socio-economic transformation': examples of regional strategies and associated policy mixes

Type of OECD region by economic profile	Degree of regional STI policy competences		
	High	Medium	Low
<p>Medium-tech manufacturing and service providers</p> <p>Industrial production regions with relatively high knowledge absorptive capacities</p>	Strategy: modernising productive activities towards value-added niches: 'Innovation ecosystem strategy'		
	<ul style="list-style-type: none"> Supporting science-industry linkages (personnel exchange and placement schemes, technology advisory services, technology diffusion) Regional agencies for innovation promotion, combining technology transfer with other services Promote innovation start-ups (business angel networks, mentoring schemes, regional seed and venture capital funds) Densification and internationalisation of regional production clusters Regional public procurement oriented towards innovation 	<ul style="list-style-type: none"> Technology platforms (linking technical schools and SMEs) Technology transfer centres in relevant sectors, co-funded by national government Regional advisory network, networks fostering synergies and complementarity between national agencies in the region and regional agencies Innovation vouchers for SMEs Support for young graduate recruitment in firms 	<ul style="list-style-type: none"> Concentration of regional action on non-traded sectors Support innovation in service or cultural industries Small-scale cluster support with an orientation towards connection to global networks Innovation vouchers, targeting 'innovation beginners'
<p>Structural inertia or de-industrialising regions</p> <p>Non-S&T-driven regions with persistent development traps</p>	Strategy: stimulating knowledge absorption and entrepreneurial dynamism		
	<ul style="list-style-type: none"> Local knowledge centres, branches of national knowledge hubs (focus on diffusion) Education and training activities in firms Supporting connection to international production networks Regional fora to identify growth prospects in value-added niches Innovation and entrepreneurship culture promotion 	<ul style="list-style-type: none"> Supply-chain management initiatives to reduce fragmentation Innovation-oriented public procurement Redefinition of programmes for regional technical schools Innovation awareness-raising, entrepreneurship promotion events 	<ul style="list-style-type: none"> Develop latent demand for innovation (innovation vouchers, placement of students in SMEs) Orient polytechnics centres to new qualifications Training for low-skilled and unemployed people Support to clusters with innovation potential Supporting inclusion of regions into international production networks

Source: OECD 2011

Table 9 - 'Catching up': examples of regional strategies and associated policy mixes

Type of OECD region by economic profile	Region institutional power		
	High	Medium	Low
Primary sector intensive regions Rural areas in lagging countries, specialised in primary sector activities	Strategy: upgrading and retaining human capital, creating critical masses and increasing quality of connectivity		
	<ul style="list-style-type: none"> • Regional agencies for business development • Training and lifelong learning courses (public offer, incentives for firms), students exchange programmes and talent attraction schemes • Regional incentives for skills upgrading programmes in companies • Incentives for hiring qualified personnel in companies • Creation of knowledge centres in traditional fields (agriculture, tourism...), branches of national research organisations • Innovation support programmes for incremental innovations (innovation intermediary, business development support) • Linkages of business support organisations (chambers of commerce, etc.) to wider networks • Financing experimental innovative projects in traditional sectors • Connection of regional actors in national and international production networks 		<ul style="list-style-type: none"> • Innovation support programmes (innovation intermediary, business development support (branch of national agencies), connection with trade and export agencies • Attracting national investments in vocational and tertiary education • Promoting national training, lifelong learning schemes for companies and individuals • Engaging regional stakeholders in external production networks • Securing national infrastructure investments to enhance connectivity

Source: OECD 2011

Developing a RIS3 involves a degree of risk-taking, since there is always some uncertainty in the choice of priorities, both in the events that can change the region's growth trajectory and the best way to implement actions in support of regional smart specialisation. Hence *experimentation* is justified, and even recommended, for testing new approaches or obtaining more information and certainty on the prospects of the priorities selected for the RIS3.

This can take the form of *pilot projects* to be launched during the RIS3 design process. These pilot projects should be selected according to two main criteria: their relevance with respect to the RIS3 priorities, and their expected impacts in the short- or medium-term (projects with longer-term impacts are valuable but would not feed the demonstration purpose of pilot projects).

Pilot projects serve the following functions:

- Feed the strategy with new information on regional innovation potential (they participate in the 'entrepreneurial discovery process');
- Provide a signal to underline the fact that the strategy is going to be concretely implemented rather than remaining a concept, contributing to the communication of the RIS3 as a whole;
- Test new or unconventional policy support approaches on a small scale before possible extension, limiting risk.

Even more than for conventional projects and actions, pilot projects need to be monitored and evaluated, in order to found the decision to continue or discontinue the projects on reliable evidence. Exit strategies and intermediary milestones involving go/no-go decisions need to be built into the pilot projects.

If such learning mechanisms are properly introduced in pilot projects, they can provide a model for *performance-based funding mechanisms*, which are notoriously difficult to impose on existing programmes or actions maintained over time without such a provision.

Step 6 - Integration of monitoring and evaluation mechanisms

Monitoring and evaluation

Establishing monitoring indicators and planning evaluations are important elements of the RIS3 design process both at the level of strategy and the different components of the Action Plan.

Smart Specialisation Strategies build on different components aiming at one or a few overall objectives. The monitoring system of these strategies may encompass 3 types of indicators:

- Context indicators scoring the region against the average score of its Member State or other similar regions. These indicators are usually attached to the overall objectives of the strategy
- Result indicators selected for each component of the strategy contributing to the overall strategic goals, e.g. important actions funded by the Structural Funds. These indicators allow verifying whether these actions are successful or not, i.e. whether they lead to the expected change for which purpose they were designed.
- Output indicators measuring the progress of the actions undertaken in order to achieve the expected results.

Monitoring differs from evaluation in two main respects. Monitoring aims to verify that activities are planned, funds are correctly used and spent on delivering planned outputs and that result indicators evolve in the desired direction. Evaluation, however, aims to assess effects of the actions undertaken (i.e. their contribution to the observed changes as measured by the result indicators) and to understand why and how the effects are being achieved. It should also take account of unintended results and analyse the mechanisms leading to the results.

Monitoring is normally carried out by actors responsible for implementation, while evaluation should be carried out by independent experts, guided closely by those responsible for the policy. Monitoring and evaluation complement each other. Monitoring provides part of the empirical basis for evaluation, while evaluation may raise the need for improved monitoring indicators (to capture new elements, e.g. the depth of partnerships involved in collective actions).

Both monitoring and evaluation need to be anchored in a clear intervention logic: the strategy and each of its component should clearly articulate what is the intended change, and how the expected outputs will lead to the intended results. A frequent problem in evaluation occurs when strategies and programmes have been established without a clear statement on intended results and the underlying intervention logic.

Targets for result indicators (both in terms of short-term or medium/long-term results) need to be incorporated into each action and the strategy as a whole *from the very beginning*. These targets can be qualitative or quantitative but they must be clear. As they measure a change, these indicators should also have a baseline (the situation before the start of the action). Reflecting on

baselines and how the action will change their value is an important element to define a sound intervention logic.

There is no single standardised approach for developing a monitoring and evaluation system for a RIS3, since it needs to be tailored to a specific region. In general, result indicators for a RIS3 should measure a *change or an evolution* of the regional productive structure towards activities that (a) are globally competitive and (b) have a greater potential for value added. When results are long-term, the programmer may use intermediate result indicators to measure the progress towards the objective. For example, a programme supporting research activities may use the number of patents as an intermediate indicator, while the programme objective is, for example, to increase the production of innovative products.

These indicators should be linked to the programme activities. The sources for their baseline and achievement value could be the monitoring system, official data bases, ad hoc surveys, peer reviews, and more rarely, regional or national statistics. If the programmers use the latter, they should be aware that these statistics also cover non-beneficiaries and are influenced by factors other than the programme. Similarly, the value of result indicators may be influenced by other factors such as an evolution in the economic context, especially where the indicator is not sufficiently close to the policy. In all case, an impact evaluation should be planned to assess the actual contribution of the supported action to the change in the statistics or the indicator value.

Outputs and results should be identified and evaluated according to programme objectives. According to intervention logic, the results may be short-term and medium/long-term (see *Table 10* below).

Table 10 - Examples of programme objectives, outputs and expected results and possible related indicators³⁸

Objectives	Expected results		
Programme aims	Outputs	Short-term results	Medium/long-term results
Increase awareness of a set of new technologies	Awareness campaign, visits to fairs, advisory services	Adoption of technologies	Improved business performance; continuing awareness and adoption of related technologies
Improve the skill basis of a set of industries	Training sessions, staff exchanges	Improved technical competencies of staff, increase effectiveness of in-house R&D	Improved innovation performance, increased technological absorptive capacity
Increase science-industry links	Student placements, academic-industry cooperation projects or networks	Improved skill, technical competence and knowledge base, change of behaviours, increase in prototypes	New products and services based on innovation, increased quality of production
Increase of research activity in a region	Research subsidies to enterprises or universities/research centres	Increase in research expenditure in firms, increase in patents or publications	Improved innovation performance, enhanced reputation
Stimulate the start-up of new technology-based companies	Finance and information for future entrepreneurs, incubation	Creation of new high-tech companies	Long-term growth and sustained development of new high-tech industrial sectors
Possible indicators (1)	Number of visits, placements, projects, incubated start-ups, and amount of funding for future entrepreneurs etc.	Number of new enterprises created in the region, number of enterprises having adopted a new technology, number of staff reporting new working behaviours, etc.	Increase rate of productivity in regional SMEs Increased share of turnover based on innovation, increased export share, new products on the market, growth of employment in knowledge-intensive sectors, R&D expenditure per worker, etc.

(1) Indicators should be selected to reflect the programme's objectives and intervention logic.

³⁸ For further guidance, please look at Inforegio website:

- Monitoring and evaluation of European Cohesion policy – ERDF and Cohesion fund, Concepts and recommendations, Guidance document.

- Evaluation of Innovation Activities: Guidance on methods and practices

http://ec.europa.eu/regional_policy/information/evaluations/index_en.cfm#2

Peer review of RIS3

Many EU regions have been developing and implementing innovation strategies over recent decades. These regions should be able to revise their strategies and include useful elements suggested by the concept of smart specialisation. Other EU regions have only very short expertise (if any) in developing their regional innovation strategies and will need to draft their own RIS3 from scratch.

The following questions cover the main features that these strategies should contain (see Annex III for further information):

1. Is the strategy based on an appropriate stakeholder involvement? How does it support the entrepreneurial discovery process of testing possible new areas?
2. Is the strategy evidence-based? How have areas of strength and future activity been identified?
3. Does the strategy set innovation and knowledge-based development priorities? How have potential areas of future activity been identified? How does it support the upgrading of existing activities?
4. Does the strategy identify appropriate actions? How good is the policy mix?
5. Is the strategy outward-looking and how does it promote critical mass/potential?
6. Does the strategy produce synergies between different policies and funding sources? How does it align/leverage EU/national/regional policies to support upgrading in the identified areas of current and potential future strength?
7. Does the strategy set achievable goals, measure progress? How does it support a process of policy learning and adaptation?

Formulating and implementing a national/regional research and innovation strategy for smart specialisation is a *continuous* process. As the economic circumstances are quickly evolving within and outside the region, there is a need to regularly adapt and update the RIS3. This element closes the policy design cycle: through the use of information and insights gathered during the implementation of the strategy, pilot projects and others, learning activities (inside and outside the region), new events that have occurred after formal adoption of the RIS3 and by incorporating this into a new version of the RIS3. The challenge associated with this step is to ensure sufficient stability to the prioritisation process, while allowing for this adaptability.

***Box 6 - Distinctive features of smart specialisation for (peer) review
and update of the RIS3***

Being place-based

The concept of smart specialisation emphasises the need to develop and implement innovation strategies that take into proper account regional features, such as economic structure, existing areas of excellence, clusters, traditions, R&D competences, presence of research institutions, extension of the inter-regional and inter-national network of scientific and technical collaborations. For this reason, the major aspects related to the current and projected structure of the regional economy should be investigated in the preliminary, self-assessment phase and receive sufficient attention thereafter. Additional elements of interest with a view to a RIS3 are distribution by size and the innovativeness of firms in the regional economy, such as the proportion of small, innovative firms or large, R&D-intensive companies. Attention should be devoted also to the width and strength of the industrial base, uncovering specific risk factors, such as the existence of a number of industries in need of modernisation or the dependence of the regional economy on a limited number of industries.

Achieving critical mass

Smart specialisation involves making choices, leading to priority setting and channelling resources towards investments with a potentially higher impact on the regional economy. The distinctive elements that can guide review, monitoring and assessment for RIS3 should thus include the existence of clearly identified priorities for regional innovation policy. The EU dimensions should also be incorporated in a RIS3 from its very origins. When setting regional priorities, priorities at EU level should have been taken into account. Those policies and funding instruments that are targeted to a specific topic, should mainly aim at one of the societal challenges (climate change, population ageing...)

Putting in place an entrepreneurial process of discovery

The existence of an entrepreneurial process of discovery of new specialisation domains is a central tenet of the concept of smart specialisation. Nevertheless, its translation to practical use proves quite difficult, because of the lack of easily observable characteristics and indicators associated with it. For the purposes of peer review and monitoring, one should take into account that a regional innovation strategy may encompass several forms of innovation (including non-technological innovation, service innovation, and social innovation). Particular attention should hence be devoted to the regular exploration and consideration of emerging opportunities. If such a process of discovery is found missing or wanting, the factors that could lead to its establishment should be identified. Finally, the existence of policies and instruments to favour the diffusion of the output of innovation can also contribute to the creation of a lively and entrepreneurial innovation system.

Being outward-oriented

The outward-orientation of a process is not just reflected in the international nature of the peer review process. It is also about constantly comparing the position of a region with actual and potential competitors in the country, in other EU countries and even beyond. This broader perspective must be incorporated in the peer review, monitoring and assessment of a RIS3 and its results. This means, for instance, verifying that market opportunities and the comparative advantage of the region with respect to other EU and non-EU regions have been and are regularly assessed. It should also be ascertained whether sufficient efforts have been made to avoid replication, and to enhance synergies with projects under way in other EU regions. Support schemes should be subjected to international comparison and benchmarking. Finally, the existence of relevant constraints to the free circulation of knowledge and related elements should be inspected: international R&D&i partnerships should be able to operate without administrative obstacles, and the cross-border mobility of research and innovation personnel should be facilitated.

Being future-oriented

The future-orientation of a process does not involve trying to make a bet on the next 'hot' technology. It is instead about incorporating in the strategy the fact that what seems fixed and well-established in the short term might evolve quickly, sometimes in unexpected directions. This implies considering scenarios for the possible evolution of the regional competitive position with respect to other regions in the country, in other EU countries and even beyond. This long-term perspective must be incorporated in the peer review, monitoring and assessment of a RIS3 and its results. This implies, for instance, verifying that the vulnerability and capacity of adaptation of the regional innovation system have been and are regularly assessed. Mechanisms should be in place to detect activities facing increasing competition and to devote special attention to these, by evaluating possibilities for the 'upgrading' and 're-tooling' of existing sectors. Finally, the existence of relevant constraints to the redeployment of physical, human and intellectual capital should be inspected: the mobility of resources from declining lines of business, firms and sectors to expanding ones should be facilitated.

ANNEX II: DELIVERY INSTRUMENTS AND HORIZONTAL APPROACHES

As developed in the previous sections of this guide, the RIS3 concept relies on policy and economic rationale. The implementation of the concept requires a set of delivery instruments (described in Step 5) and horizontal approaches. These are introduced here based on a typology which tries to group typical projects that are financed or are to be financed by the ERDF and other Structural Funds. These cover a wide range of fields of action, such as:

- Clusters,
- Innovation friendly business environments for SMEs,
- Research infrastructures, centres of competence and science parks,
- Universities-enterprise cooperation,
- Digital agenda,
- Key enabling technologies,
- Cultural and creative industries,
- Internationalisation,
- Financial engineering instruments,
- Innovative public procurement,
- Green growth,
- Social innovation.

This is not new to EU policies. Indeed, for many years, the European Commission has developed schemes, regulations, analyses and funded initiatives in all of the topics listed above.

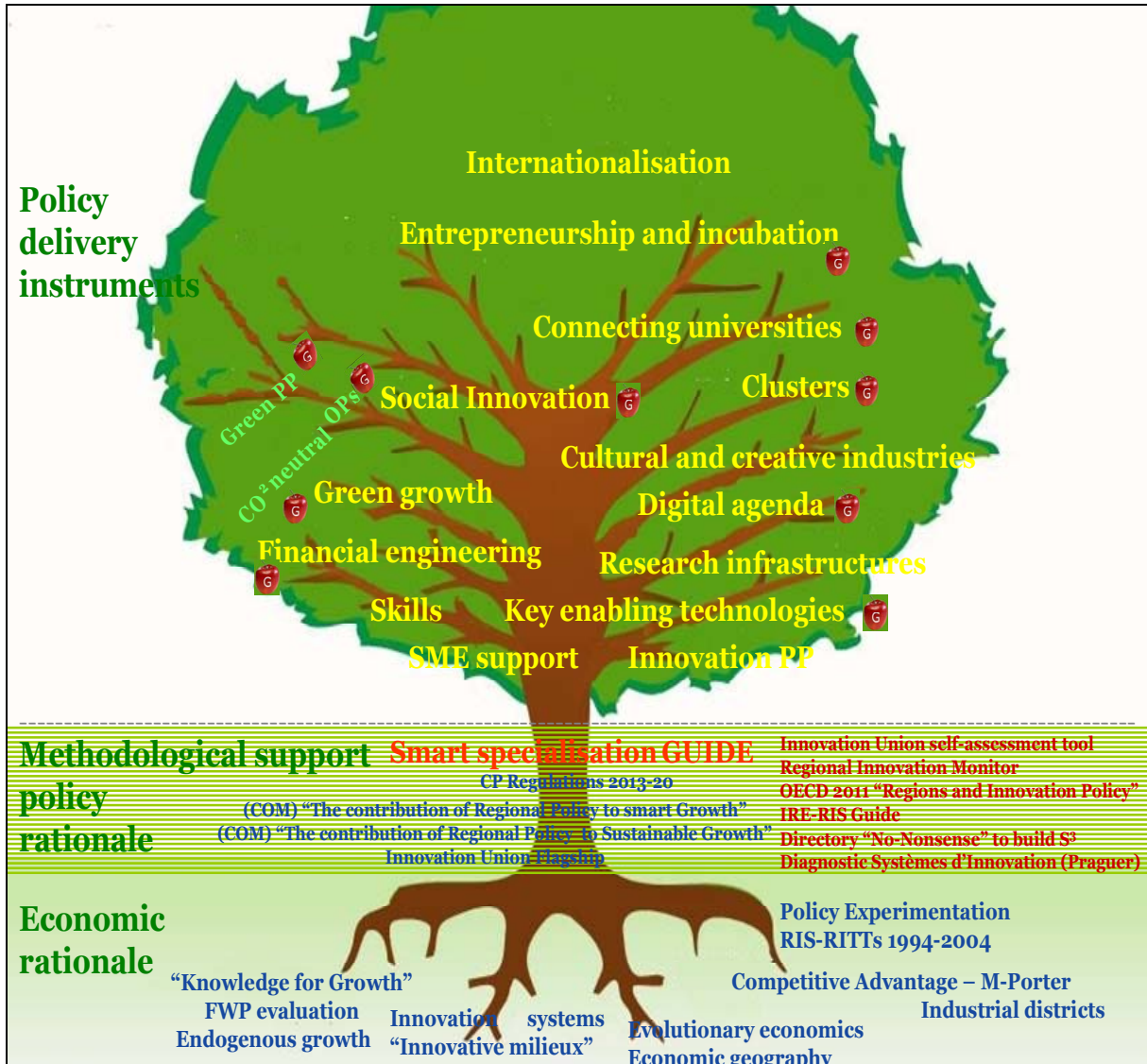
In order to help regional stakeholders to capture the critical lessons and knowledge about those delivery instruments, a summary of EU staff experience in managing them is given here in a standardised form, i.e. why the instrument is perceived as important for economic growth, what are the challenges and barriers, how the next programming period will still support them and where to obtain more detailed information about each one.

The following sheets are to be considered as the 'branches' of the smart specialisation 'tree', whose 'trunk' is represented by this guide. The 'trunk' feeds and nurtures the 'branches' but the latter form self-standing elements of the whole policy array of tools made available to policy-makers, who can ultimately combine them following their strategic vision and building up their own policy mix for responding to their needs and expectations. The roots are the several economic schools that provide the economic and policy rationale to this concept.

These branches are to be supported by a 'family' of guides on each topic that are available or being developed and are enumerated in each sheet.

Figure 7 gives a synthetic overview of the interactions between the 'trunk' and the 'branches' across smart specialisation-related policy, conceptual and methodological issues, as presented in the introduction.

Figure 7 - The 'trunk and branches' structure



Clusters and smart specialisation

Why should clusters be part of smart specialisation?

Due to their inherent capacity to support cooperation between different innovation actors in a region, clusters are powerful instruments for fostering industrial competitiveness, innovation and regional growth. Currently, they are used by policy makers worldwide as building blocks for implementing different policies such as research & innovation, industrial and regional policies.

Smart specialisation requires that regional governments have a clear vision and are committed, and at the same time, have people who will take up and realise such strategies on the ground. Clusters offer a huge potential for implementing smart specialisation strategies by providing and mobilising the necessary resources for that purpose. Their knowledge, networks and dynamism are the right ingredients available at local level, allowing regions to create more value, reaching higher levels of excellence and thriving in the global economy.

Clusters can be used at both the design and implementation phase of smart specialisation strategies. In the design phase, they can be used to identify the industrial strengths and assets in a region, contribute to set strategic priorities and make the right political decisions. For this purpose, cluster mapping and benchmarking are valuable tools that can be used to identify regional specialisation patterns and compare economic activities, including agriculture, and strengths with other regions in the EU.

In the implementation phase, clusters can be used as efficient platforms that can focus on and quickly contribute to smart specialisation's objectives. In particular, by fostering cross-sectoral cooperation, clusters can contribute to implementing thematic-based strategies addressing new society challenges, and creating new competitive advantages in a region.

Barriers and challenges

The use of clusters for smart specialisation may imply important political decisions regarding the development of new cluster initiatives or the use of existing ones. New cluster initiatives can be launched, provided that they are crucial for implementing the regional governments' visions and that will therefore be strongly supported in the future. Otherwise, new cluster initiatives should be avoided. Fragmentation and proliferation of cluster initiatives often leads to dispersion of forces and financial resources as well as to less cooperation and fewer synergies between them.

Policy makers can streamline existing cluster initiatives towards the goals and objectives of smart specialisation. In parallel, linkages between different initiatives should be strengthened to enable clusters to become less vulnerable to future market changes and be better prepared to shape new markets. The support of such cross-linkages often requires a new mindset and courageous political decisions which may not be an easy task in some regions.

Identification of regional strengths is not a trivial task and requires reliable historical statistical data and in-depth analysis. Cluster mapping and benchmarking activities are powerful tools for

starting the assessment of regional specialisation patterns and comparing statistical findings among regions. The European Cluster Observatory³⁹ can be useful for identifying regional competences and providing benchmarking possibilities across the EU. It should be stressed that statistical data at the same level of granularity are not always available across the EU and, therefore, additional efforts should be made by some regions to complement existing data sets by more detailed quantitative and qualitative information.

Furthermore, smart specialisation strategies should look at optimal cluster-specific framework conditions such as access to research and testing facilities, educational and skills development issues, cooperation with local incubators and efficient cluster management, which, all together, will allow clusters fully exploit their potential in the context of smart specialisation.

How to act?

The following list of actions describes a 3x3 approach on how to use clusters for designing and implementing smart specialisation strategies. Although not exhaustive, it represents a starting point and can be completed and customised according to the specificities, experience, and priorities of each region.

Using cluster mapping to identify regional competences and assets:

- Identify specialisation patterns in the region through cluster mapping analysis, in particular, by using the European Cluster Observatory tool⁴⁰;
- Perform benchmarking activities to better understand the position of the region in a particular sector in comparison to other EU regions. The European Cluster Observatory tool offers such benchmarking opportunities;
- Collect, if necessary, more detailed statistical data and perform qualitative-based surveys to better understand the dynamics of regional clusters to be used for implementing smart specialisation strategies.
-

Support clusters to meet the objectives of smart specialisation:

- Launch, if necessary, new cluster initiatives or strengthen existing ones, and ensure appropriate budgetary provisions by streamlining regional, national and EU funding support including the European Regional Development Fund, Research and Innovation funds (FP7, and the future Horizon 2020), the Rural Development fund (EAFRD) and funding possibilities provided under the Knowledge Innovation Communities of the European Institute of Innovation and Technology;
- Support existing clusters to work more closely with research infrastructures, incubators⁴¹ and science parks and other knowledge institutions as well as integrate large scale

³⁹ www.clusterobservatory.eu

⁴⁰ The European Cluster Observatory provides a unique cluster mapping and benchmarking methodology that is currently applied to more than 35 manufacturing and service sectors in 32 EU and EU-associated countries:

⁴¹ The Smart Guide to Innovation-Based Incubators, publishes in 2010, provides guidance on this issue and is available at the website of the Platform

demonstrators for promoting Key Enabling Technologies and better involving user communities;

- Promote cluster management excellence by using the European Cluster Excellence initiative⁴² to develop competent clusters that are able to sustain regional growth in the long run.

Strengthen local and international cluster cooperation, in particular for addressing emerging industries:

- Streamline funding resources to support joint projects between clusters working in different industries with a view to creating new competitive advantages under the smart specialisation strategy;
- Identify and create optimal cluster-specific conditions to facilitate the emergence of new industries through clusters in the context of the smart specialisation strategy;
- Promote internationalisation, including trans-national cooperation, in particular by making use of the European Cluster Collaboration Platform.⁴³

⁴² The European Cluster Excellence initiative aims at promoting cluster management excellence through training and benchmarking activities: to <http://www.cluster-excellence.eu/>

⁴³ The European Cluster Collaboration Platform aims at promoting cluster cooperation within the EU and abroad on the basis of a number of business agreements signed with international partner organisations in Japan, India, Brazil and South Korea: www.clustercollaboration.eu.

Innovation friendly business environments for SMEs

Why should an innovation-friendly business environment be part of smart specialisation?

SMEs are at the centre of the creation of jobs and growth at regional level. Furthermore, SMEs are key players in introducing new products/services into the market place and offering innovative solutions to the grand challenges. Entrepreneurship is necessary to make sure that innovation ideas are turned into sustained growth and quality jobs.

Therefore, it is important to provide, at regional level, the right mix of financial and non-financial support to assist entrepreneurs to create new firms and existing enterprises to innovate and develop. The support should aim to increase the innovation capacity of SMEs, enabling them to develop, access and absorb new knowledge and thereby grow and compete on increasingly global markets.

Regional policy makers also have to understand the different forms of innovation such as non-technology services, cross-sector technology integration, system and business model innovation, which are today as important as the technology breakthrough innovation for SMEs. It is relevant for the regional authorities to adapt their offer of support services to the demand of the different types of enterprises: manufacturing, service-oriented, high-tech or social. In this context, analysis and benchmarking of regional policies can be an important starting point towards the development of regional strategies.⁴⁴

SMEs, and especially micro-enterprises, are heavily dependent on their regional environment where proximity plays a key role for innovation, in particular regarding the spread and absorption of tacit knowledge. SMEs need policy support in tapping into the necessary outside resources, principally access to knowledge in the form of advice through innovation support services and tailored counselling, technology or qualified human capital, to face up to the new forms of competition that are developing in the global economy. SMEs are thus at the core of Cohesion Policy.

For the period 2007-2013, the Community Strategic Guidelines on Cohesion emphasise the key role of SMEs, notably when it comes to increasing and improving their investment in R&D, facilitating innovation and promoting entrepreneurship. Cohesion Policy in fact provides the largest financial Community support to SMEs through financial engineering instruments such as JEREMIE.⁴⁵ For the period 2014-2020, the Commission has proposed an even stronger focus on enhancing the competitiveness of SMEs in the context of Cohesion Policy.

Moreover, the Cohesion Policy support often provides the initial platform for an increased number of SMEs to access the FP7 or the CIP, and will indeed continue to do so for the forthcoming successors of these programmes.

⁴⁴ See for example the Regional Innovation Monitor initiative at: <http://www.rim-europa.eu/>

⁴⁵ http://www.eif.org/what_we_do/jeremie/index.htm

Barriers and challenges

Most SMEs face problems such as accessing finance, covering the whole life cycle from idea to market, finding their first clients, either in national or international markets, and accessing risk capital.

All these barriers can be overcome if regional authorities are able to provide an integrated approach to addressing the needs of SMEs, covering all phases of enterprise creation and development, and a link to European activities that support SMEs in setting up or joining cross-border knowledge networks and collaborations and in realising European research and innovation projects.

The EU provides finance for small firms in different forms: grants, loans, and in some cases, guarantees. In addition, the EU funds specific projects. The European Small Business Portal provides information on possible funding opportunities for SMEs.⁴⁶

How to act?

Member States have committed to implement the Small Business Act for Europe (SBA) which is a framework for building a more friendly business environment in Europe. Regional authorities should focus on the content of the SBA and ensure its implementation at regional level as well. The SBA is based on ten principles aiming at tackling the obstacles that hamper the potential of SMEs to grow and create jobs.

Besides this, EU policies and instruments are providing support for:

- supporting entrepreneurship spirit and enterprise creation and development;
- enhancing innovation support for existing SMEs;
- building capacities in innovation agencies and SMEs by spreading information on new tools to support innovation in SMEs or testing new ways to access high added-value support services: vouchers, innovative procurement, market replication, proof of concept, lead markets,⁴⁷ Key Enabling Technologies (KETs), and also the Europe Innova⁴⁸ and ProInno Europe⁴⁹ initiatives;
- supporting R&D activities by SMEs⁵⁰;
- facilitating access to risk capital;
- enhancing skills;
- providing market opportunities via market replication projects, for which SMEs constitute the main target group;

⁴⁶ http://ec.europa.eu/small-business/funding-partners-public/finance/index_en.htm

⁴⁷ See for example the Lead Market Initiative of DG Enterprise and Industry at: <http://ec.europa.eu/enterprise/policies/innovation/policy/lead-market-initiative/>

⁴⁸ <http://www.europe-innova.eu/web/guest/home>

⁴⁹ <http://www.proinno-europe.eu/>

⁵⁰ See for example http://ec.europa.eu/research/sme-techweb/index_en.cfm

- ICT value chain actions IPR help desk IP Portal, SME Chine IPR help desk;
- Erasmus for young entrepreneurs;
- e-skills actions;
- ICT value chain action;
 - interconnecting SMEs through the Enterprise Europe Network and in particular via brokerage events, platforms, survey mechanisms, Internal Market information, etc.

SME participation in the 7th Framework Programme for Research, Technological Development and Demonstration Activities (FP7) has been strongly encouraged: mainly research-performing SMEs are addressed in the 10 themes of the 'Cooperation' programme with a budgetary target of 15% for SMEs, equivalent to some EUR 5 billion. SMEs and SME-associations in need of outsourcing research to research providers are supported through the programme 'Research for the Benefit of SMEs' in the 'Capacities' strand with an overall budget of EUR 1.3 billion. The Industry-Academia partnerships in the 'People' Programme promote cooperation between academia and industry, including SMEs, through staff secondments and temporary hosting of experienced researchers.

The last calls for proposals under FP7 will be published in summer 2012. The forthcoming Horizon 2020 Framework Programme for Research and Innovation (2013-2020) will have a dedicated SME strategy covering the whole innovation cycle. It will address highly innovative SMEs showing a strong ambition to develop, grow and internationalise, regardless of whether they are high-tech and research-driven or non-research conducting, social or service companies.

Regional organisations can boost the involvement of regional actors in FP7 and Horizon 2020 and enhance the impact of their participation through actions such as:

- awareness-raising, information and advice to access FP7 and its successor,
- creation of sectoral or cross-sectoral interest groups,
- promotion of local academia-industry cooperation and their cross-border networking,
- aid for international partner search,
- grants for exploring project feasibility and validation of project ideas,
- provision of training to potential project managers,
- provision of mentoring and coaching to EU project partners (from the conception phase, through implementation and management to commercialisation of project results) as part of the regional innovation support services,
- use of financial engineering instruments to promote commercialisation of promising EU research and innovation results by regional actors,
- support to ERA-Nets⁵¹ involving regional partners can be an interesting learning tool for them.

Useful links and further information

- *Enterprise Europe Network*⁵²;

⁵¹ http://ec.europa.eu/research/fp6/index_en.cfm?p=9_eranet

⁵² http://www.enterprise-europe-network.ec.europa.eu/index_en.htm

- *Support services based on direct customised assistance:*
 - the IPR Helpdesk provides information on intellectual property issues related to FP7⁵³;
 - the Business Innovation Centres (BIC) provide innovation related business services on a commercial basis;
 - the China SME IPR Helpdesk provides free information, first-line advice and training support to European SMEs to protect and enforce their IPR in China.⁵⁴
- *KETs*⁵⁵;
- *SME TechWeb* providing targeted and regularly updated information on EU research and innovation activities for SMEs⁵⁶;
- *Participant Portal* containing information regarding calls for proposal under FP7 and providing the entry point for electronic administration of EU-funded research and innovation projects⁵⁷;
- *National Contact Points for SMEs* (NCP SME)⁵⁸;
- *Rapport project*, financed under FP7, aiming to develop a reference guide of good practices for strengthening the exchange and transfer of knowledge between research organisations and various kinds of SMEs and a blueprint paper on new emerging forms of SME support in the context of open innovation and public-private partnerships (including benchmarks).⁵⁹ For the 2014-2020 programming period, the European Commission has proposed establishing a Programme for the Competitiveness of Enterprises and Small and Medium-sized Enterprises (COSME).⁶⁰ The programme aims to achieve the following general objectives:
 - strengthen the competitiveness and sustainability of the Union's enterprises, including the tourism sector,
 - encourage an entrepreneurial culture and promote the creation and growth of SMEs.

Activities funded through the Programme will aim to:

- improve the framework conditions for the competitiveness and sustainability of Union enterprises,
- promote entrepreneurship including specific target groups,
- improve access to finance for SMEs in the form of equity and debt,
- improve access to markets inside the Union and globally.

⁵³ <http://www.ipr-helpdesk.org/>

⁵⁴ <http://www.china-iprhelphdesk.eu/>

⁵⁵ http://ec.europa.eu/enterprise/sectors/ict/key_technologies/index_en.htm

⁵⁶ http://ec.europa.eu/research/sme-techweb/index_en.cfm

⁵⁷ <http://ec.europa.eu/research/participants/portal/appmanager/participants/portal>

⁵⁸ <http://www.ncp-sme.net/>

⁵⁹ <http://www.rapport-project.eu/>

⁶⁰ http://ec.europa.eu/cip/files/cosme/cosme-commission-proposal_en.pdf

Research infrastructures, centres of competence and science parks

Why should research infrastructures be part of smart specialisation?

Research infrastructures (RIs) are a driving force behind innovation. The term 'research infrastructures' refers to facilities, resources, systems and related services that are used by research communities to conduct top-level research in their respective fields. This definition covers: major scientific equipment or sets of instruments; knowledge based-resources such as collections, archives or structured scientific information; ICT-based e-Infrastructures (networks, computing resources, software and data repositories) for research and education; and any other entity of a unique nature essential to achieving or enabling excellence in research. Research infrastructures may be 'single-sited' or 'distributed' (a network of resources).

There are at least 300 such Research Infrastructures, which have strong international visibility, attracting world class researchers. They represent an aggregate European investment of more than EUR 100 billion. Some 50,000 researchers a year use them to produce 3,000 to 6,000 high-impact research papers annually, as well as a chain of patents, spin-off companies and industrial contracts.

Their know-how helps European industry develop new pharmaceuticals and high-performance materials, monitor the earth's oceans and air, and track the changing social attitudes and behaviour of our fellow-citizens. They help provide the answers we will need to solve our grand societal challenges: energy supply, climate change and healthcare for all. They propel collaboration across borders and disciplines, promote mobility of people and ideas, and enhance quality in education. The resulting innovation ecosystem spurs new ideas, solutions and innovations of benefit to the European economy and society, as well as science.

Consequently, the development of regional Research Infrastructures (in particular Regional Partner Facilities and Cross Border Facilities) should create a particularly important way of capacity-building, should help to concentrate regional human capital (e.g. training and attracting international researchers and technicians) and thus stimulate turning science and innovation into a key instrument of regional development, in terms of socio-economic return. The concept of regional Research Infrastructure includes:

- Regional Partner Facilities (RPF)⁶¹ which are facilities associated with pan-European single site or distributed Research Infrastructures, and
- Cross Border Facilities (CBF) which are independent regional or national facilities with cross-border dimension, open to international use.

⁶¹ A Regional Partner Facility (RPF) to a research Infrastructure of pan-European interest must itself be a facility of national or regional importance in terms of socio-economic return, training and attracting researchers and technicians. The quality of the facility including the level of its scientific service, management and open access policy must meet the same standards required for pan-European Research Infrastructures. Recognition as a RPF should be the responsibility of the pan-European Research Infrastructure itself (or the members of a to-be ERIC) based on regular peer-review.

Research Infrastructures are often integrated in a wider eco-system encompassing science parks, incubators, sectoral excellence centres, living labs, prototyping centres, intellectual property right (IPR) centres, technology transfer offices, etc. which often facilitate the commercialisation of research results into market applications.

Science parks provide the advanced infrastructure on which research-intensive enterprises rely, besides the location factor, often in close proximity to a university. They provide the necessary infrastructure for research, such as advanced ICTs, and are also expected to create proper conditions for informal exchanges between firms, creating a specific social milieu.

They can also provide complementary services and support to local firms. Spin-offs and SMEs can find wider support services that allow them to better focus on their core business and on research for the development of innovations in science parks. They are usually associated with strong networking effects and high levels of social capital. They also provide visibility and hence attraction to wider local strategies aimed at the creation of conditions for high-tech industries to prosper.

Sectoral excellence centres can be split into two categories: sectoral centres targeting specific industries (providing a range of specialised services, directly to firms) and cross-sector centres concerned with generic issues (such as product development and work in partnership).

Business and Innovation Centres (BICs) are support organisations for innovative small and medium-sized businesses (SMEs) and entrepreneurs. The BICs are recognised by the European commission through a quality certification exam, which enables them to obtain the European 'EC BIC' label.

Operating in the public interest, they are set up by the principal economic operators in an area or region in order to offer a range of integrated guidance and support services for projects carried out by innovative SMEs, thereby contributing to regional and local development.⁶² The BICs are grouped together within the European BIC Network (EBN). Lessons from the 'Living Labs': by engaging user groups or at least by looking on innovations from the perspectives of user groups, the strengths and weaknesses of the eco-innovation system could be identified and addressed.

Barriers and challenges

First, there is still a lack of a consistent strategy of Europe's regions and MS for setting their own priorities and developing their own roadmaps. Nevertheless a dynamics is in place, stimulated by the European Strategy Forum for Research Infrastructures (ESFRI) and EC work, which should not be hindered by the lack of a European consolidated vision in the near future.

Member States, which constitute the convergence and outermost regions, do not often have ambitions to host the site and/or to coordinate a large multidisciplinary infrastructure. They are involved almost exclusively through participation in the construction and exploitation of the new

⁶² *The Smart Guide to Innovation-Based Incubators (IBI)*. European Union - Regional Policy, February 2010.

infrastructures localised in the EU15 MS, and/or setting-up components of distributed infrastructures, again coordinated by the EU15 MS.

As a consequence, the distribution of research infrastructure facilities in Europe is still as disproportionate as ten years ago. Except the Extreme Light Infrastructure (ELI; <http://www.extreme-light-infrastructure.eu/>), the Svalbard Integrated Arctic Earth Observing System⁶³ and the European Carbon Dioxide and Storage Laboratory,⁶⁴ all other 45 projects included in the ESFRI Roadmap are either localised or coordinated by the EU15 Member States.

Regions have to ensure that their research infrastructures are managed by professionals and that they are able to provide high added-value, financial and non-financial support services to SMEs, and avoid duplication of investment in infrastructures similar to those already in place nearby.

How to act?

The EU landscape for research infrastructures is undergoing dynamic changes. But this welcomed trend is yet to bring improvement and better balance in distribution. This will require specific actions towards the pooling of the existing national/regional resources augmented by the available EU funding. Furthermore, both streams of such funding should be better focussed on activities which contribute to the full utilisation of intellectual potential across the EU regions.

Regions should envisage improving their framework conditions and access to finance for research and innovation, so as to ensure that innovative ideas can be turned into products and services that create growth and jobs.

The contribution of the stakeholders at regional and national level needs therefore to be enhanced. Regional and local authorities should work in partnership and take measures that would create a 'stairway to excellence' for research and innovation infrastructures and businesses within their areas of responsibility. Investments in existing and new RIs should combine in the most efficient and effective way the instruments and funds available (e.g. taking into account the needs of the industrial users, i.e. large amounts — not lab scale —, faster results, and standards for quality control).

This need for synergies has been stressed by key EU institutions, namely: the Council,⁶⁵ the Parliament⁶⁶ and the Commission.⁶⁷ In this context, the Commission has produced the 'Practical Guide to EU funding opportunities for Research and Innovation'⁶⁸ and is exploring how far the Regional Policy can provide financial support for the construction of RIs foreseen in the ESFRI roadmap.⁶⁹

⁶³ (SIOS; <http://www.sios-svalbard.org/servlet/Satellite?c=Page&pagename=sios/Hovedsidemal&cid=1234130481072>)

⁶⁴ ECCSEL; <http://www.eccsel.org/>

⁶⁵ Conclusions of 17 May 2010

⁶⁶ EP Resolution [EP:A7-0138/2010, P7_TA(2010)0189; May 2010]

⁶⁷ COM (2010)553 and SEC(2010)1183, 06.10.2010

⁶⁸ SEC (2010)1183, item 3.2.

⁶⁹ COM (2010)553, item 4 and SEC (2010) 1183, item 3.3.1.

Member States should set visible targets and sustainable support for operational costs and involvement of priority ESFRI projects or regional RIs, and they should also complete the process of development of national roadmaps for RIs.

The authorities establishing National Roadmaps for Research Infrastructures (in connection with the EU ESFRI Roadmap) should work together with the authorities involved in designing and delivering national and regional strategies for smart specialisation, in particular for improving access to industrial users and in the context of industrial clusters.

ERDF provides financial support to create and run research infrastructures: R&TD infrastructure (including physical plant, instrumentation and high-speed computer networks linking research centres) and centres of competence in a specific technology, technology transfer.

In its proposal for the 2014-2020 Framework Programme for Research and Innovation (Horizon 2020),⁷⁰ the Commission suggests funding projects aimed at reinforcing European research infrastructure policy and international cooperation.

⁷⁰ [http://ec.europa.eu/research/horizon2020/pdf/proposals/com\(2011\)_811_final.pdf](http://ec.europa.eu/research/horizon2020/pdf/proposals/com(2011)_811_final.pdf)

Universities

Why should universities be part of smart specialisation?

In the framework of the Education, Research and Innovation triangle, the so-called knowledge triangle, universities⁷¹ have a crucial role to play in creating knowledge and translating it into innovative products and services, in cooperation with research centres and businesses. Successful mobilisation of the resources of universities can have a strong positive effect on the achievement of comprehensive regional strategies.

Universities dealing with economics, public policy and administration, as well as those dealing with specific policy areas (such as industry, health, agriculture, environment and culture) can provide public authorities and private sectors with strategic advice, as well as experts to work directly on regional development priorities. Universities are a critical 'asset' of the region, mainly in the less developed regions where private sector may be weak or relatively small, with low levels of research and development activity.

There is a range of mechanisms by which universities can contribute to regional innovation systems. Universities can, for instance, stimulate the entrepreneurial spirit of their staff and students, provide advice and services to SMEs, and participate in schemes promoting the training and placement of high level graduates in innovative businesses. They can also host incubators for spin-offs in science and technology parks and provide valuable input to innovative clusters and networks. These mechanisms can be delivered as stand-alone projects or within wider strategies. The latter is the ideal and will ensure maximum impact but is difficult to achieve as there are many barriers to overcome and there are few good practice examples to draw on. Furthermore, Universities and Businesses should directly cooperate in curricula design and curricula delivery to ensure that graduates have the right skills and transversal competences. By having businesses cooperating with the educational side of Universities, talent attraction and retention would be enhanced in the region. Universities can also play an important role in the field of vocational training.

Barriers and challenges

Improving the contribution of universities to regional growth by implementing such mechanisms requires the interconnection of the partners in the innovation systems. 'Disconnections' may occur between the partners and the barriers to overcome are of a different nature. They can be internal to the university and involve the capacity to 'reach out' to the wider region (i.e. supply side). For instance, universities are usually focused on teaching and research (driven by academic outputs) and are part of national academic systems that are not targeted to respond to regional needs. As a result, some universities are viewed as being 'in' the region but not 'of' the region where they are located.

⁷¹ The term 'university' includes all higher education institutions, in line with the Commission's Communication on the modernisation agenda for universities [COM (2006) 208].

These barriers can also be linked to the capacity and willingness of the public and private sector actors in the region to 'reach in' to the university to seek expertise and knowledge that can contribute to regional growth and development (i.e. demand side). Successful partnerships involve 'boundary spanners' providing leadership within and across the partners and enabling a mutual understanding of the drivers affecting all the partners. Universities will appreciate the opportunities that their regions present for their activities as 'living laboratories' opened to international linkages; their private and public partners will benefit from their expertise for translating knowledge into innovation.

How to act?

Universities and other knowledge institutions should be closely linked to the process of designing national/regional innovation strategies for smart specialisation. They are needed to develop several steps of these strategies and they can also act as intermediary bodies for the implementation of several delivery instruments that are described in this guide.

For the *next programming period*, the investment's priorities proposed under the Cohesion Policy cover these aspects with an emphasis on connecting universities to regional growth and developing stronger partnerships within the knowledge triangle. To obtain further information on these processes, see the practical guide 'Connecting universities to regional growth' that presents processes and delivery mechanisms for building capacity and incentives for universities and their regional partners to work together. Based on examples, it explores the following issues:

- establishing a regional higher education partnership to better understand the regional situation and to overcome the barriers, with a possible technical assistance budget,
- ensuring mechanisms allowing universities and business in the region to cooperate in curricula design and in jointly delivering education in an innovative way, fostering graduates with regional relevant competences and with transversal skills including entrepreneurial attitude,
- mapping the regional higher education system in terms of their degree-awarding ability, research activities and possible cooperation with regional partners,
- assessing the connectivity of the universities to the regional public and private sectors to move towards a situation where universities are key players,
- selecting, designing and evaluating interventions that strengthen the connectivity of universities in the region to the region, by moving from simple to complex projects.

In the *future programming period 2014-2020*, support under the European Agricultural Fund for Rural Development (EAFRD) could be provided to Universities in the following areas:

- Knowledge transfer and information actions for the provision of vocational training and skills acquisition actions, demonstration activities and information actions. These should be provided for persons engaged in the agriculture, food and forestry sectors, land managers and other economic actors which are SMEs operating in rural areas;
- Advisory services for the improvement of the economic and environmental performance as well as the climate-friendliness and resilience of the farms, forest enterprises and rural SMEs, and/or relevant investments;

- Studies and investments associated with the maintenance, restoration and upgrading of the cultural and natural heritage of villages and rural landscapes, including related socio-economic aspects;
- Co-operation among different actors in the Union, agriculture, food chain, forestry sector and among other actors (including Universities) that contribute to achieving the objectives and priorities of rural development policies (e.g. pilot projects; new products, processes and technologies; public-private partnerships; etc.) This also covers support for clusters and networks, and for Operational groups under the European Innovation Partnership where universities could also take part.

References

The European Commission promotes several support tools at European level. These may serve either as models, adaptable to different regions (considering each region's specific features), or as a direct support to regional actors or the administration itself:

- *EU Guide 'Connecting universities to regional growth'*: Available on the website of the Smart Specialisation Platform,⁷²
- *University Business Forum*: A platform to promote cooperation between HEI and businesses at European level,⁷³
- *Marie Curie – Initial Training Networks – Industrial doctorates*: A pilot action promoting industrial PhD schemes,⁷⁴
- *Knowledge Alliances*: Between higher education and businesses in educational issues,⁷⁵
- *Erasmus for all*: The Union Programme for Education, Training, Youth and Sport for the programming period 2014-2020.⁷⁶

⁷² http://ipts.jrc.ec.europa.eu/activities/research-and-innovation/s3_a.cfm

⁷³ <http://ec.europa.eu/education/universitybusinessforum.html>

⁷⁴ http://cordis.europa.eu/fp7/people/initial-training_en.html

⁷⁵ Further information can be found in the UB Forum link above.

⁷⁶ http://ec.europa.eu/education/erasmus-for-all/doc/legal_en.pdf

Digital Agenda for Europe

Why should the Digital Agenda be part of smart specialisation?

Information and communication technologies (ICT) are a powerful driver for economic growth, innovation and increased productivity. Data from the 2010 Digital Competitiveness report⁷⁷ reveals that while representing 5% of GDP, ICT drives 20% of overall productivity growth and that the ICT industry has a 25% share in total business R&D. The Europe 2020 strategy has recognised the enormous potential of ICT and made the Digital Agenda for Europe⁷⁸ (DAE) one of its seven flagships. Its aim is to deliver smart, sustainable and inclusive economic growth through the realisation of the digital single market and the exploitation of the potential for innovation of fast and ultra fast internet and interoperable services and applications.

DAE has set ambitious targets for high speed internet infrastructure across the Union (by 2020: 100% coverage of EU households at 30 Mbps minimum + 50% take-up [subscriptions] at 100 Mbps minimum) and for wide deployment and more effective use of digital technologies, applications and services.

Successful delivery of this Agenda will enable Europe to deliver a better quality of life through, for example, better health care (eHealth Action Plan, Active and Healthy Ageing Partnership), social inclusion and education (eInclusion, eSkills, eLearning), a more effective public administration (eGovernment Action plan, eProcurement, eJustice) and dialogue between citizens and decision-makers (eParticipation), safer and more efficient transport solutions (Intelligent Transport Systems, eCall), a cleaner environment and more efficient energy networks (smart grids, smart metering), inter-modal and sustainable cities (smart cities), new media opportunities and easier access to cultural contents (eBooks, online platforms for music and movies, digitisation and access to Europe's cultural heritage⁷⁹). The deployment of a culture of open data and secured online access, the harnessing of a true digital single market (eCommerce), together with an affordable high speed internet infrastructure, are essential components of these ambitious goals.

Whether your region is struggling to provide medical and social care in times of austerity or trying to create the conditions to attract new investment, the smart specialisation strategy builds on or constitutes the first step towards local/regional 'digital agenda'. It provides a better understanding and the best leverages for the potential of digital technologies and services to meet today's challenges and prepare for tomorrow's opportunities. The long-term competitiveness and innovation potential of regional and rural areas and the ability to achieve the fundamental objectives of both regional and rural policies depend on the good planning of these investments. This is as much a socio-economic as a cultural and political challenge which management authorities of EU funds cannot afford to miss.

⁷⁷ See Digital Competitiveness Report 2010: http://ec.europa.eu/information_society/digital-agenda/documents/edcr.pdf

⁷⁸ http://ec.europa.eu/information_society/digital-agenda/publications/index_en.htm

⁷⁹ www.europeana.eu

The reviewing of the initial Digital Agenda Communication will redefine and update priorities based on the current financial conditions and will remove actions which have already been complete or become obsolete.

Barriers and challenges

Europe is facing an investment challenge in the financing of high speed internet infrastructure because *the benefits for society as a whole appear to be much greater than the private incentives to invest in faster internet network infrastructures*. The large amount of investment required to achieve ubiquitous coverage⁸⁰ requires a combined effort from a large number of investors from the private and public domains, the adoption of open and long-term investment models⁸¹ and the use of a range of financial tools including grants and financial engineering.

Similar barriers exist for the wide deployment and more effective use of digital applications and services spurring innovation, increased competitiveness and economic growth. For instance, copyright rules are nationally based and therefore prevent the full harnessing of the digital single market. In addition, there are weaknesses in the European research and innovation system which considerably complicate the discovery or exploitation of knowledge and, in many cases, ultimately prevent the entry of innovations into the market place. This requires improving the framework conditions for the uptake of innovation, leveraging financing and investments in innovation and improved coordination and coherence between funding for research and innovation at European, national and regional level in Europe.

The Digital Agenda for Europe⁸² is committed to overcoming this challenge and to making every European digital, irrespective of geographic location or social and economic condition. The EU's Cohesion and Rural Development Policies may contribute to this EU pledge by joining forces with Horizon 2020⁸³ — the future Framework Programme for Research and Innovation — as well as the Connecting Europe Facility⁸⁴ in supporting open, affordable and good quality high speed networks in areas of market failure, as well as ensuring investment in digital service infrastructures (trans-European high speed backbone connections for public administrations, cross-border delivery of eGovernment services, enabling access to public sector information and multilingual services, online safety and security, intelligent energy networks and smart energy services). To best harness EU funding from these various financial instruments, one of the key challenges for management authorities is therefore to select investment models and strategic priorities that will foster the above efforts.

Summarising, for the period 2014-2020 and according to the Commission legislative proposals, EU financial support for digital growth measures may come from:

⁸⁰ Estimated by the EC between EUR 180 and 270 billion.

⁸¹ See EU Broadband good practice site: <http://www.broadband-europe.eu/Pages/Home.aspx>

⁸² DAE: http://ec.europa.eu/information_society/digital-agenda/index_en.htm

⁸³ Horizon 2020: http://ec.europa.eu/research/horizon2020/index_en.cfm?pg=home

⁸⁴ CEF: http://ec.europa.eu/information_society/newsroom/cf/item-detail-dae.cfm?item_id=7430&language=default.

- Cohesion policy: measures aiming at enhancing access to the use and quality of ICT.⁸⁵ ICT measures can also be financed as support measures within any of the other 10 objectives, particularly research and innovation, promoting the competitiveness of SMEs and the shift to a low carbon economy;
- Rural Development: measures aiming at enhancing accessibility to the use and quality of information and communication technologies (ICT) in rural areas⁸⁶;
- Connecting Europe Facility⁸⁷: measures aiming at the removal of bottlenecks which hinder the completion of the Digital Single Market: broadband and NGA networks and Digital Service Infrastructures including core service platforms and generic services.
- Horizon 2020: (see proposal⁸⁸).

How to act?

Moving from a classic ICT sector approach to a comprehensive local/regional/national 'digital agenda' within the Smart Specialisation Strategy is a key success factor for passing the 'ex-ante conditionality' test. This *démarche* should build on at least two pillars:

1) *Network infrastructure*: mapping existing and planned assets, identifying the needs for reaching ambitious population coverage and take-up targets of next generation networks (over 30 Mbps), assessing the most suitable investment models,⁸⁹ etc. This may take the form of a stand-alone 'Broadband Plan' (most Member States have one at national level) or be presented as a dedicated chapter within the RIS3 document.

2) *Harnessing digital growth*: identifying the needs for the supply of innovative eServices (eHealth, eGovernment, etc.) and stimulating demand for new applications (cloud computing, eBusiness) and ICT usage (eCommerce for SMEs and consumers, smart energy networks and low energy lighting, ICT R&D, etc.). This may be integrated within all the relevant (sector-based) initiatives being developed in the RIS3. Alternatively, it may also be presented as a dedicated digital growth chapter within the RIS3.

Digital growth chapter

The development of a chapter for digital growth within the smart specialisation strategy will enable regions to identify the priorities for ICT investment which are pertinent to your territory. The *Digital Agenda for Europe* can be taken as a model. *Box 7* provides further information about ICT measures in RIS3. The identification of these priorities will involve a SWOT analysis

⁸⁵ Ref: Article 9 of General Regulation:

http://ec.europa.eu/regional_policy/sources/docoffic/official/regulation/pdf/2014/proposals/regulation/general/general_proposal_en.pdf

⁸⁶ Ref: EAFRD support for Rural Development: http://ec.europa.eu/agriculture/cap-post-2013/legal-proposals/com627/627_en.pdf

⁸⁷ Ref. CEF: http://ec.europa.eu/commission_2010-2014/president/news/speeches-statements/pdf/20111019_3_en.pdf

⁸⁸ Horizon 2020: http://ec.europa.eu/research/horizon2020/index_en.cfm?pg=home

⁸⁹ http://ec.europa.eu/regional_policy/newsroom/detail.cfm?id=158

Notably the Guide to Broadband investment:

http://ec.europa.eu/regional_policy/sources/docgener/presenta/broadband2011/broadband2011_en.pdf

based on the DAE scoreboard's⁹⁰ indicators and targets, which reflects the main areas of action up to 2020.

The DAE scoreboard provides data and an annual assessment of the performance at EU and Member State level. Regions are requested to make a SWOT analysis taking the DAE scoreboard as a reference grid against which to assess the performance with a view to identifying gaps requiring regional actions in the domain of ICT. The S3 platform, in combination with relevant Commission Services can provide specific assistance to regions which identify ICT as one of its main policy objectives for the 2014-2020 period.

A critical success factor, complementing the effort of the S3 platform, is the use of EU technical assistance to support ICT competence centres enabling regional and rural actors to absorb expertise to plan and implement ICT-based innovation.

Box 7 - ICT measures in RIS3

Within the national/regional strategies for smart specialisation, ICT measures could:

- a) feature as horizontal measures such as application-driven research and user-driven innovation and, adoption of ICT including ICT-based solutions in all kinds of fields (healthcare, healthy and active aging, e-accessibility, assisted living, e-government, access to public information, resource efficiency, smart grids, intelligent transport, safety, e-commerce, manufacturing, design, public services, e-education, e-inclusion, e-skills, entrepreneurship, digital literacy, e-content, creativity, culture, living labs, smart buildings and neighbourhoods, smart cities, trust, security, etc);
- b) have a sectoral focus targeting ICT industrial and technological leadership in R&D&i fields such as Key Enabling Technologies (KETs), or promoting specialisations in specific market segments or niches (such as micro- or nanoelectronics, photonics, embedded systems, smart integrated systems and complex systems engineering, next generation computing and future Internet, eInfrastructures; content technologies and information management; robotics, cognitive systems, advanced interfaces and smart spaces: mobile apps and social networks apps, etc.);
- c) include measures in support of the regional capacity to plan, manage and implement ICT measures (e.g., networking); to establish accelerators and mentoring facilities for start-ups; to support web entrepreneur camps, good practices exchange, peer review, studies, regular mapping of infrastructure, monitoring and benchmarking, development, expertise; to set up innovative investment models; to exploit pre-commercial procurement and other related innovative procurement activities including reinforcing cross border and international collaboration in preparing the digital growth actions.

⁹⁰ DAE Scoreboard : http://ec.europa.eu/information_society/digital-agenda/scoreboard/index_en.htm

Plan for high speed Internet Infrastructure (Next Generation Networks)

The Guide to Broadband Investment, presenting the various models for management authorities wishing to invest in high speed infrastructure, provides a useful tool kit. Provided that these investments respect the relevant regulation (telecom framework, State aid guidelines, etc.) they can benefit from a wide range of EU funding instruments from the Connecting Europe Facility (CEF) and from cohesion (in less developed regions) or rural development policies.

The European Broadband Portal⁹¹ (EBP) is an initiative of the DG Information Society and Media supporting the exchange of good practice in the planning and the deployment of broadband and high speed internet infrastructure. The EBP provides assistance to regions to work through the different stages of the Guide to Broadband Investment as well as specific assistance through a range of training modules, workshops and training events.

The EBP will also continue to work on the guide on broadband investment models with the provision of additional models and with the evaluation of the impact of the models on the development of the information society in regions and areas with a view to achieving Cohesion and Rural development objectives.

Finally, to assist regions in the development of their RIS3, the S3 platform will also develop services dedicated to broadband roll-out.

Regions are reminded to closely coordinate their plans with the actions included in the national plans for high speed internet (national broadband plans) with a view to exploiting synergies and avoiding duplication of efforts.

Rural development policy will support the development of fast and ultra-fast broadband including its creation, improvement and expansion, passive broadband infrastructure and provision of access to broadband and public e-government solutions. This may include small and large scale projects.

For support under the Connecting Europe Facility see the guidelines for trans-European telecommunications networks.⁹²

⁹¹ EBP: <http://www.broadband-europe.eu/Pages/Home.aspx>

⁹² CEF guidelines: http://ec.europa.eu/commission_2010-2014/president/news/speeches-statements/pdf/20111019_3_en.pdf

Key enabling technologies

Why should Key Enabling Technologies be part of smart specialisation?

The Commission defined micro/nanoelectronics, photonics, nanotechnology, industrial biotechnology, advanced materials and advanced manufacturing systems as the six Key Enabling Technologies of Europe. KETs are knowledge-intensive and associated with high R&D intensity, rapid innovation cycles, high capital expenditure and highly-skilled employment. They enable process, goods and service innovation throughout the economy and are of systemic relevance. They are multidisciplinary, cutting across many technology areas with a trend towards convergence and integration. KETs can assist technology leaders in other fields to capitalise on their research efforts.⁹³

Key Enabling Technologies (KETs) have been singled out by the European Commission in the proposal for the new Cohesion Policy as one of the investment priorities of the European Regional Development Fund (ERDF) as a relevant investment for the smart growth of regions.⁹⁴

KETs are seen as the route to new and better products and processes, capable of generating economic growth and employment and strengthening the competitiveness of the EU economy. They bear *enormous market potential*. In the coming four years, the growth rates of each of these technologies range between 6%-15%. The overall global market volume will most likely increase from USD 840 billion to USD 1300 billion. Even more important are their spill-over effects on industry users from various industrial value chains, including suppliers and downstream sectors. KETs can spur innovation, increase productivity, give rise to new applications and help tackle societal challenges.

The particularity of a KET-related innovation policy is that it engages actors along different industrial value chains across the EU, including technology developers (universities, research and technology organisations), start-ups, SMEs and manufacturers. Consequently, a *KET-focused innovation policy allows most industrial sectors and any region to become involved* and benefit from the EU's overall KET approach, whatever its specialisation and focus areas. The Commission is in the process of aligning and coordinating EU policies in favour of a coherent strategy on KETs, which will open up great opportunities for regions. Regions should indeed analyse those opportunities, either as an emerging sector, or as a means to modernise traditional sectors.

Barriers and challenges

The key challenge for regions will be *to identify their respective economic niches and competitive advantages* in KET development and deployment activities. Regions should be aware of key guiding principles, such as: what are the industrial needs with regard to

⁹³ (COM(2009) 512)

⁹⁴ See Article 5 (1) (c) ERDF: '*supporting technological and applied research, pilot lines, early product validation actions, advanced manufacturing capabilities and first production in Key Enabling Technologies and diffusion of general purpose technologies*'.

technologies? Who are the main actors and potential customers of these activities? Is there a business case in terms of market exploitation?

For this, solid economic data is necessary. The Commission is in the process of setting up an EU Monitoring Mechanism, which will provide information on the supply and demand of KETs in the EU and third countries. This will help regions in their smart specialisation strategies with regard to KETs. Pending the availability of the EU Monitoring Mechanism on KETs, regions can already use existing information available through the Nano-Observatory⁹⁵ and the Regional Innovation Scoreboard.⁹⁶ Further, *synergies should be obtained by linking regional activities to EU programmes*, such as those sponsored under the research and innovation programme (Horizon 2020). Regions should therefore closely follow the EU's activities in order to maximise the impact of their own activities on KETs.

Quick reference guide

It is important for regions, in their smart specialisation strategies, to follow an economic assessment, which would allow the identification of niche markets and regional competitive advantages.

An *EU Monitoring Mechanism on KETs* should become operational as of 2013. A first pilot shall be available by the end of 2012. This mechanism will provide EU-wide and international market data on the demand and supply of KETs, which will help regions (and Member States) to identify their competitive advantages more easily.

Furthermore, KETs will take up a prominent role in the upcoming revision of the EU's research & innovation framework programme (*Horizon 2020*). It is important to note that due to another change to the Common provisions regulation,⁹⁷ regions will be able to more easily *combine different EU instruments* in order to support their local economic ecosystems, including technology developers, start-ups, SMEs and anchor companies. In the future, several EU funding tools can be combined for the financing of one operation, given that the expenditure is not double-financed and general state aid principles are followed.

In addition, the Commission plans to cooperate more closely with the European Investment Bank in order to provide loan guarantees to productive investments. Overall, a coherent financial framework will be put in place in order to support all development and innovation stages of KET-related processes.

References

- *Policy Recommendations* of the High-Level Expert Group on KETs (2011).⁹⁸

⁹⁵ <http://www.observatorynano.eu/project/>

⁹⁶ <http://www.proinno-europe.eu/page/regional-innovation-scoreboard>

⁹⁷ Art. 55 (8) Proposal for a Regulation of The European Parliament and of the Council laying down common provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund, the European Agricultural Fund for Rural Development and the European Maritime and Fisheries Fund covered by the Common Strategic Framework and laying down general provisions on the European Regional Development Fund, the European Social Fund and the Cohesion Fund and repealing Regulation (EC) No. 1083/2006.

⁹⁸ http://ec.europa.eu/enterprise/sectors/ict/key_technologies/kets_high_level_group_en.htm

- *Commission Communication on KETs* (2009).⁹⁹
- *Horizon 2020*: in the framework of this programme, the Commission will support future and emerging technologies, as well as an integrated approach to Key Enabling Technologies.¹⁰⁰

Cultural and creative industries

• Why should cultural and creative industries be part of smart specialisation?

In many cities and regions, including rural areas across Europe, investments in cultural and creative industries (CCIs) already have a significant impact on smart, sustainable and inclusive growth. Indeed, these industries have a multiple role to play in unlocking the creative and innovative potential of a region, as they:

- are vital for the emergence of new economic activities and the creation of new and sustainable job opportunities¹⁰¹;
- have the potential to increase the quality of life in urban and rural areas and to make Europe and its regions more attractive places in which to invest and work;
- contribute to the social integration of marginalised groups of the population and have wide-ranging social impacts, in particular in terms of social regeneration or social cohesion;
- are catalysts for structural change and diversification in many industrial zones and rural areas with the potential to rejuvenate economies, stimulate innovation and contribute to growth;
- constitute a powerful magnet for tourism, generate a creative buzz, attract talent and contribute to changing the public image of regions and cities;
- have potential in generating social demand, engaging the public and addressing social concerns in rapidly growing markets, such as those relating to energy, recycling and biotechnology, aging and health.

Moreover, culture and creativity also promote growth and qualified jobs, as CCIs contribute to and have a strong and positive influence on ICT, research, education and can increase the attractiveness of regions in terms of human resources and investments. These positive impacts are highlighted in different EU policy documents and studies.¹⁰²

⁹⁹ http://ec.europa.eu/enterprise/sectors/ict/files/communication_key_enabling_technologies_sec1257_en.pdf

¹⁰⁰ [http://ec.europa.eu/research/horizon2020/pdf/proposals/com\(2011\)_811_final.pdf](http://ec.europa.eu/research/horizon2020/pdf/proposals/com(2011)_811_final.pdf)

¹⁰¹ According to recent estimates, CCIs are one of Europe's most dynamic sectors and account for up to 4.5% of the total EU GDP and some 3.8% of its workforce, 'Building a Digital Economy: The importance of saving jobs in the EU's creative industries,' TERA Consultants, March 2010. See also the emphasis on the creative industries in the European Competitiveness Report 2010, Commission staff working document, COM (2010)614.

¹⁰² In particular in the 2010 Commission Communication '*Regional policy contributing to smart growth*': http://ec.europa.eu/regional_policy/sources/docoffic/official/communic/smart_growth/comm2010_553_en.pdf; the 2010 Commission Green Paper '*Unlocking the potential of cultural and creative industries*': http://ec.europa.eu/culture/documents/greenpaper_creative_industries_en.pdf; the 2011 analysis of the contributions to the public consultation launched by the Green Paper 'http://ec.europa.eu/culture/documents/analysis_green_paper.pdf'; as well as in the 2010 Study on the '*Contribution of Culture to Local and Regional Development – Evidence from the Structural Funds*': http://ec.europa.eu/culture/key-documents/contribution-of-culture-to-local-and-regional-development_en.htm

Barriers and challenges

The cultural and creative sectors are faced with a rapidly changing context characterised in particular by digitisation and globalisation, offering great opportunities for the sectors but making it necessary for them to develop new skills, upgrade their equipment, develop new production and distribution methods and adapt their business models accordingly. European cultural and creative sectors are furthermore inherently fragmented along national and linguistic lines, which make it difficult for them to operate transnationally within and outside the EU and can lead to missed business opportunities. Moreover, cultural and creative sectors face difficulties in accessing the resources they need to finance their activities and adapt to the digital shift and globalisation. This is in particular due to the intangible nature of many of their assets, the prototype profile of their activities, their lack of investment-readiness, as well as the insufficient investor-readiness of financial institutions to support them.

However, in many regions, cultural and creative sectors constitute a major asset for the economy, and building on this asset should be considered in national/regional research and innovation strategies for smart specialisation. The challenge is to further integrate CCIs in this context, promoting the emergence of 'creative ecosystems' throughout the EU, i.e. via the development of a creative environment that promotes traditional cultural assets (cultural heritage, touristic destinations, dynamic cultural institutions and services), stimulates the development of creative businesses, and supports spill-over effects into the local existing industries and fuel development.

How to act?

The European Regional Development Fund and the European Agricultural Fund for Rural Development can support such strategies. Member States and regions are invited to finance their cultural and creative industries through investment priorities¹⁰³ closely linked to the objectives of the EU 2020 Strategy.

A group of experts from Member States currently working on the '*strategic use of EU support programmes, including structural funds, to foster the potential of culture for local and regional development and the spill-over effects of CCIs on the wider economy*', will provide in early 2012 a policy handbook identifying good practices in this field that might prove very useful for managing authorities, regional authorities and cultural sector operators. On this basis, a joint EU-wide awareness-raising initiative might be launched in 2012 by the Commission and the Member States.

Over the years 2012-2015, the European Creative Industries Alliance¹⁰⁴ will support the CCIs via concrete actions related to better business support, better access to finance and better cluster

and the 2011 *Study on the Entrepreneurial Dimension of the Cultural and Creative Industries*: http://ec.europa.eu/culture/key-documents/entrepreneurial-dimension-of-the-cultural-and-creative-industries_en.htm

¹⁰³ Such as 'Promoting centres of competence', 'Promoting clusters', 'Developing ICT products and services', 'Promoting entrepreneurship', 'Developing new business models for SMEs', 'Improving the urban environment', 'Developing Business incubators', 'Supporting the physical and economic regeneration of urban and rural areas and communities', etc.

¹⁰⁴ <http://creativebusiness.org/themes/magazeen/favicon.ico>

excellence & cooperation. Furthermore, the Alliance will gather European, national and regional policy makers in a Policy Learning Platform with the aim of raising the general awareness of the CCIs, to draw practical knowledge from the concrete actions and to share and exchange this better practice among Member States. The Alliance and its Policy Learning Platform might prove another useful forum for managers of European Structural Funds and regional and local authorities.

So far, the exchange of experience has shown that the following set of recommendations might pave the way for using CCIs to design and implement a targeted implementation strategy focused on the delivery of the Europe 2020 objectives. Although not exhaustive, it represents a starting point and can be completed and customised according to the specificities, experience and priorities of each region.

Map regional assets (this mapping should take into account the level of development of CCIs in the region concerned):

- Identify specialisation patterns in the region through a CCI mapping analysis (mapping should comprise quantitative as well as qualitative analysis). The European Cluster Observatory can provide assistance in this type of mapping exercise¹⁰⁵;
- Identify optimal CCI-specific conditions and develop a positive creative climate to enhance the attractiveness of the city or the region (creative ecosystem);
- Identify lead organisations and dynamic individuals who are potential partners in development projects and possible structures for coordinating action. In this respect, the Europe Enterprise Network could provide assistance in organising matching events or assist in coordinative actions¹⁰⁶;
- Collect, if possible, statistical data and perform qualitative-based surveys to better understand the dynamics of CCIs to be used for implementing smart specialisation strategies;
- Perform benchmarking activities to better understand the positioning of the region in the sector of CCIs in comparison to other EU regions.

Involve all cultural, administrative and political actors in the decision-making process (inclusive approach):

- Develop partnerships between national and regional authorities in charge of different public policies such as economic development, employment, higher education and culture. Successful CCI strategies most often depend on excellent internal and external networks and communication channels involving different levels of administration and representatives from several CCI sectors;
- Set up platforms, networks as well as clusters in order to support building of partnerships with representatives from the private sector and allow the creation of valuable synergies for the regional economic development;

¹⁰⁵ European Cluster Observatory, www.clusterobservatory.eu

¹⁰⁶ Enterprise Europe Network, www.enterprise-europe-network.ec.europa.eu

- Promote transnational cooperation to exchange experience on the level of both CCI SMEs and the authorities in charge of developing local creative strategies as a way to facilitate knowledge and capacity transfer and accelerate the learning path.

Strategic and inclusive approach to investments and the use of financial resources:

- Streamline regional, national and EU funding support to cover the different needs of the cultural and creative sectors. Synergies need to be developed in the use of the Structural Funds, including the *European Regional Development Fund*, the *Creative Europe* framework programme (2014-2020),¹⁰⁷ the *Business Competitiveness and SME Programme* (2014-2020), *Horizon 2020 – the Framework Programme for Research and Innovation* (2014-2020), tools and instruments developed and tested under the *European Creative Industries Alliance*, national and/or regional programmes for the CCIs, and other possible sources of funding;
- Develop innovative financial instruments such as equity funds or guarantee funds to co-finance investments in the cultural and creative sectors, in conjunction with the financial instrument that is proposed under the *Creative Europe* framework programme¹⁰⁸ as a way to give leverage to private investment in this field;
- Further exploit links between the CCIs and other important policy areas for cohesion and/or rural development policies, in particular urban and rural regeneration, territorial cooperation, cultural heritage and tourism;
- Promote investments in the protection, promotion and development of cultural heritage.¹⁰⁹ Other investments could include: the development and use of new information technologies (for example to promote the digitisation of cultural heritage), strengthening of entrepreneurship in CCIs, the support to urban regeneration in which the cultural component (notably cultural infrastructure) traditionally plays a key role, the development of ICT-based cultural products, applications and services, the support to new business models for CCI SMEs, etc. Balance between hard (structures/infrastructures: creative hubs and clusters, networks, incubators and connected infrastructures) and soft (human capital addressing skills and training issues) investment should equally be encouraged.

¹⁰⁷ Add reference when programme is adopted on 23 November.

¹⁰⁸ Innovative financial instruments for CCIs are also tested under the *European Creative Industries Alliance*.

¹⁰⁹ Included under the Cohesion policy as part of the thematic objective for protecting the environment. In Rural development policy, a specific action targeting cultural heritage is foreseen.

Internationalisation

Why should internationalisation be part of smart specialisation?

Internationalisation is a crucial component of a S³ for at least three reasons:

- The world is flat and all elements of an enterprise value chain can be located anywhere in the world through FDI or outsourcing;
- The eco-system of Member States and Regions can be challenged by the eco-system of emerging countries. Today, even high added-value elements of the enterprise value chain (i.e. R&D&i, support services, access to finance, design) can be produced outside OECD countries. Regions have thus to benchmark themselves with any other regions to assess where the real or believed competitive advantages are challenged in order to permanently increase their values;
- Internationalisation is becoming a more and more sophisticated context. It is much more than export and FDI. It is indeed also strategic alliances, joint research, co-development, outsourcing, relocation, mergers and acquisitions, licensing IPR, soft landing, technology showcase.

Barriers and challenges

Internationalisation is about market and technology intelligence aiming at assessing whether the smart specialisation strategy is able to resist global competition or take advantage of global competition opportunities (often niche markets).

Many reports are showing that lots of SMEs do not use the full potential of either the internal or the external market. Some of these reports indeed show that while 25% of EU-based SMEs are involved in export to the Internal Market, in the last three years only 13% of EU SMEs were internationally active outside the EU through trade or any other forms of cooperation with foreign partners.

According to a Finnish survey entitled 'International R&D in high growth SMEs – Implications to innovation policy',¹¹⁰ public authorities can help the internationalisation process of technological companies by supplying them with support services in the six areas below:

- knowledge of international market and technology demand,
- strategy development for international R&D activities,
- identification and selection of partners,
- identification, selection and acquisition of technology,
- skilled personnel,
- funding for international core, close-to-market and supporting R&D.

¹¹⁰ Gaia Group, http://proact.ktm.fi/index.phtml?menu_id.

In some cases bold regional outsourcing or offshoring support policies should be deployed in order to help SMEs acquire components — including knowledge — at affordable prices, thereby enabling them to remain competitive and hence ensure their long term survival. These days, there are definitely one or more good reasons to compare the expertise available in-house in all departments — research, innovation, production, marketing/sales — with that available around the world. A detailed segmentation of regional business needs reveals the advantages they could derive from an internationalisation strategy.

Figure 8 below illustrates this concept.

Figure 8 - Matrix of business functions and international services

Business functions	International services
Research	Joint research Access to equipment Establishment (FDI)
Innovation	Joint development Proof of technological concept Proof of economic concept Licensing and transfer of intellectual property
Production	Outsourcing Offshoring Subcontracting Establishment (FDI)
Marketing	Market testing
Distribution	Economic intelligence
Finance	IPO Mergers and acquisitions

How to act?

The European Commission recently published different relevant papers:

- Small Business, Big World – A New Partnership To Help SMEs Seize Global Opportunities, November 2011¹¹¹;
- Opportunities for the Internationalisation of SMEs, August 2011;
- The EEN Network can help SMEs find sustainable partners to implement their internationalisation strategies;
- For the 2014-2020 programming period, the European Commission has proposed establishing a Programme for the Competitiveness of Enterprises and Small and Medium-sized enterprises (COSME). One of the activities funded through the Programme will target the improvement of access to markets inside the Union and globally.¹¹²

¹¹¹ http://ec.europa.eu/enterprise/policies/sme/market-access/files/com_2011_0702_f_en.pdf

¹¹² http://ec.europa.eu/cip/files/cosme/cosme-commission-proposal_en.pdf

Financial engineering instruments

Why should financial engineering instruments be part of smart specialisation?

For more than ten years, the EU budget has been using financial instruments such as loans, guarantees and equity investment for SMEs. In the 2007-2013 financial framework a new generation of financial instruments was put in place in cooperation with the EIB Group. In the area of structural funds, financial instruments have been set up to support enterprises, urban development, energy efficiency and renewable energies through revolving funds. Financial instruments have been set up to support farmers, rural micro- and tourism businesses through the Rural Development Fund.

The Europe 2020 Strategy envisages an increased use of financial instruments as part of an approach to pull together EU and national public and private funding in order to pursue the Strategy's objectives of smart, sustainable and inclusive growth. In this context, on 6 October 2011, the European Commission adopted a draft legislative package which will frame Cohesion Policy for the period 2014-2020 and provides a common framework for all EU policies in shared management, including rural development policy and maritime policy. This proposal emphasises that the role of innovative financial instruments, by extending their scope and by rendering their implementation frameworks more flexible and effective, encouraging their use as a more efficient alternative of support or in a complementary way with traditional grants. The proposal represents a more solid legal and operational framework that provides clear and simplified rules concerning key implementation matters such as the financial management of EU contributions or the combination of financial instruments with grants.

Subject to feasibility, financial instruments can be applied to the full bandwidth of policy objectives reflected in programmes, in order to deliver investments in projects which demonstrate appropriate repayment capacity in situations of market imperfection. They can be deployed by Member States and managing authorities either as tailor-made instruments or on the basis of pre-defined models for national or regional instruments which allow for efficient roll-out of operations, in line with standard terms and conditions proposed by the Commission. Managing authorities may also contribute to financial instruments set up at EU level with resources, which will be ring-fenced for investments in line with the programmes concerned, for example, a guarantee facility is being launched to incentivise financial intermediaries to extend loans to SMEs in the cultural and creative sectors (CCS) under the new Creative Europe Programme.

Barriers and challenges

Given the relative newness of many of the financial instruments, dissemination of information and exchange of experiences and good practices among Member States, regions and financial intermediaries implementing the financial instruments will remain essential for the ongoing implementation in the present programming period. But in addition, given the increased role of financial instruments as stated in the cohesion policy post-2013, further focus will need to be put

on the promotion allowing new potential users to become familiar with this innovative way of financing and contribute to a smooth and rapid implementation of these instruments.

Quick reference guide

This section provides a quick reference guide of the existing financial instruments in the 2007-2013 Financial Framework implemented under shared management by the European Commission. It also briefly describes the joint initiatives with the European Investment Bank (EIB), the European Investment Fund (EIF) and the Council of Europe Development Bank (CEB) which promoted the implementation of financial instruments with resources provided to Member States through Regional Policy (European Regional Development Fund) and the EU Rural Development Policy (European Agricultural Fund for Rural Development).

EU level risk capital/equity instruments: CIP/GIF, Marguerite

- *CIP – High Growth and Innovative SME Facility (GIF)*. Innovative financial instruments form part of the Entrepreneurship and Innovation Programme (EIP), one of the three specific programmes under the CIP. Their overall objective is the improvement of access to finance for start-up and growth of SMEs in order to support the investments of such companies in innovation activities, including eco-innovation. The High Growth and Innovative SME Facility (GIF), with a budget of EUR 500 million, aims to increase the supply of risk capital/equity for innovative SMEs in their early stages (GIF1) and in the expansion phase (GIF2). It is operated by the EIF on behalf of the Commission (representing the EU).¹¹³ Policy DG in charge: DG ENTR, with participation of DG ECFIN for the design of the instruments;
- *The Marguerite Fund*. The 2020 European Fund for Energy, Climate Change and Infrastructure (the Marguerite Fund) is a pan-European equity fund for infrastructure investments in the transport, energy and renewable sectors. The Fund was established as a regulated, specialised investment vehicle under Luxembourg law. The Commission, representing the EU, has a seat on the Supervisory Board responsible for setting the overall strategy of the Fund, but is not involved in the day-to-day management of the Fund or in individual investment decisions, as this is the responsibility of the Management Board and Investment Committee of the Fund.¹¹⁴ Policy DG in charge: DG ECFIN, with participation of DG MOVE and DG ENER.

EU level debt instruments (guarantees/risk sharing): CIP-SMEG, RSFF, LGTT

- *Risk Sharing Finance Facility (RSFF)*. The Risk-Sharing Finance Facility (RSFF) aims to improve access to debt financing for promoters of research and innovation investments by sharing the underlying risks between the EU and the EIB. Together, the European Commission and the EIB are providing up to EUR 2 billion (up to EUR 1 billion each) to support loans or guarantees supporting the priorities of the Seventh Framework Programme for RTD (FP7). These contributions will translate into up to EUR 10 billion worth of additional financing available to innovative companies and the research community. RSFF

¹¹³ http://ec.europa.eu/enterprise/policies/finance/cip-financial-instruments/index_en.htm

¹¹⁴ <http://www.margueritefund.eu/>

financing is available for promoters and entities of all sizes and forms, including corporations, midcaps, small and medium-sized enterprises, special-purpose companies, public-private partnerships and joint ventures, research institutes, universities, science and technology parks, and research infrastructures (covering suppliers, the infrastructures themselves, and enterprises commercialising their results and services). A new RSFF facility to provide loans and leases to SMEs and smaller mid-sized firms, the Risk-Sharing Instrument (RSI), was launched at the end of 2011. It was operated by the EIF on behalf of the EIB and provides guarantees to financial intermediaries against loan defaults. The Commission intends to scale up and expand the RSFF under the proposed Horizon 2020 Framework Programme for Research and Innovation (2014-2020).¹¹⁵ Policy DG in charge: DG RTD, with participation of DGs ENER, INFSO, MOVE, ECFIN and BUDG;

- *CIP – SME Guarantee Facility (SMEG)*. The SME Guarantee Facility (SMEG), with a budget of EUR 500 million, provides counter-guarantees to national guarantee schemes as well as direct guarantees to financial intermediaries in order to increase and enhance the supply of debt finance to SMEs. SMEG is operated by the European Investment Fund (EIF) on behalf of the Commission (representing the EU).¹¹⁶ Policy DG in charge: DG ENTR, with participation of DG ECFIN for the design of the instruments;
- *Loan Guarantee Instrument for TEN-T projects (LGTT)*. The Loan Guarantee Instrument for TEN-T projects aims at facilitating larger participation of the private sector in the financing of Trans-European Transport Network infrastructure (TEN-T). Attracting private sector funding in core European transport projects can be challenging due to the relatively high levels of revenue volatility in the projects' early operating stages. The Loan Guarantee Instrument for TEN-T projects partially covers this revenue risk and consequently improves the financial viability of such TEN-T projects.¹¹⁷ Policy DG in charge: DG ECFIN and DG MOVE for the initial design of the instrument;
- *MEDIA Production Guarantee Fund*. The MEDIA Production Guarantee Fund was set up in 2010 in the framework of the MEDIA 2007 Programme. The fund is used to guarantee 50%-55% of the loans granted by local banks to film producers in order to reduce their risk and increase their lending activities in favour of the sector. It amounts to EUR 8 million over the period 2010-2013. The fund is being managed on behalf of the Commission by two different financial institutions.¹¹⁸ Policy DG in charge: DG EAC.

Instruments combining equity and debt support

- *European Progress Microfinance Facility*. The European Progress Microfinance Facility, set up in 2010, consists of two parts: 1) a guarantee instrument to providers of micro-credit (i.e. loans of up to EUR 25,000, in particular to vulnerable groups in risk of social exclusion, for the purpose of setting up small commercial operations); and 2) the European Progress Microfinance Fund, which offers loans and equity participations to micro-credit providers. The European Progress Microfinance Fund has the EU (represented by the

¹¹⁵ <http://www.eib.org/products/loans/special/rsff>

http://www.eif.org/what_we_do/guarantees/RSI/index.htm

¹¹⁶ http://ec.europa.eu/enterprise/policies/finance/cip-financial-instruments/index_en.htm

¹¹⁷ http://www.eib.org/attachments/press/2008-005-fact_sheet_en.pdf

¹¹⁸ IFCIC in France and Audiovisual SGR in Spain.

http://ec.europa.eu/culture/media/programme/overview/funding/index_en.htm

Commission) and the EIB as investors, while the EIF act as a management company.¹¹⁹ Policy DG in charge: DG EMPL, with participation of DG ECFIN for the design of the instruments;

- *European Energy Efficiency Fund*. The European Energy Efficiency Fund, which was set up in 2011 is a structured finance vehicle set up under Luxembourg law to invest either directly in smaller scale energy efficiency and renewable energy projects of local authorities and energy service companies (ESCOs), or invest in such projects indirectly via financial institutions.¹²⁰ Policy DG in charge: DG ENERGY.

Structural Funds

- In the present programming period (2007-2013), under the principle of shared management, *Structural Fund* resources can be used for establishing financial engineering instruments, which can be invested either in the form of equity, loans, guarantees or other forms of repayable investments in enterprises, mainly SMEs, public private partnerships, urban development projects; or in legal or natural persons carrying out specific investment activities in energy efficiency and renewable energies. Cohesion policy does not finance individual projects directly at the EU level, instead it funds multi-annual national or regional operational programmes aligned with EU objectives and priorities and managed by national or regional authorities. EU Structural Funds are implemented within the framework of shared management and the legislation defines a clear division of responsibilities between Member States and the Commission;
- *JEREMIE*: Joint European Resources for Micro to Medium Enterprises is an initiative of the European Commission's Directorate General for Regional Policy (DG REGIO) developed together with the European Investment Fund in order to promote the use of financial engineering instruments to improve access to finance for SMEs via Structural Funds interventions.¹²¹ Policy DG in charge: DG REGIO;
- *JESSICA*: Joint European Support for Sustainable Investment in City Areas is a joint initiative of the European Commission's Directorate General for Regional Policy (DG REGIO) developed in co-operation with the EIB and the CEB which is aimed at supporting sustainable urban development and regeneration through financial engineering mechanisms.¹²²

European Agricultural Fund for Rural Development (EAFRD)

In the current programming period (2007-2013), similar to the Structural Funds and under the principle of shared management, the EAFRD contributes to support financial engineering actions such as loan funds, guarantee funds and venture capital funds. These funds, the setting-up of which depends on the choice of the Member States and on their needs, invest in agricultural and food processing enterprises, rural non-agricultural micro- and tourism businesses, or in legal or natural persons carrying out specific investment activities in rural areas, in accordance with the relevant rural development programmes. As in the case of the Cohesion policy, the EU rural

¹¹⁹ <http://ec.europa.eu/social/main.jsp?catId=836>

¹²⁰ http://ec.europa.eu/energy/eepr/eeef/eeef_en.htm

¹²¹ http://ec.europa.eu/regional_policy/thefunds/instruments/jeremie_en.cfm

¹²² http://ec.europa.eu/regional_policy/thefunds/instruments/jessica_en.cfm

development policy does not finance individual projects directly at EU level, instead it funds multi-annual national or regional rural development programmes aligned with EU rural development objectives and priorities, and managed by national or regional authorities.¹²³ Policy DG in charge: DG AGRI.

EIB Group's own resources

The European Investment Bank is the long-term financing institution of the European Union and its mission is to help implement the EU's policy objectives by financing sound business projects. Within this context the priority objectives for the EIB's lending activities set out in the Bank's operational plan are Economic and Social Cohesion and Convergence i.e. supporting the economically less developed regions of Europe, implementing the knowledge-based economy, developing Trans-European Networks (TENs), supporting small and medium-sized enterprises (SMEs), protecting and improving the environment and promoting sustainable communities, and supporting the establishment of a sustainable, competitive and secure energy supply. The EIB has two main financing facilities:

- Individual loans: provided to viable and sound projects and programmes costing more than EUR 25 million which are in line with EIB lending objectives;
- Intermediated loans: credit lines to banks and financial institutions to help them to provide finance to small and medium-sized enterprises with eligible investment programmes or projects costing less than EUR 25 million. Micro-finance has also been provided by the EIB in some countries.

The European Investment Fund provides financial intermediaries an integrated risk finance product range of SME finance initiatives, complementing the products offered by the EIB with which the EIF forms the EIB Group. The EIF aims at satisfying existing and future market needs by designing innovative financial products such as equity products and debt products, portfolio guarantees & credit enhancement and microfinance.

For the 2014-2020 programming period, the European Commission has proposed the establishment of a Programme for the Competitiveness of Enterprises and Small and Medium-sized enterprises (COSME). One of the activities funded through the Programme aims to improve access to finance for SMEs in the form of equity and debt.¹²⁴

¹²³ http://ec.europa.eu/agriculture/rurdev/index_en.htm

¹²⁴ http://ec.europa.eu/cip/files/cosme/cosme-commission-proposal_en.pdf

Innovative public procurement

Why should innovative public procurement be part of smart specialisation?

Most of the existing research and innovation support schemes in the Member States and regions consist mainly in providing support in the form of finance, infrastructure or services for R&D or other activities and capacities that aim to produce innovations. The introduction of these innovative products or services into the market is, however, a problem that is barely addressed, or only at the end of the innovation support process.

Yet, customers are what innovative firms need most in order to be successful. Lead customers provide credibility for innovative products, and are vital for validating and further improving innovations. Having customers is also a major incentive for private investors to support innovative firms.

A comprehensive innovation support strategy thus needs to include support for identifying potential customers or fostering market opportunities (e.g. by stimulating private or public demand for eco-innovations). Starting with demand issues provides more chances for successful innovation than starting with R&D grants, as it allows the design of the innovation process to more precisely match the market opportunity and to obtain faster market take-up of the innovation.

Some of the most successful innovation support schemes — such as the US Small Business Innovation Research scheme (SBIR)¹²⁵ — take public sector demand for innovative, affordable and high-quality solutions as a starting point. They then either procure R&D services to develop innovative solutions with pre-commercial public procurement,¹²⁶ or directly engage a public procurement of innovation¹²⁷ if the necessary technologies/solutions are available but not yet in the market. The US public sector procurement of R&D&i is therefore about 20 times bigger than in the EU, and the firms benefiting from this seem to have an exceptionally good access to private venture capital for their further growth.

Also in Europe public procurement holds an enormous — so far largely unused — potential for providing demand pull for innovation and market opportunities for innovative firms, as the purchasing power of public authorities in the EU represents around 19% of the EU's GDP, equivalent to EUR 2.3 trillion a year.¹²⁸ Part of this budget stems from the ERDF.

Using public procurement as an element of a national/regional research and innovation strategy for smart specialisation offers multiple advantages, such as:

- Better match to new needs in providing more and better public services and infrastructures to citizens and firms than off-the-shelf products could offer,

¹²⁵ <http://www.sbir.gov/>

¹²⁶ http://ec.europa.eu/information_society/tl/research/priv_invest/pcp/index_en.htm

¹²⁷ http://ec.europa.eu/enterprise/policies/innovation/policy/lead-market-initiative/public-proc_en.htm

¹²⁸ http://ec.europa.eu/internal_market/publicprocurement/docs/indicators2009_en.pdf

- Cost-savings for public budgets in the medium- and long-term thanks to more efficient energy or resource solutions (e.g. functional requirements),
- Higher impact of innovation investments thanks to a comprehensive strategy that combines R&D investments (e.g. in eco-innovation) with purchasing innovations (e.g. of energy efficient and low carbon buildings or transport),
- Higher mobilisation effect on private investors/venture capital, thanks to the faster market access and return-on-investment for innovative firms.

Barriers and challenges

The main reasons why still too few public procurers in the EU buy innovations and why the procurement of innovation is still hardly used as an innovation support tool are:

- Lack of or wrong incentives for public procurers: Procurers tend to favour low cost, low risk, and off-the-shelf solutions once the (political) decision on what to buy and at which price has been made, even when there are longer-term benefits to public service providers in testing and procuring new technologies and solutions;
- Lack of knowledge of public procurers on what new technologies and innovations are available in the internal market or are possible and what could be the medium to long-term benefits and cost savings;
- Lack of capabilities of public procurers to manage procurement procedures involving market consultations, competitive dialogues, cost-benefit evaluations, life-cycle costing assessments, etc.;
- Fragmentation in demand and lack of critical mass: In general, individual procurements are mostly too small for companies to make investments in innovations worthwhile. There are hardly any mechanisms to allow the pooling of risk and resources across countries and different administrations;
- Difficulties for innovative SMEs to become involved in public procurement as direct suppliers, as shown by the EC study on SMEs access to public procurement.¹²⁹ This hampers the access of public authorities to the innovative potential of SMEs, in particular high-tech SMEs who play a key role in creating innovative solutions;
- No strategy that links public procurement with other public policy objectives: for example, the administrations in charge of health and care services, environment, mobility, energy, housing, waste and water management do not perceive themselves as having any role to play regarding support for innovative firms. On the other hand, administrations in charge of research, innovation and business support do not include in their strategies the question of what innovative solutions the public sector would need to procure. In addition, the two sides of the administration do not jointly develop their strategies.

How to act?

The ERDF permits the strategic combination of investments in R&D&i capacity-building with demand-side measures in a unique manner. This is particularly true for public procurement, as the partnership contracts and strategic reference frameworks include different strands of

¹²⁹ <http://ec.europa.eu/enterprise/policies/sme/business-environment/public-procurement/>

administration (e.g. environment, transport, industry, innovation) and allow the development of strategies that cover entire countries (and even beyond).

Therefore, the European Commission recommends:

- The development of smart specialisation strategies to include the issues of market-up-take and public procurement needs among the starting points for identifying the fields of specialisation. Funding, for instance, the development of energy-efficient technologies becomes more credible and has more impact, if the public sector buys them as a lead customer for applying and testing them in practice;
- Encouraging procurers to purchase innovative solutions by rewarding them and by decreasing the potential innovation costs and financial risks through ERDF co-funding;
- The recognition of the procurement phase as strategic in public policy cycles, by associating procurement departments at an early stage in the definition of a project and of regional innovation strategies for smart growth;
- Supporting transparency for the procurers, to get to know the market better and to stimulate innovation; and for businesses (in particular SMEs) to better understand and anticipate the requirements of contracting authorities;
- Supporting a change in procurement practices towards more demanding requirements/specifications to pull innovations to the market (e.g. related to green public procurement and life-cycle-costing) in order to encourage the procurer to become an 'intelligent' customer.¹³⁰ This can be achieved through better preparatory work and capacity-building in procurement offices both as regards the identification of state-of-the-art technologies/solutions in the market and the capacity to manage complex procurement procedures.

Concrete actions to develop

- To support the capacity-building of procurement departments through training, exchanges of civil servants/procurement officers and exchanges and promotion of good practices amongst peers¹³¹ (e.g. awarding prizes for the best innovation procurement or methodology¹³²), and developing guidance,¹³³ including sector orientation such as for the health,¹³⁴ construction,¹³⁵ energy efficiency¹³⁶ or protective textile sectors,¹³⁷ by building procurer groups and networks¹³⁸;

¹³⁰ <http://www.proinno-europe.eu>

¹³¹ <http://www.comune.torino.it/relint/PPI/>

¹³² <http://lcc.sustainable-procurement.org/>

¹³³ http://www.europroc.eu/public/docs/europroc_navigate_change_public_procurement_4fgd.pdf

¹³⁴ <http://lowcarbon-healthcare.eu/>

¹³⁵ http://www.sci-network.eu/fileadmin/templates/sci-network/files/Resource_Centre/Reports/Innovation_in_construction_procurement_-_Preliminary_report.pdf

¹³⁶ <http://www.smart-spp.eu/index.php?id=7633>

¹³⁷ <http://www.enprotex.eu>

¹³⁸ http://ec.europa.eu/enterprise/policies/innovation/policy/public-procurement/index_en.htm#h2-1

- To support procurers to better engage with the market¹³⁹ by involving innovation agencies,¹⁴⁰ chambers of commerce, cluster organisations/sectoral platforms, SME support organisations (e.g. Enterprise Europe Network¹⁴¹) and other bodies that can assist in developing demanding specifications;
- To invite and guide procurers to join forces with others, in order to attain critical mass, making it interesting for firms to develop innovative solutions for a bid and in order to pool capacities (legal, procedural, knowledge of market, technologies and performance levels, administrative budgets for the procurement processes, etc.);
- To financially support the procurement of innovative solutions (goods & services), through targeted and limited grants to contracting authorities.

Where to get inspiration

- The Procurement Forum from various procurement of innovation fields provides access to a community of procurers with experience in the field of innovation¹⁴²;
- Trans-national networks between Public Procurement for innovation were set up with the support of the CIP programme to facilitate the sharing of good practices and the joint market and technology screening and development of specifications around selected topics: sustainable construction of hospitals,¹⁴³ protective textiles for fire brigades¹⁴⁴ and sustainable construction.¹⁴⁵ Many of their methodological findings are of a general nature and can inspire innovative procurement initiatives in other fields;
- Several on-going projects dedicated to support networks of European procurers engaged in pre-commercial procurement are running under the Seventh Framework Programme (FP7)¹⁴⁶;
- European Commission actions to support the development of Green Public Procurement that are boosting the procurement of innovation and eco-innovative solutions¹⁴⁷;
- The Enterprise Europe Network also developed 3 networks of members dedicated to facilitating the meeting between innovative SMEs and public buyers of innovation¹⁴⁸;
- Member States (UK,¹⁴⁹ NL,¹⁵⁰ FI,¹⁵¹ SE, BE, AT, FR, IT, SP...) and Regions (Flanders,¹⁵² Észak-Alföld,¹⁵³ Helsinki Metropolitan Area,¹⁵⁴ Greater London¹⁵⁵...) are implementing schemes for enhancing public procurement of innovation and pre-commercial procurement;

¹³⁹ http://www.smart-spp.eu/fileadmin/template/projects/smart_spp/files/D1-3_report_on_impacts_on_the_market.pdf

¹⁴⁰ <http://www.proinno-europe.eu/inno-grips-ii/article/fostering-innovation-through-public-procurement>

¹⁴¹ http://www.enterprise-europe-network.ec.europa.eu/index_en.htm

¹⁴² <https://procurementforum.viadesk.com/do/login/>

¹⁴³ <http://lowcarbon-healthcare.eu/>

¹⁴⁴ <http://www.enprotex.eu/>

¹⁴⁵ <http://www.sci-network.eu/>

¹⁴⁶ http://cordis.europa.eu/fp7/ict/pcp/home_en.html

¹⁴⁷ http://ec.europa.eu/environment/gpp/index_en.htm

¹⁴⁸ <http://www.prismeprocurement.eu>; <http://www.winningtenders.eu/t4sme-tender-trial/>;
<http://www.dubchamber.ie/>

¹⁴⁹ <http://www.bis.gov.uk/policies/innovation/procurement>

¹⁵⁰ <http://www.agentschapnl.nl/onderwerp/aanbesteden-van-innovaties>

¹⁵¹ <http://www.tekes.fi/about/publicprocurements/funding>

¹⁵² <http://www.procurementofinnovation.eu/>

¹⁵³ <http://innova.eszak-alfold.hu/?lang=en>

- Several European studies are supporting the policy support to procurement of innovative solutions (e.g. Public Procurement of Innovation: Towards a European Scheme¹⁵⁶);
- Information on EU level policy development for procurement of innovative solutions.¹⁵⁷

¹⁵⁴ <http://innova.eszak-alfold.hu/?lang=en>

¹⁵⁵ <http://www.london.gov.uk/rp/>

¹⁵⁶ http://ec.europa.eu/enterprise/policies/innovation/policy/lead-market-initiative/pp-conf2_en.htm

¹⁵⁷ http://ec.europa.eu/enterprise/policies/innovation/policy/public-procurement/index_en.htm

Green growth

Why should green growth be part of smart specialisation?

In a resource-constrained planet, Europe needs to accelerate its transition towards a climate resilient and greener economy to boost its competitiveness and be able to sustain its growth.

This is why sustainable growth is one of the priorities of Europe 2020, which stresses the need for a transition to a green, low-carbon, resource-efficient economy as a new paradigm for sustainable growth. Innovation is essential to succeed in decoupling growth from natural capital utilisation and is therefore the key to enabling sustainable and smart growth to go hand in hand. Innovation strategies for smart specialisation will need to foster green growth. This will result in an EU economy that is more competitive in a world of high energy prices and tough resource constraints and competition. In this framework, public decision-makers and stakeholders in Europe's regions and cities, which are responsible for designing, implementing and monitoring these strategies, play a crucial role.

Not only do they often set the framework, but local and regional authorities are also usually responsible for implementing policies, programmes, legislation and public investments in key areas for sustainable growth and innovation such as energy, environment, transport, land-use, education or social services. The coordination of different policies and different levels of government is always a challenge, but it is critical in accelerating the transition towards a greener economy and getting the actors of innovation and environment working together. Moreover, regions have to reflect on how to benefit from the fast-emerging green eco-innovation sector.

How to act?

In the current programming period, ensuring innovation for sustainable growth requires improved coordination between different operational and rural development programmes in the areas of innovation, competitiveness, environment and energy. This requires integrated and cross-cutting approaches that combine innovation and sustainability into joint policies and programmes.

Managing authorities need to work together and make sure to involve relevant actors, such as environmental or energy agencies as well as NGOs and other representatives of civil society. Public and private sector decision-makers need to integrate sustainable development principles into their day-to-day decision making process. Sustainability must be integrated throughout the strategies for growth and in the project life-cycle, taking into account the impacts on the environment from design to delivery and end-of-life.

As part of their innovation strategies for smart specialisation, public authorities at regional and local level also need to design interventions that help to overcome specific market failures in this area, as well as improving the supply of green innovation, technologies and solutions. Among the core measures that should be encouraged are:

- Commissioning a strategic analysis and approach on the region's own characteristics, assets, challenges and opportunities as regards its environment, natural assets, renewable energy potential and climate impacts in the studies that will serve as a basis for the identification of the priorities to be established regarding smart specialisation;
- Increasing the support for new entrepreneurial firms that aim to deliver more radical eco-innovations and challenge existing firms and business models, or that deploy new environmental technologies;
- Improving access to finance, knowledge, and know-how and skills development in order for SMEs to boost their resource efficiency and develop new products and services that are more environmentally-friendly;
- Enhancing international and interregional co-operation on innovation for sustainable growth.

It is also necessary to go beyond the creation and supply of new technologies and innovations and strengthen the diffusion and take-up of innovations for sustainable growth. Such policies include:

- Reinforcement of markets for green innovation: local and regional authorities need to deploy more Green Public Procurement,¹⁵⁸ possibly in synergy with Innovative Public Procurement, as a key lever to boost innovation and sustainable development;
- Promoting changes in consumer behaviour and social innovation: consumer policy, education and information as well as labelling;
- Taking an exemplary role, for instance in engaging the administration in EMAS certifications¹⁵⁹ or state-of-the-art renovation of public buildings for improved energy efficiency¹⁶⁰;
- Other instruments such as fiscal or pricing mechanisms can, in certain cases, also be in the hands of regional authorities.

For the next programming period, the contribution of key areas of sustainable growth is ensured. Environment, climate change and energy are specifically included in the draft new regulatory package, covering all shared managed funds, through thematic objectives, investment priorities, and also as a cross-cutting principle. The proposed regulations include concrete ex-ante conditionality requesting MS to comply with EU's waste, water, climate and energy legislation to ensure efficient use of the funds in those areas. Furthermore, ERDF resources are earmarked for thematic priority 'supporting the shift towards a low-carbon economy in all sectors; in particular, at least 20% in more developed and transition regions and at least 6% in less developed regions. Ring fencing of a 5% minimum share on Sustainable Urban Development will also contribute to address environmental, energy & climate challenges in cities

¹⁵⁸ http://ec.europa.eu/environment/gpp/toolkit_en.htm

¹⁵⁹ http://ec.europa.eu/environment/emas/tools/index_en.htm

¹⁶⁰ http://www.e2b-ei.eu/e2bjti_about.php?sSe=3

Challenges in specific areas

Sustainable energy

For the period 2014-2020, the Commission has proposed a significant concentration of cohesion policy efforts on renewable energy and energy efficiency. For example, the more developed regions and those regions that did not yet complete their catch-up process would have to spend 20% of their ERDF allocations on this topic, and the less developed regions 6%. Rural development policy has also reinforced its contribution for the energy investments.

Yet, achieving the EU's 20-20-20 objectives on greenhouse gas emissions, energy efficiency and renewables will require further innovations and a revolutionised energy system. In addition to this large scale roll-out of already established solutions, research and innovation will thus be critical to make new, cleaner, more efficient energy sources commercially attractive at the scale needed. The Strategic Energy Technology Plan (SET-Plan)¹⁶¹ provides a long-term agenda to address the key innovation bottlenecks. Thus, in assessing their position and assets in the context of the development and the subsequent implementation of their innovation strategies for smart specialisation, regions are invited to make full use of the knowledge developed in the framework of the SET-Plan.

Eco-innovations

The forthcoming EU Eco-Innovation Action Plan underscores that eco-innovations are central to addressing the challenges of resource scarcity, air, water and soil pollution or water efficiency. Eco-innovations also create major opportunities for growth and jobs and increase European competitiveness within the global market, which is estimated to grow to a trillion EUR market after 2015.¹⁶² Already 45% of companies have introduced some type of eco-innovation. It has been estimated that around 4% of eco-innovations led to more than a 40% reduction of material use per unit of output,¹⁶³ highlighting the great future potential.

They must be promoted not only through technologies, but also through business processes and organisational change. In particular a closed-loop economy that aims to reduce, in absolute terms, input, waste and the release of harmful substances along the value chain and foster re-use, recycling and resource substitution should be further reinforced.

This needs new business models, industrial symbiosis, product service systems, product design, full life cycle and cradle-to-cradle approaches. Managing authorities are encouraged to put eco-innovations at the core of their innovation strategies as a cross-cutting requirement in all sectors, liaising with the area-specific stakeholders in the field of energy, water and other natural resource management. The aim is to embed eco-innovations from the outset in the design and development of the strategies and programmes for innovation and tap into its opportunities.

¹⁶¹ http://ec.europa.eu/energy/technology/set_plan/set_plan_en.htm

¹⁶² European Parliament 'Policy Department Economic and Scientific Policy, Eco-innovation - putting the EU on the path to a resource and energy efficient economy, Study and briefing notes', March 2009.

¹⁶³ Eco-innovation Observatory 'The Eco-Innovation Challenge - Pathways to a resource-efficient Europe - Annual Report 2010', May 2011.

Nature

Eventually, the challenges that regions face in terms of adaptation to climate change and the preservation and management of their natural assets ask for innovative approaches for regions to fully benefit from the underlying opportunities. Nature and its resources need to be fully integrated in the regional approaches to sustainable growth and the national/regional innovation strategies for smart specialisation.

First, the sustainable management of a region's natural assets needs research and innovation to further build knowledge and practical outcomes in terms of improved preservation and management instruments, practices and applications. Second, a region's natural assets can be the very start of innovation activities and the development of new technologies or solutions, for instance in the case of renewable energy sources but also the expansion of the bio-economy.

Therefore, innovative methods need to be taken into account to monitor and manage nature in broad partnerships that include the business community, the agriculture and forestry sector, civil society and municipalities. Action is also very much needed in the realm of social innovation, to engage communities positively in the preservation of the local natural resources and assets.

Social innovation

Why should social innovation be part of smart specialisation?

Social innovation is important for regional development, as it can create new business opportunities, provide new perspectives to citizens, and help the modernisation of the public sector. It can also be a vehicle for making policies more responsive to social change and to encourage and support innovative social enterprises. Social innovations are innovations that are social in both their ends and their means. Specifically, we define social innovations as new ideas (products, services and models) that simultaneously meet social needs (more effectively than alternatives) and create new social relationships or collaborations. In other words, they are innovations that are both good for society and enhance society's capacity to act.¹⁶⁴

Social innovation is about developing new forms of organisation and interaction to respond to social/societal issues. They address a social demand or need (e.g. elder care), contribute to addressing a societal challenge (ageing society) and, through their process dimension (e.g. the active engagement of the elderly, new services) they contribute to re-shaping society in the direction of participation, empowerment, co-creation and learning.

For these reasons social innovations offer a way of tackling societal challenges when the market and public sector do not respond effectively to the social needs. They also contribute positively to diminishing the innovation divide by involving end-users (including disadvantaged groups) and stakeholders into innovation processes, promoting inclusive growth. Therefore, they are a relevant rationale to have in mind while designing innovation strategies for smart specialisation.

Social innovators can come from all walks of life. Social innovations can be developed by private, public and third sectors, and should involve households and citizens, i.e. the quadruple helix, and can be implemented at national, regional and local level.

Barriers and challenges

Social innovation is a relatively new concept for which a theoretical framework is being developed. There is a risk of it being hampered by insufficient knowledge, limited support of grass roots, social enterprise and social entrepreneurship activities, poor diffusion and little scale-up of good practices, and poor methods of impact evaluation. The context for developing social innovations is very different across European countries' welfare regimes (i.e. the relative role of state, market, family).

Social innovation challenges traditional structures, forms of organisation and power relations, which are difficult and slow to change. New forms of engaging with employees, end-users or citizens, NGOs and local communities can be powerful tools for innovation, making better use of their innovation potential, for example through co-creation, workplace innovation or quadruple helix models (including civil society), however, they require a considerable mentality change.

¹⁶⁴ Social Innovation Exchange and Young Foundation 2010 Study on social innovation for BEPA.

Access to finance can also constitute a barrier. For example, social enterprises may not have as easy an access to finance from banks as other enterprises. Projects need to be encouraged to get out of grant logic and become self-sustainable. Financial engineering tools can offer alternatives whose potential has not been exploited well enough in the social (innovation) sector.

But social innovation can create new business opportunities, e.g. in growth sectors like health and education. It can also play an important role in the modernisation and transformation of the public sector and public services, through cooperation with social enterprises, NGOs and civil society, and needs therefore to be exploited.

How to act?

Member States and the EC are investing in social innovation activities. Examples can be found in urban regeneration, community-led local development, microfinance, (e-)health and ageing, workplace innovation, co-creation, service innovation and social and/or green public procurement.

It is important to link business, the public sector, the social economy and civil society. To make an impact, regional and managing authorities must use the expertise of public organisations such as innovation agencies, social/work agencies and regional development agencies, but also NGOs, volunteering organisations, religious organisations, etc. should not be left untapped.

New cooperation structures and partnerships can be set up, incubation facilities can be provided for social enterprises and citizens' initiatives as well as measures to stimulate the development and scaling-up of social enterprises aiming at the creation of social value. Public sector is central in the delivery of many services of social and economic value. In this regard, it has a pivotal role in answering (together with private stakeholders and the civil society) today's major societal challenges such as demographic ageing, increased demand for healthcare services, risk of poverty and social exclusion, the need for better and more transparent governance, and a more sustainable resource management.

Public sector innovation may involve notably, new or improved services (e.g. healthcare at home), organisational innovation, system innovation (e.g. new patterns of co-operation and interaction) and conceptual innovation (e.g. a change in the outlook of actors). This can lead to increased efficiency and the delivery of new and better quality services that respond not only to the users' evolving needs and expectations but also to budget constraints.

Directorate General (DG) Regional Policy is publishing a *guide on social innovation for the EU's regions*. It will contain guidance on how to design regional strategies that include social innovation as a potential for growth and change.

The categories for the Regiostars awards for 2013 (organised by DG Regional policy) include a category for social innovation.¹⁶⁵

¹⁶⁵ http://ec.europa.eu/regional_policy/cooperate/regions_for_economic_change/regiostars_13_en.cfm

Micro-finance has proven to be a good tool to support social innovation enterprises. In this respect, the European Commission has launched the JASMINE scheme. JASMINE, the Joint Action to Support Micro-finance Institutions in Europe. JASMINE is a joint initiative of the Commission and the EIB group to support non-bank micro-credit providers in the EU. JASMINE seeks to help non-bank micro-credit providers to improve their governance, information systems, risk management and strategic planning with a view to obtaining a better access to the private capital markets, to expand and become sustainable.¹⁶⁶

The *European Social Fund (ESF)* has made significant investments in social innovations, ranging from supporting local partnership and enhancing the capacity-building and networking of local stakeholders to implementing active labour market policies. For the next programming period, social innovation is treated in a horizontal way in the ESF regulation. DG Employment, Social Affairs and Inclusion will also directly fund social experimentation projects through PROGRESS and the Programme for Social Change and Innovation to reform social policy. Furthermore, they have published a methodological guide on social experimentation for policy makers¹⁶⁷ and will set up further information initiatives (databases, conferences) and a high-level expert group on social experimentation.

DG Internal Market has launched the *Social Business Initiative (SBI)*, as part of a 'Responsible Business package', including also a communication on CSR and directives on accounting and transparency.¹⁶⁸ The aim of the SBI is to make access to the market and to finance easier for social enterprises. Co-initiators of the SBI are DG Enterprise and DG Employment, Social Affairs and Inclusion. Early December, the Commission proposed the Regulation on European Social Entrepreneurship Funds.¹⁶⁹

DG Enterprise has mobilised *CIP* funds for social innovation. CIP funds will create a social innovation prize, exploit the development of incubators for social enterprises, and organise a conference on workplace innovation in cooperation with the Flemish government. They are also coordinating the Social Innovation Europe Initiative, with an online hub for social innovators¹⁷⁰ and two studies to be published soon, one on financing social innovation and one on measuring and evaluating social innovation.

The Seventh Framework Programme FP7 has launched various calls for proposal related to social innovation under the 'Social sciences and humanities' strand. HORIZON 2020 will also include social innovation.¹⁷¹

1.1. ¹⁶⁶ http://ec.europa.eu/regional_policy/thefunds/instruments/index_en.cfm

¹⁶⁷ <http://ec.europa.eu/social/main.jsp?catId=88&langId=en&furtherEvents=yes&eventsId=358>, download on the right of the page.

¹⁶⁸ Press release on the package:

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/11/1238&format=HTML&aged=0&language=en&guiLanguage=en>; SBI texts (communication + working document + FAQ):

http://ec.europa.eu/internal_market/social_business/index_en.htm

¹⁶⁹ http://ec.europa.eu/internal_market/investment/docs/social_investment/20111207proposal_en.pdf

¹⁷⁰ www.socialinnovationeurope.eu

¹⁷¹ [http://ec.europa.eu/research/horizon2020/pdf/proposals/com\(2011\)_811_final.pdf](http://ec.europa.eu/research/horizon2020/pdf/proposals/com(2011)_811_final.pdf).

The *Digital Agenda* also includes scope for social innovation, through e-health and ageing and e-government, for example. DG Information Society and Media is applying the concept of user-driven innovation in Living Labs and in a number of European Cities supported by CIP ICT-PSP funds. The implication of users and of citizens in the whole process from conception and development down to validation and dissemination is expected to bring societal innovation in many sectors such as e-health, ageing, and local government.

ANNEX III: REGIONAL RESEARCH AND INNOVATION STRATEGIES FOR SMART SPECIALISATION: GUIDANCE FOR EXPERT ASSESSMENT

1. Is the strategy based on appropriate stakeholder involvement? How does it support the entrepreneurial discovery process of testing possible new areas?

1.1 Has the strategy been developed through a broadly-based process of direct stakeholder involvement, including mainly regional government/regional agencies, entrepreneurs, knowledge providers but also other/new stakeholders with the potential for innovative contributions, through measures such as surveys, consultations, dedicated working groups, workshops, etc.?

1.2 Has this process been adequately described or referred to in the submitted document?

1.3 Is there an identified leader of the RIS3 process? If yes, who is it? Does the strategy identify the leading entrepreneurs involved in the process?

1.4 Is the priority-setting in the strategy based on an identification of market opportunities/economic potential informed by an entrepreneurial search/discovery process, i.e. by a process foreseen to identify and test specific entrepreneurial opportunities?¹⁷²

2. Is the strategy evidence-based? How have areas of strength and future activity been identified?

2.1 Does the strategy include/build on a sound analysis of the country's/region's existing situation with regard to scientific/technological and economic specialisations or refer to such an analysis/related studies?

2.2 Is it based on a sound assessment of the competitive assets of the region, including an analysis of its strengths, weaknesses and bottlenecks?

2.3 Besides a SWOT analysis, what other quantitative and qualitative information/methods have informed the strategy (e.g. cluster analysis, value chain analysis, peer review, foresight)?

2.4 Does the document propose a vision for the region? Is this vision clearly described, credible and realistic?

¹⁷² In this context entrepreneurial search or discovery is to be understood broadly, as a combinatorial process that is not confined to the private sector but is a synthesis and integration of dispersed and fragmented global and local knowledge (technological, business and societal) to inform S3 choices and identify opportunities for the region to expand/ into new domains.

3. Does the strategy set innovation and knowledge-based development priorities? How have potential areas of future activity been identified? How does it support the upgrading of existing activities?

3.1 Does the strategy outline a limited set of innovation and knowledge-based¹⁷³ development priorities?

3.2 Are these priorities sufficiently specific in identifying existing/potential niches for smart specialisation and related upgrading of existing activities or potential future activities?

3.3 Do the thematic priorities chosen in the strategy reflect the description and analysis of the regional economic structure, competences and skills?

3.4 Does the strategy take into account considerations for achieving critical mass and/or critical potential in the priority areas selected?

4. Does the strategy identify appropriate actions? How good is the policy mix?

4.1 Does the strategy include action lines and/or realistic roadmaps in line with the objectives? Are these sufficient to reach the objectives?

4.2 Does the strategy indicate which bodies are responsible for the implementation of these action lines/roadmaps?

4.3. How does the strategy support/facilitate:

- cross-clustering and the identification of innovation opportunities at the interface between different disciplines/industries/clusters?
- entrepreneurship and the innovation capabilities of SMEs, for instance by facilitating the diffusion and adoption of technologies, incl. Key Enabling Technologies?¹⁷⁴
- the improvement of demand-side conditions and, in particular, public procurement as a driver for innovation?

Are there sector-specific support services/schemes foreseen?

4.4 Does the document outline measures to stimulate private R&D&i investments, for instance through public-private partnerships? Does it demonstrate/aim at financial commitment of the private sector with the strategy?

4.5. Does the strategy identify budgetary sources, and does it present indicative budget allocations?

¹⁷³ Incl. non-technological and service-sector innovation

¹⁷⁴ The six KETs are: nanotechnology, micro-nanoelectronics, advanced materials, photonics, industrial biotechnology and advanced manufacturing systems.

4.6 Does it include a sufficiently balanced mix of soft innovation support services and financial instruments? Does it foresee an appropriate mix of grants, loans and financial engineering (venture capital)?

5. Is the strategy outward looking and how does it promote critical mass/potential?

5.1 Does the strategy take into account the competitive position of the country/region with regard to other countries/regions in the EU and beyond, as well as its position within global value chains?

5.2 Does it foster the internationalisation of SMEs and does it stimulate regional clusters/initiatives to make connections within international/global value chains?

5.3. Does it foster strategic cooperation with other regions (please note whether the regions foresee the allocation of mainstream Structural Funds within their Operational Programmes and/or cooperation through INTERREG)?

5.4 Are sufficient efforts being made with regard to avoiding imitation, duplication and fragmentation, in particular with regard to what is happening in neighbouring regions?

6. Does the strategy produce synergies between different policies and funding sources? How does it align/leverage EU/national/regional policies to support upgrading in the identified areas of current and potential future strength?

6.1 Is the strategy and its priority-setting complementary to national-level priorities, e.g. is it in line with the National Reform Programme?, and is it in synergy with national research/education policies?

6.2 Is the strategy based on inter-departmental/inter-ministerial/inter-agency coordination and cooperation covering relevant policies, in particular between research/science policies and economic development policies, but also with regard to other relevant policies such as education, employment and rural development policies? Does it assess/take into account the existing level of policy coordination within the region?

6.3 Does the strategy include a clear reflection/proposal on how to exploit synergies between different European, national and regional funding sources, in particular between ERDF and Horizon 2020 but also with other key programmes such as ESF, EAFRD and COSME?

6.4 Does it consider both upstream and downstream actions to and from Horizon 2020, financed by Cohesion Policy?¹⁷⁵ How does the strategy link to relevant European (ESFRI) as well as smaller national and regional partnering facilities?

¹⁷⁵ Upstream actions aim at preparing regional R&I players/teams to participate in Horizon 2020. This may involve enhancing R&I infrastructures, the modernisation of universities and research organisations as well as developing technology auditing, international partner search and information campaigns to stimulate and facilitate participation in Horizon 2020. Downstream actions aim to diffuse R&I results from Horizon 2020 swiftly into the market. These might include pilot plants and demonstration sites, proof of concept and early stage financing incubation facilities, applied research, specific industrial and technology transfer capabilities and cluster support.

7. Does the strategy set achievable goals and measure progress? How does it support a process of policy learning and adaptation? How is it to be communicated?

7.1 Does the document identify concrete, achievable goals? Does it identify output and result indicators and a realistic timeline for these goals?

7.2 Does the region have a sound governance and monitoring system in place to implement, monitor and evaluate the regional innovation strategy? Does this support a process of continuous policy learning and adaptation? If not, are actions foreseen to build up capabilities for that?

7.3 How is the strategy to be communicated to stakeholders and the general public? What are the mechanisms for ensuring support for the strategy from critical groups and the active participation of such groups in its implementation?

8. What are the conclusions and which advice can be given to improve the strategy?

8.1 If the strategy is based on an earlier strategic exercise/innovation strategy, has it been appropriately reviewed and updated? What is done/going to be done differently as a consequence of the strategy and process compared to the previous/existing economic strategy?

8.2 Can the strategy be regarded as a regional research and innovation strategy for smart specialisation? What are its strong aspects? What are its weaker parts?

8.3 What needs to be changed/improved? Feel free to add any other comment you may have that could help the region to improve its RIS3 process and strategy.

