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THE PROCESS DIMENSION OF SMART SPECIALISATION: SOCIAL AND POLITICAL CHALLENGES TO THE REGIONAL DECISION-MAKING IN EUROPE

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The process dimension of smart specialisation: social and political challenges to the regional decision-making in Europe

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Declaration

I declare that the work submitted in this thesis is the result of my own investigation and the views expressed are my own. No portion of this work has been submitted for any other degree of award at this or any other university or place of learning, nor is being submitted concurrently in candidature for any degree or other award.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF ABBREVIATIONS

DG REGIO	European Commission's Directorate-General for Regional and Urban Policy
EC	European Commission
EDP	Entrepreneurial Discovery Process
EQI	European Quality of Government Index
ERDF	European Regional Development Fund
ESF	European Social Fund
ESIFs	European Structural and Investment Funds
EU	European Union
GVC	Global Value Chains
GPT	General Purpose Technology
KET	Key Enabling Technologies
ICT	Information and Communication Technologies
LDR	Less Developed Regions
MDR	More Developed Regions
OP	Operation Program
R&D	Research and Development
R&I	Research and Innovation
RIS	Regional Innovation Systems
RIS3	Research and Innovation Strategies for Smart Specialisation
SME	Small and Medium-sized Enterprise
S&T	Science and Technology
TO	Thematic Objective

ABSTRACT

Smart specialisation strategies are a key element of the reformed 2014-2020 EU Cohesion Policy, both because of the novelty of their approach and because of being the object of an ex-ante conditionality. The development of smart specialisation strategies is not a voluntary bottom-up practice but a coercive requirement that the European Commission introduced and imposed on all Member States and regions to make innovation policies more effective over the on-going programming period, thus emerging as an agenda for innovating innovation policies, and more precisely processes.

The thesis questions how smart specialisation's transformational ambitions are implemented in the world of policy practice by proposing a policy learning based approach to investigate the ongoing deployment of the new agenda. Through a qualitative field analysis conducted in two case study regions, Apulia and Sicily (IT), the research discusses the extent to which the new approach is able to trigger a collective learning process and a durable change of strategy-making processes in EU regions, and if so, under what conditions. The main assumption is that in order to be successfully designed and implemented, RIS3 require the presence of policy learning at all the different levels i.e. within the public sector, at the regional innovation system level and between different systems horizontally and vertically, and throughout all phases of the policy cycle, from design to implementation and evaluation. The main evidence and recommendations are discussed from an international perspective by comparing how the new agenda is absorbed and operationalized in different EU settings.

INTRODUCTION: SMART SPECIALISATION AND POLICY LEARNING

Research and Innovation Strategies for Smart Specialisation (RIS3) are the newest European approach to regional innovation policy. As part of the 2014-2020 Cohesion Policy reform, the European Commission (EC), and more precisely the Directorate General for Regional and Urban Policy (DG REGIO), introduces the development of national and/or regional RIS3 as legal ex-ante conditionality for accessing innovation funds under the on-going programming period.

RIS3 refer to a place-based, multi-level and innovative paradigm meant to encourage the development of intelligently designed research and innovation (R&I) policies by all Member States and regions of the European Union (EU) (OECD, 2009; Foray, 2015).The fact that the RIS3 agenda is an obligation imposed on all Member States and regions signals a real and deep change in the EU approach to R&I policy. RIS3 are not a voluntary bottom-up practice but a coercive requirement introduced to make strategies more effective. Likewise, it is worth stressing that smart specialisation as a concept is nothing new in itself but the culmination of a long-standing debate that has been discussed at the EU level over the last couple of decades around the 'how' of regional innovation policies. The idea of smart specialisation is supported by key economic geography and systems thinking literature, and based on practical experimentations that have developed the field of regional innovation policies during the last decades. The concept was first coined in 2009 within the Knowledge for Expert Group, the independent advisory body established in 2005 by Research Commissioner J. Potocnick in the context of the need to reinvigorate the Lisbon Strategy. The principle of smart specialisation is introduced as a possible response to the need to improve EU regions capacity to attract foreign research and development (R&D), especially vis a vis the USA (Foray et al., 2009). EU inefficiencies were mainly explained by the scarcity of agglomeration economies. Regions often tend to compete for the same assets and research systems have a strong national base, and are thus unable to fully capture the potential of economies of scale and spill-over arising from the varieties existing at regional level (EC, 2013). Instead, according to the new paradigm each territory should concentrate its innovation investments in areas in which it has existing or potential competitive advantages. Smart specialisation is about each region finding its own role within global economy through the identification of the unique characteristics and assets of territory, and by rallying regional stakeholders and resources around an excellence-driven vision of their future (Foray et al., 2012).

The concept has moved from theory to ex-ante conditionality in a very short span of time. A fertile debate was nurtured around smart specialisation at the time when the future of ESIF 2014-2020 was discussed, and three years after its first appearance – with the publishing of the official Guide to RIS3 (Foray et al., 2012) by the newly established Smart Specialisation Platform (S3 Platform) - the

RIS3 theory was almost there to be applied. A key issue animating the on-going debate concerns the actual feasibility of the new agenda in different contexts (Foray, 2015). RIS3 is a method to shape specific regional paths grounded in innovation and cluster development, which responds to the need to move quickly towards a new season of place-based policies in Europe (Barca, 2009). Its operationalization is characterized by two innovative elements: the requirement to set up an Entrepreneurial Process of Discovery (EDP), and the need to fulfil the principle of inclusiveness. EU Member States and regions are required to identify the knowledge specialisations that best fit their innovation potential, through a process of discovery that includes all the relevant entrepreneurial actors, from both the private and the public sector in the decision-making process (Foray et al., 2009). Under the new paradigm, a strong emphasis is put on the need to introduce new blood into the process (Morgan, 2016b). The nature of the required changes is about modes and procedures more than at the scales of interventions, making it the case for framing smart specialisation as an agenda for 'innovating innovation policies', and more precisely, processes.

The thesis questions how the EC prescriptions find realisation in the world of policy practice. Three years after its introduction, contradictions between the rhetoric of the smart specialisation discourse and the reality of its implementation are emerging. When moving to deployment, the new agenda can lead to very different results right up until the point of overturning the initial theoretical ambitions. Succeeding within RIS3 depends on the mix of entrepreneurial skill, adaptive behaviours and institutional capacity present within different EU contexts and able to leverage knowledge sharing capacity and exchange, making institutional capacity building even more relevant than in past approaches (McCann and Ortega-Argiles, 2013). Particularly for the purpose of investigating how the RIS3 prescriptions are applied by EU regions, the interpretative key of policy learning is proposed within this research. Learning is the most critical aspect of the new paradigm. Learning is what can make the difference between the mere drafting of the strategy according to opportunistic behaviours, inspired by the need to formally fulfil EC's requirements, and its interpretation and adoption as an opportunity to increase the quality and efficiency of innovation processes and thus enhance the possibility of all EU regions to effectively take part in the new round of regional innovation policies. In satisfying the EC tasks and exploiting the full potential of the new agenda, the local institutional arrangements and their quality have the potential to make a difference to how well or badly the process is implemented, even more than for past innovation policies. Three so-called institutional learning challenges to the regional decision-making are identifiable: a governance challenge, a policy-mix challenge and a political challenge. These appear particularly heroic in the case of less advanced systems, where the lack of preconditions and the weaknesses of the regional economy and polity might compromise the promise (Foray, 2015; Morgan, 2016b).

The general aim of the thesis is to investigate if and to what extent the introduction of smart specialisation has induced or supported policy learning and changes. Through a qualitative analysis in two case-study regions i.e. Apulia and Sicily (IT) the research analytically explores the extent to which regional authorities have understood RIS3 as an opportunity to review and reform policy-making processes for the coming years. The focus is on the strong process element of the smart specialisation EU agenda and on the role that the various innovation stakeholders play within it. At the time of this research, EU Member States and regions have concluded the phase of designing their RIS3, and are entering the heart of its implementation. Although based on an on-going process, some preliminary observations are possible and presented here.

Evidence produced throughout this thesis are expected to be of interest to scholars, practitioners and managers of regional innovation programmes. The RIS3 framework gives the opportunity to deepen knowledge about the ways through which institutional mechanisms govern innovation and shape economic development (Morgan, 2016b) by discussing the mutual impacts between RIS3 efforts and policy learning dynamics that occur as part of its implementation. Conclusions are meant to be generalizable to other similar policies, beyond the domain of the Cohesion Policies and outside Europe.

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The thesis is organised as follows.

1. Chapter one introduces the notion of policy learning and its relevance within the RIS3 agenda. Firstly, the chapter discusses the recent advancements made within the theories and mechanisms for policy transfer and lesson drawing, highlighting the main factors that might enable or constrain policy changes. Secondly, different modes of policy learning in complex and multidisciplinary scenarios are identified i.e. internal, horizontal and vertical, and framed within the RIS3 framework. Lastly, the chapter presents the general and empirical aim of the thesis.

2. Chapter two positions the research topic within the wider scientific and policy debate on regional economic growth and innovation. For the purpose of delineating the path towards the emergence of the smart specialisation principle and the ratio behind its adoption as a mainstream agenda at the EU level, the most significant evolutions that have sparked debate on regional innovation theory and practice since the 1990s are discussed. Lessons emerging from 25 years of regional innovation actions that precede the introduction of the RIS3 agenda are put forward and the main innovations introduced as part of the recent reform of the EU Cohesion Policy reform 2014-2020 are presented.

3. Chapter three introduces the RIS3 agenda by detailing its economic and political origins and the main practical innovations when passing from the smart specialisation discourse to its

implementation. The centrality of the EDP and the principle of inclusiveness are underlined, focusing on the role to be played by regional institutions i.e. the public sector and the other involved actors of the innovation ecosystem, for its successful deployment. Three learning challenges to the regional decision-making are discussed: the governance, the policy mix and the political challenge.

4. Chapter four describes the research design and methodology. Firstly, in order to frame the analysis within the international panorama, the main evidence emerging from the thus-far-developed RIS3 scientific assessments and evaluation projects are discussed. Secondly, the case study methodology adopted within the thesis to conduct the fieldwork in two selected regions, i.e. Puglia (IT) and Sicily (IT), and the methods and sources used to collect data are specified. Thirdly, the conceptual framework developed to guide the empirical analysis is introduced and explained.

5. and 6. Chapter five and six present the evidence from the case study analysis according to the following structure. The first section of the chapters provides an account of the regional profile in terms of pre-existing socio-economic characteristics, innovation performance and institutional and policy setting in which the RIS3 agenda is introduced. The second section discusses the RIS3 on-going practices in the two regions by making a distinction between the governance, the policy mix and the political challenges in operationalizing the new agenda.

7. The last chapter summarises the investigation's main findings by offering a comparative analysis of the case study evidences, and draws the thesis conclusions.

CHAPTER 1. INNOVATING INNOVATION POLICIES: POLICY LEARNING FOR POLICY CHANGE AND INNOVATION IN EU REGIONAL STRATEGIES

The chapter introduces the research topic by discussing the notion of policy learning and its relevance within the RIS3 framework. The first part of the chapter goes through the theory and practice of policy learning, highlighting potentials, limits and open issues. In the second part, the research plan is presented. Different modes of policy learning in complex and multidisciplinary policy scenarios are framed into the RIS3 policy cycle, leading to the development of the conceptual framework, which in turn will serves as the foundation to investigate the key features underpinning the operationalization of the new agenda in two case study regions, i.e. Apulia and Sicily (IT). The last part of the chapter introduces and discusses the general and empirical aim of the thesis.

1.1 Policy learning and policy change

As part of the wider discipline of public policy analysis, policy learning is a recurrent theme. This section introduces the notion of policy learning; how it may be recognised and studied. Firstly, recent advancements made within policy transfer and lesson drawing theories are presented. Secondly, transnational learning mechanisms and methods for policy transfer are discussed. Lastly, the main factors enabling or constraining policy transfer for policy change and related open issues are highlighted.

1.1.1 Policy learning: a literature review

Learning theories started to be developed in the 1980s following a cognitive turn in policy analysis. The idea of policy learning entails the ability of the State and the broader community of policy actors to make use of existing know-how in the future policy decision process. “Policy learning is the commonly described tendency for some policy decisions to be made on the basis of knowledge and past experiences and knowledge-based judgments as to future expectations” (Bennett and Howlett, 1992, p. 278). Learning is the capability related to the use of knowledge, and policy learning is “the specific process in which knowledge is used in the concrete development of policy formulation and implementation…and is a consequence of a specific intentionality towards problem solving” (Borras 2011, p.727). Moreover, policy learning approaches focus on the consideration of learning as an explanatory factor of policy changes and policy innovation. Learning implies “a process in which policy makers evaluate the effects of a policy by taking into account the experiences of others” (Fueglister 2012, p.21). It is about a change in ideas; not just any change but

a structured, conscious change in thinking about a specific policy issue. A policy change or innovation instead refers to a change in doing something that may be the consequence of a conscious change in thinking, but not always. Policy changes are, in practice, possible without previous learning e.g. through pressure of interest groups or naïve benchmarking practices. However evidence shows that often policy changes are the result of a certain degree of policy learning (Borras, 2011), making it a strategic element to promote intelligently designed policies.

First conceived as a main state centric and descriptive approach, policy learning gradually evolves toward a multidisciplinary and comprehensive frame, emerging as a distinct research focus in its own right (Benson and Jordan, 2011; Dolowitz and Marsh, 1996). The concept has been enriched over time, inspiring the development of many and overlapping models that investigate the reasons behind the learning practices, the type of actors involved, and the contents and different degrees of policy transfer that may occur.

The first scientific contributions appeared in the 1960s in the USA within the discipline of comparative policy analysis. Policy diffusion, intended as a trend of successive or sequential adoption of a practices, policy or program, starts to gain attention as a possible explanation of policy changes. This literature conceives changes occurring by osmosis i.e. something that is contagious rather than chosen, and ignores the modalities through which policies are alerted when transferred, as well as the role of politics in favouring the diffusion (Stone, 2012).

In Europe instead, one major branch of literature focuses on the processes of lesson drawing and policy transfer between policy domains that are at some distance from each other in time and/or space. The term 'lesson drawing' was coined in the 1980s. It refers to the voluntary act of transfer under the implicit assumption of rational actors working in specific political contexts (Rose, 1993). Whilst policy transfer is defined as the "process in which knowledge about policies, administrative arrangements, institutions etc. in one time and/or place is used in the development of policies, administrative arrangements and institutions in another time and/or place" (Dolowitz and Marsh, 1996, p. 2). Although similar, the two concepts differ in the consideration of the possible motivations behind engaging in policy transfer. Lesson drawing focuses on voluntary transfer generally seen as driven by dissatisfaction with current policy or uncertainties in the mind of policy makers. These may be related, for instance, to policy failures, poor performance of existing programs, or the introduction of a new agenda following political elections, and the need to promote new allies. Policy transfer instead embraces also coercive forms of practice occurring when a Government, a supra-national institution or other forces push to adopt a set of policy innovations.

From the point of view of the receiver location that is adopting a specific policy developed elsewhere, coercive transfers can be further categorised in direct coercive transfer, i.e. resulting

from obligations imposed, for example, by international or transnational treaties or entities compelling a government to introduce constitutional, social and political changes against its will and the will of its people; and indirect coercive transfer usually driven by externalities that result from interdependence, such as regional or global environmental problems or migration patterns, global economic constraints, or rivalry or emulation consideration (Dolowitz and Marsh, 1996; Evans, 2009). Furthermore, policy transfer may also be negotiated, for example, by influential donor countries, global financial institutions, supra-national institutions, international organizations or transnational corporations, compelling a government to introduce policy change in order to secure grants, loans or other forms of inward investment, or be prompted by the need to compensate for a lack of in-house expertise within local public administrations and organisations, as well as by the necessity to use evidence-based policy making in order to offer effective answers to collective policy problems (Evans, 2009; Legrand, 2012).

From the perspective of the location that originally implements the policy and decides to publicise it instead, engaging in transfer practices is often related to the willingness to enhance reputation and image, mainly for political reasons (Timms, 2011).

As far as the contents of policy learning are concerned, originally the literature focuses on the transferring of hard elements such as policy goals, targets, instruments or administrative techniques. Later on, an increasing amount of focus is put onto the importance of softer elements, such as institutions, ideology, ideas, attitudes and concepts as well as negative lessons (Dolowitz and Marsh, 1996).

Moreover, evidence shows that different degrees of policy transfer may occur. Transfer can entail the mere adoption of a policy or program in use elsewhere, without making any kind of change (i.e. copying); it can entail its adaptation as a standard to develop programs at home (i.e. emulation), or imply more complex forms such as the combination of elements of programs from two or more countries to develop a policy best suited to the emulator (i.e. synthesis or hybridization), as well as the study of familiar problems in an unfamiliar setting to expand ideas and inspire fresh thinking about what is possible at home (i.e. inspiration) (Benson and Jordan, 2011; Dolowitz and Marsh, 1996; Rose, 1993).

Accordingly, different categories of actors can be involved, such as officials, political parties, bureaucrats/civil servants, pressure groups, policy entrepreneurs, and supra or sub-national institutions (Dolowitz and Marsh, 1996), as well as the wide range of non-state agents like knowledge institutions, academicians and other experts, pressure groups, global financial institution and international organisations, transnational advocacy networks, transnational philanthropic

institutions, think tanks, epistemic communities, and so on (Benson and Jordan, 2011; Evans, 2009; Stone, 2012).

Learning can be an endogenous process, meaning that searching for lessons occurs within a country or a region's past, or an exogenous process, when policies are imported from external political systems, as well as exported towards these. Endogenous learning is commonly seen as more efficient in terms of costs and time. Moreover, the generation of lessons from past errors represents a necessary initial step that policy makers should engage in when aspiring to introduce changes. Exogenous learning instead is more complex, implying the huge challenge of considering the specific contextual constraints when transferring knowledge from one place to another. Likewise, exogenous learning processes entail higher potentials increasing the likelihood of finding innovative policy solutions or ideas.

The original distinction between endogenous and exogenous forms of learning has been further extended including multiple spatial and temporal scales. Adopting more than one perspective is particularly relevant to study learning processes in a more comprehensive way (Timms, 2011). Policy transfer can occur according to different directions and at the same time: upwards and downwards from the national to various sub-national levels, as well as horizontally through peer to peer learning practices across different political systems, or within networks that transcend multiple scales and borders (Dolowitz and Marsh, 1996).

The latest generation of studies looks at policy learning as both a precursor, possibly a necessary element, of successful economic development, and a possible consequence of adopted policy innovations and changes (Benz and Fuerst, 2002). A bidirectional cause-effect chain characterises the very functioning of transfer mechanisms. Learning is not just an observable phenomenon that can help to explain why a particular policy was adopted, such as in the case of influence on wider phenomena like Europeanization and globalization. The policy learning capacity is itself influenced by factors such as the specific institutional setting in which it occurs and the type of transfer agents that are involved. Knowledge transfer is the result of strategic decisions made by actors inside and outside government. The role of local context features such as ownership, empathy and relationships should be taken into account rather than solely focusing on the contents of technical knowledge (Stone, 2012). Investigating learning as a dependent variable trying to explain why transfer occurs and how it can be facilitated is thus a particularly promising field of analysis to better understand policy innovation and change in modern societies (Dolowitz and Marsh, 1996; Marsden and Stead, 2011).

1.1.2 Transnational learning mechanisms and tools for policy transfer

At EU level, policy transfer and lesson drawing are acknowledged as useful tools to explain and stimulate policy innovation and change. Policy transfer is widely adopted to guide the Europeanization convergence process among a variety of policy issues and themes (Benson and Jordan, 2011). Policy convergence is generally intended as the trend of increasing similarity in economic, social and political organisation between countries due to structural forces such as industrialisation, globalisation or regionalisation (Stone, 2012). A massive transfer platform for disseminating different aspects of policies across member States and regions currently characterises the EU functioning (Radaelli, 2000). Transnational learning practices have become increasingly central (Atherton and Price, 2008). Sophisticated mechanisms are designed and implemented to let policy-makers and stakeholders learn from each other, such as best practice exchange and benchmarking, peer review, mapping and trend charts, checklists and facilitated coordination, ex-ante and ex-post program evaluation and foresights (Borras, 2011; Stone, 2012).

One of the most diffuse tools is the exchange of good practice together with benchmarking. Best practice exchange is used to inform or change existing initiatives in a specific country or region, introduce new initiatives from outside, or develop joint initiatives with other countries or regions. It can entail the transfer of abstract content such as inspiration, principles or concepts, as well as more concrete ones like models or tools (Atherton and Price, 2008). Besides, benchmarking procedures, which are intended as the measurement of the performance of a policy, program or strategy of a country and their comparison with standard measurements or similar measurements from its peers, have proliferated in Europe since the 1990's. Transposed from the managerial to themacro national or international sphere, benchmarking emerges as a sustainable and comprehensive tool for policy learning and improvement, though complex to apply. Particularly, benchmarking is adopted a key instrument to coordinate policy outcomes related to a wide range of socio-economic issues in the framework of the Open Method of Coordination (OMC). The OMC is an inter-governmental means of participatory and deliberative governance based on the voluntary cooperation of EU Member States. It rests on soft-law mechanisms such as guidelines and indicators, benchmarking and sharing of best practice. This means that there are no official sanctions for laggards. Rather, the method's effectiveness relies on a form of peer pressure and naming and shaming, as no Member State wants to be seen as the worst in a given policy area. Historically seen as a reaction to the EU's economic integration in the nineties, the OMC was designed to help Member States in undertaking the reforms needed to reach the Lisbon goals. Within this frame, benchmarking is conceived as an iterative process of co-ordination through a cycle of information sharing and learning with the promise of greater democratic legitimacy and effectiveness in development and implementation

(Arrowsmith et al., 2004). To be worthwhile, benchmarking and best practice exchange requires the adoption of strict procedures in the selection of the references to be used in the comparison exercise (Navarro et al., 2014). The issue of transferability here is crucial. The difficult task is to develop mechanisms that enable the exchange of experiential knowledge and ideas avoiding the mere adoption of established techniques and practices without reference to the specificities of local and institutional contexts (Atherton and Price, 2008). It is not just about identifying through, for example, composite indicators the similar areas in terms of socio-economic structural conditions. It entails choosing, among homogenous contexts, those that exhibit better performance from which it is possible to learn. And, even more crucially, it is about isolating the causes of the differences in performance, in order to identify which lessons can be drawn. Moreover, when applied at the territorial level, benchmarking is a consensual exercise with no well-established boundaries between the actors involved, as happens in the case of firm organizations, making the methodological challenge even more difficult (Arrowsmith et al., 2004).

Another practice deserving particular attention is peer review. Peer review is a voluntary exercise for assessing overall policy processes and building up policy capacity. It is nurtured by the shared interest of both the reviewers and the reviewed actors; it is aimed at concretely improving practices, and is usually mediated by a neutral intermediary organization acting as facilitator and organiser. In practical terms, peer reviews usually consist of three main phases: a preparation phase during which the reviewed country or region develops a background analysis; a consultation phase of dialogue between reviewers and reviewed, which often includes visits; and a recommendation phase consisting of the adoption of the peer review report, often through a high-level event, and its diffusion. When deploying its full potential, peer review offers the benefit of combining the exploitation of both quantitative and qualitative information, internal and external learning, and the translation of results into policy-relevant recommendations, thus being particularly suitable for complex and multidisciplinary fields such as innovation policy. Likewise, as for benchmarking, the methodology's main limitation lies in the difficulty of transposing results from one context to another. Transferring experiences is a complex process, involving the capacity to capture subjective elements of the involved contexts in terms of institutional structure, agents, and policies, which are difficult to be systematically assessed and compared (Nauwelaers and Wintjes 2008).

An increasing amount of focus has recently also been put onto the foresight praxis. Foresight is a systematic and medium-to-long-term vision-building process aimed at orienting present decisions and mobilizing joint actions. It is essentially aimed at learning about the future. Foresight consists of gaining and deploying relevant knowledge about potential future development trajectories of a specific innovation domain or development field in a certain context. Strategic foresight is not

aimed at predicting the future but about supporting the involved actors in building and shaping the future. The systematic analysis and comparison between different and alternative scenarios through a participatory and multidisciplinary approach has shown to be particularly pertinent in promoting policy learning processes, especially in the field of R&I (André, 2015; Cassengena Harper, 2013; European Commission, 2015a).

Moreover, a remarkable contribution to policy learning is certainly offered by program evaluation practices and their intake in policy-making. Evaluation exercises can consist of ex ante and in-itinere assessments through analytical frameworks and metrics, commonly employed as key elements for influencing policy-making future decisions; or be conducted ex post, in questioning whether programs are working or have worked and why. Notwithstanding the efforts made in spreading the message of the need to adopt evidence-based policy-making, evaluation exercises are still not effectively adopted as part of policy learning processes in most countries across the EU. This is particularly true in the case of ex-post evaluation, whose potential tends to be undermined by mainly political reasons (Borras, 2011).

1.1.3 Limits and potentials of policy learning

Although widely acknowledged by development theories as one of the most important processes to induce and stimulate the constant adaptability of an economic system, policy learning remains difficult to grasp, especially when it comes to identifying the factors and mechanisms that facilitate or constrain it (Borras, 2011; Lundvall, 1992; Mariussen and Virkkala, 2013). Answers are offered by the literature to many of the original questions posed, at least from a government centric perspective. Aspects such as who is involved and their motivation, what is being learned and to what effect, as well as the directions that transfers may undertake, have been largely addressed. Nevertheless, predicting and, even more so, governing policy learning is problematic (Atherton and Price, 2008; Mariussen and Virkkala, 2013).

Many scientific contributions focus on the factors limiting the policy learning practice (Atherton and Price, 2008). Barriers have been classified according to differing criteria. A distinction can be made between demand-side, programmatic, contextual and application related constraints (Dolowits and Marsh, 1996). Demand side barriers are mainly related to the willingness of policy makers to go beyond the status quo. Also referred to as political lock-ins, these relate to the influence of the inertia affecting policy-makers' behaviours on policy-making processes (Hassink, 2004). Policy makers are inheritors before being choosers (Morgan, 2016c). The lack of political commitment and the absence of awareness among policy stakeholders is one of the main reasons slowing down policy innovation processes. Here it is mainly about cognitive obstacles affecting the recognition of

public policy problems and occurring during the pre-decision phase, leading to the ineffective assimilation of policy alternatives (Evans, 2009). Programmatic difficulties instead are those affecting the transferability phase. Transferring knowledge is something different to being able to deploy it. This is mainly related to the type of transferred knowledge; its degree of complexity and uniqueness. The more complex a program or a policy the less easily it is transferred. Policies with multiple goals, with critical side effects and a low predictability of the outcomes, for example, are very difficult transfer (Fueglister, 2012). The embedded nature of experiential knowledge is another key constraining factor. Tacit knowledge embedded in specific communities of practice is complicated to exchange and disseminate (Athenton and Price, 2008). Third, contextual barriers may arise during the importation phase due to environmental obstacles. These include structural, institutional, political, economic and social factors (Evans, 2009). Path dependency and the presence of political, social and cultural incompatibilities are key issues to considered when trying to nurture learning practices. Particularly, path dependency arising from past decisions is increasingly recognised as a crucial element within the regional studies of literature to explain development paths. The concept refers to the evidence that a current situation is dependent on its own history (Valdaliso et al., 2014). History matters in regional development, past and future and past decisions are strongly interrelated. Policy-decisions, and especially those favouring certain technologies, fields and firms, are difficult to justify. One of the reasons is that any specific policy mix has typically evolved over a sustained period, generating expectations of support from certain subsets of firms and agents that reflect the conscious or unconscious priorities of past strategies. Path-dependency is thus a critical element to be considered when assessing potential policy change trajectories. Layering i.e. the introduction of completely new policies, as well as the conversion or recombination of past policies, are ideally achievable discontinuities. But to overcome lock-in situations and support restructuring, it is important to develop broad-based participatory dynamics capable of generating focused consensus around the pursued changes (Hassink, 2004). Fourth, practical barriers may be generated by the high transaction costs often characterising the concrete application and implementation of policy lessons. These can be related to institutional and organisational impediments such as budgetary limitations, language and communication difficulties, lack of ideological compatibility between transferring organisations, lack of time for policy-makers to develop an effective understanding of the foreign experience, amongst others. More generally, it is about the insufficient availability of technological, economic, bureaucratic and political resources on the part of the receiving country (Arrowsmith et al, 2004; Borras, 2011). In addition, the literature stresses the methodological problems when it comes to investigating policy learning. There is still no clear definition of policy learning, and assessing the causality chain behind its

occurrence is an arduous task. This makes it difficult to quantify its impacts and therefore prove its relevance as a key element of policy making (Benz and Fuerst, 2002; James and Lodge, 2003).

In the attempt to measure policy learning, the literature often tends to excessively focus on quantitative measures of inputs or outputs rather than on the quality of the processes, resulting in auditing league tables responding to quantifiable targets more than real improvements of the policy making process (Arrowsmith at al., 2004; Atherton and Price, 2008; Borras, 2011). But policy learning is something very different from policy adoption. The transfer of policies or programs does not always involve learning. If the transferred information is not translated and combined with forms of knowledge within the policy-making process, the promise of learning might be easily unfulfilled. To be successfully deployed, knowledge must be transformed via de-contextualisation from its originating context and re-contextualisation into the new one. In some cases,a minimal adaptation is sufficient while in others an extensive customisation to different operating conditions and parameters is necessary. Too much positivism has affected the original literature. One thing is recognising that an idea is pertinent for a specific place in a specific moment, and another is the consideration of the conditions that have to be generated before policy change can really occur (Atherton and Price, 2008; Borras, 2011; Dolowitz and Marsh 1996; Stone, 2012). The scope of benchmarking and related practices is not to copy what is successfully done in another place or moment of time but to act as a stimulus for thinking of new ways of impacting on the present and local systemic conditions. The transplantation of established practices if not inspired by an interactive and collaborative exchange of experiences has proved to be ineffective for learning, leading instead to emulation practices (Atherton and Price, 2008; Fueglister, 2012; Nauwelaers and Wintjes, 2008). In many cases evidence shows that learning happened within single projects without affecting regional policy-making or being transmitted to participating regional and organizations (Mariussen and Virkkala, 2013). Moreover, effects tend to be highly diversified across territories. In the case of the OMC, for example, some degree of learning in terms of convergence in priorities, introduction of specific principles and instruments has occurred. But overall effects remain ambiguous, with some countries learning more than others (Borras, 2011).

Policy learning thus is confirmed to be a complex, costly and uncertain practice. The reality is that policy goals are often conflicting. A clear identification of the contents to be transferred and the variables that can be used for comparison is problematic, and the guarantee of clear benefits at the end is very low (Arrowsmith et al., 2004; James and Lodge, 2003). As a result, in the real world, status might tend to be given precedence over knowledge, power over learning, and past over present (Hassink, 2004), thus calling for a more intelligent use of policy transfer mechanisms. The way policy-makers and communities learn e.g. through internal or external processes, within their

own context or through inter-regional or international exchanges, and, even more crucially, how the capacity to learn within a given political, economic and social system may be fostered, are still open issues to be investigated (Benson and Jordan, 2011; Borras, 2011; Dolowitz and Marsh, 1996).

1.1.4 The functioning of learning mechanism: open issues

Recent literature stresses that to exploit its full potential, a less state-centric and ahistorical treatment of policy learning is imperative (Stone, 2012). Problems and solutions are socially constructed processes. The adaptation to the particular environment in which the decision must be made is influenced by human actions that shape degrees of learning and directions (Atherton and Price, 2008; Dolowitz and Marsh 1996; Stone, 2012). The relative weight of local conditions against more general structures and drivers is crucial when trying to understand one place from the perspective of another. The heterogeneity in legal systems, regulatory frameworks, labour markets and economies, politics and cultures, and so on, are key factors to be considered (Atherton and Price, 2008; Dolowitz and Marsh 1996). Amongst these, the role of politics merits specific attention. Recent studies stress that learning practices can be a highly politicised-process, inspired by the willingness to justify preferred solutions rather than insert discontinuities on the basis of acquired lessons. Pressure for short-term results and the need to legitimize actions can exercise a strong influence on the reality of policy practice (Benson and Jordan, 2011; Marsden and Stead 2012; Stone, 2012). The presence of intangible cultural factors and communities of practice based on trust is another crucial element to be taken into account. Psychological proximity is fundamental. Differences in the cultural values of the involved actors can lead to misunderstanding when experiences and insights are communicated. The shorter the mental distance among regional contexts the easier the transfer, and the greater the likelihood that it is successful (Atherton and Price, 2008; Marsden and Stead, 2011; Randma – Liiv and Kruusenberg, 2012). Adopting an organisational capacity perspective may also offer many possible insights into the conditions that explain diversity in policy change, thus representing a promising line of research. The capacities of the specific organisation implementing change, namely its administrative, analytical and institutional capacity, influence variations in the entity and direction of learning and may help to explain the relationships between learning and the introduction of policy change (Borras, 2011). Among policy learning enablers the role of networks in spreading policies is gaining increasing attention too. Investigating policy learning through networks means embracing a function-oriented approach that looks at the interactions between actors of the network moved by the promise of better opportunities (Evans, 2009). Well-functioning networks are advanced as a possible prerequisite for generating learning and innovation, able to make both States and markets more

effective (Morgan, 2016c). Policy-network approaches focus on how decision-makers acquire knowledge. Particularly, networks represent a middle-range level of analysis combining interpersonal relationships i.e. information and communication exchange, with structural ones i.e. organizational rules and imperatives, thus emerging as a suitable framework for understanding policy transfer within complex multi-organisational and multi-level settings (Evans, 2009). Succeeding within learning depends on the structural characteristics of networks, on the actors' disposition and orientation, on their degree of autonomy and type of interactions. Essentially, it is about the capacity to combine two often-contradictory logics. On one hand, the circulation of information requires pluralistic, polyarchic and open networks in which competitive and internally autonomous actors act through flexible but intensive patterns of communication (cognitive dimension of networks). On the other, an effective solution of conflicts is more likely to occur in homogeneous, hierarchical and closed networks with cooperative, interdependent actors forming stable coalitions of promoters of change (political dimension of networks) (Benz and Fuerst, 2002). How networks should be organised and linked to the institutional framework is still to be understood (Füglister, 2012). Some authors assume that governance is the decisive factor comprising both the institutionalized and the informal patterns of policy making. According to a network-based governance approach, a mix of networks and institutions is what is needed. Networks don't replace institutions but reconcile with formal institutional settings, compensating each other (Benz and Fuerst, 2002).

Recent literature also stresses that more attention should be paid to the specific case of less advanced contexts. Notwithstanding the acknowledgement that the introduction of policy innovations and changes is needed in less developed regions/States, even more than in advanced systems, it is still not clear how learning might be facilitated in these very contexts i.e. either through benchmarking with peers or across categories to access more advanced practices (Randma – Liiv and Kruusenberg, 2012). Most studies have been focused on a small sub-set of better performing systems in the search for successful practices to be eventually transferred to less advanced ones (Benson and Jordan, 2011). But this is problematic for at least two reasons. Firstly, because it is not said that knowledge acquired in one setting is transferable to another, especially in the case of strong differences in the levels of development and in the economic, political and social features across regions or countries. In immature policy environments additional difficulties may arise, for example, due to the lack of administrative expertise and financial resources, or because of the need to urgently solve problems, making time more crucial than the quality of the process. As a consequence, the risk of embracing one-size-fits-all approaches that are based on copying rather than learning is very high (Dolowitz and Marsh, 1996; Randma-Liiv and Kruusenberg, 2012).

Secondly, focusing on success stories denies the significance of negative lessons. Failures are equally as valuable to policy development as best practices. Insufficient attention is paid to unexpected and undesired policy outcomes, and to the capacity to learn from these. Public policy is often addressed through a normative perspective and not as an objective of study itself. The failure to learn from failures is one of the main obstacles arising from a leadership that does not affirm the values of failures. Adopting a policy learning approach instead implies recognising that useful knowledge can also be acquired through negative experiences. This may happen every time that the diffusion of evidence and ideas helps decision-makers to crystallize policy paths they do not wish to follow (Borras, 2011; Marsden and Stead, 2011; Morgan, 2016c; Stone, 2012).

Many open issues therefore affect the practice of policy learning. Why do some contexts learn more than others, and how can we explain this diversity? What are the specific conditions of learning in regional policy? How should policies be designed in order to improve the capacity to learn? Difficulties also persist in distinguishing policy learning from other toolkits such as social learning, policy networks, and multilevel governance. Additionally, the ability of policy learning to offer valuable scientific contributions is often questioned. Policy learning is, in fact, about adapting more than developing new ideas, with the risk of revealing less and less about more and more (Benson and Jordan, 2011; James and Lodge, 2003). However, learning to learn within a region or a country is widely acknowledged as a key dynamic (Morgan, 2016c). Thus, further studies and experiments that focus on the mechanisms, through which knowledge about policies is converted and transferred, are desirable in order to nurture the debate around what is confirmed as a promising area of research and an interesting file rouge to investigate growth and innovation dynamics.

1.2 Research plan

1.2.1 Policy learning within the RIS3 agenda

Remarkable changes have been introduced into innovation policy as a result of a process of co-evolution between theoretical ideas and policy design (Borras, 2011). A learning turn has occurred at the interface between innovation, economic geography and entrepreneurship studies stressing "the capacity of both individuals and organisations to engage successfully in learning processes as a crucial component of economic performance in the knowledge-based economy" (Hassink, 2004, p.4). Advances in the field of innovation policy and policy learning start to go hand in hand. Innovation is now conceived as a dynamic and non-linear process whose full comprehension should include the nature and effects of learning within policy systems (Mytelka and Smith, 2001).

Within this context, the RIS3 agenda is specifically conceived to innovate R&I policies at the EU level. Innovation policies themselves have been shown to require innovativeness in the processes

through which they are drafted and implemented through the activation of more creative political, economic and social procedures (Barca, 2009; Foray et al., 2012; Grillo and Nanetti, 2016). Under the RIS3 agenda, strategies lose their rhetorical character and become essential not only because they show the existence of an overall reflection on policies and the capacity of the public administration to operate in an integrated way, but even more so because they assume a binding character. RIS3 require the capacity to openly declare where a region or country wants to go, and make consequent choices based on accumulated knowledge and experiences. The very 'smartness' of the RIS3 paradigm should come out of the processes. A strong emphasis is put on the procedures of choices and identification rather than on the contents of the strategy and its outcomes. Its key operational step i.e. the EDP, entails the promotion of "a learning process to discover the R&I domains in which a region can hope to excel" (Foray et al. 2009, p. 2). Setting up the EDP is paramount to the success of any RIS3. Indeed, policies for facilitating an EDP are more important than setting the specialisation priorities themselves (Morgan, 2016c). New policies based on smart specialisation are much about empowerment i.e. helping regions to help themselves (Grillo and Landabaso, 2011). Moreover, the EDP is about the discovery of new or unknown areas of specialisation. Discovery is something different to innovation. It's about opening a new domain where innovation might occur, i.e. it is the stage that precedes innovation. The EDP entails exploring, experimenting and learning to combine existing knowledge in a new way to compete on global markets. Implementing the new agenda does not imply adopting policy directives of which areas of research should be followed, but rather providing the supporting measures that incentivise and facilitate the path of discovery and its commercialisation. In order to nurture the evolution of the EDP, policy makers should allow this bottom up learning process by helping agents to discover where to invest, supporting new relationships and networks of actors in the region or country, and then implement policies according to what has been discovered and learned (Foray, 2015). Accordingly, robust policy learning is definitely a key feature of successful RIS3. Smart specialisation is all about learning about policies both internally i.e. built on internal capacities at the regional level, and externally i.e. related to the capacity to rapidly absorb and implement the EC indications (regional perspective) and learn from regional experiences (EU perspective). Furthermore, RIS3 is about changing the way of learning, which is even more ambitious and difficult than learning itself. Innovation is not necessarily successful and, often, success comes from failure. According to the smart specialisation principles failure is an equally valuable outcome as long as it provides the option to learn, and policy interventions must be directed to supporting these steps (Hargadon and Sutter, 2000; Morgan, 2016c). The relevance and centrality of policy learning is reflected in the unprecedented assistance scheme activated by the EC to create a community of

practice around the implementation of the new agenda. A community of practice generally refer to groups of people who engage in a process of collective learning in a shared area of interest. Membership implies a commitment and competence around a common domain, and the regular interaction through joint activities and discussions, aimed at building relationships that enable them to learn from each other. The RIS3 community of practice is formed by practitioners who share their repertoires of resources, experiences, stories, tools, and ways of addressing recurring problems in the RIS3 design and deployment. For the purpose of supporting and nurturing dialogue within the community, and an ad hoc platform i.e. the S3 Platform (s3platform.jrc.ec.europa.eu) is established in 2011 by the EC. The Platform is hosted by the Joint Research Centre (JRC) Institute of Prospective Technological Studies (IPTS) of Seville (ES) and currently counts the participation of 172 EU regions and 18 EU Member States[1]. Its mission is to support and facilitate transnational and trans-regional learning around RIS3. Methodologies, tools, expertise and advice are offered, and a rich set of activities, meetings and events is organised to promote knowledge exchange both vertically and horizontally across the EU. Amongst these, in 2012 the Platform released the official Guide to Research and Innovation Strategies for Smart Specialisations, which has been adopted by both theorists and practitioners as the reference document to guide the operationalization of the new agenda. The Guide contains a six-step approach for the design of RIS3, namely: step 1 - Analysis of the regional context and potential for innovation, focusing on main barriers and past errors, and on possible policy solutions to overcome them; 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, on the basis of the macro analysis/diagnosis and the vision; step 5 - Definition of coherent policy mix, roadmaps and action plan; step 6 - Integration of monitoring and evaluation mechanisms (Foray et. al, 2012). But even more importantly, the Guide provides the common language for an effective sharing and dialogue on opportunities and challenges between policymakers and planners in different regions and countries, thus emerging as a key policy-learning tool (Mariussen et al., 2014).

The Guide has recently been integrated by the development of a handbook on the RIS3 implementation (Gianelle et al., 2016). The document is based on the experience of practitioners from Member States and regions and contains some first evidence and best practices on key issues

[1] Source: http://s3platform.jrc.ec.europa.eu/ [Accessed on April 18th, 2017].

such as the EDP cycle; good governance models; the translation of priorities into projects; trans-national cooperation and value chains; monitoring and evaluation systems.

Among the tools adopted to facilitate learning, peer reviewing was embraced as key methodology within the RIS3 community, especially during the strategy design phase. Peer reviewing is used to deliver policy recommendations to regional and national officials from a practitioner-oriented perspective. Peer-review meetings are where regions can outline their RIS3 and obtain feedback from other regional administrators, professionals and experts present. The first peer-review workshop was launched in January 2012. Since its launch more than 60 regional RIS3 and 15 national RIS3 have been peer reviewed by critical friends (peers and experts). Half of the represented regions (55%) took part in more than one workshop, some in as many as 5 or 6 events, revealing the high degree of success of the instrument[2]. Peer-review exercises and visits are also contributing to the mobilization of stakeholders, making the process more participative and effective; and bettered the implementation of the six-step EC approach, forcing the search and collection of data and information that is usually not readily available in an integrated form (Mariussen et al., 2014; Midtkandal and Hegyi, 2014).

Regional benchmarking is also widely adopted by the S3 Platform. A benchmarking interactive tool has been developed and launched, which permits the identification of reference regions based on structural social, economic, technological, institutional and geographical characteristics, and so facilitating the transferring of policy lessons and practices across contexts sharing similar conditions which are relevant for innovation-driven development. Similarly, in order to foster cooperation and avoid duplications, an online database of the selected RIS3 priorities called EYE@RIS3 and a database of the planned investments in the European Structural and Investment Funds (ESIF) Operational Programmes (OP) are made available on the Platform website. Furthermore, starting from 2015, thematic sections were launched to foster interregional cooperation in specific RIS3 fields such as agro-food, energy and industrial modernisation.

This wide set of policy learning tools and mechanisms made available as part of the S3 Platform activities was integrated by the activation of a task force of experts that the EC activated in 2012 to support those regions encountering specific difficulties in setting in motion the RIS3 design. Assistance takes the form of professional advice and personalised support in the implementation of the 6-step approach of the Guide. Particular attention is paid to the strong process dimension of the

[2] Source: http://s3platform.jrc.ec.europa.eu/ [Accessed on April 18th, 2017].

new agenda, i.e. on the setting up of the EDP. Advancements made in the RIS3 design are constantly assessed by the experts and communicated to the EC, thus nurturing an important vertical learning process between the EU and the regional level, in both directions.

1.2.2 Policy learning in complex and multidisciplinary policy scenarios: internal, horizontal and vertical modes of learning within RIS3

Within the RIS3 framework, policy learning can be framed according to three main modes, namely: internal intra-organisational learning occurring at the Government level; intra-system learning, occurring at the policy-network level; and inter-system learning, involving horizontal and vertical learning between different systems (Borras, 2011; Moodysson et al., 2015; Nauwelaers and Wintjes, 2008).

Intra-organisational learning refers to learning in policy-making implementing institutions i.e. within regional administrations. Following the new agenda, public sector innovation is introduced as a result per se (Morgan, 2016c). Intra-organisational learning is about administrative resources and skills and the capability to use them. More precisely, it relates to the issue of regional administrative capacity for managing the ESIF implementation. Administrative performance is of critical importance to enabling or hampering the effective implementation of the OPs. Administrative capacity is the ability of the units tasked with the management of EU co-funded interventions to effectively and efficiently operate processes. It is influenced by three main components: structures, intended as the clear assignment of responsibilities, tasks and functions to departments or units, and their effective intra-organisational coordination; human resources, in terms of the ability to detail tasks and responsibilities at the level of job description through recruiting, training, retaining and promotion of core staff, and thus count on the availability of skilled, experienced and motivated administrative personnel; and tools, intended as the availability of instruments, methods, guidelines, audit and monitoring systems, checklists and procedures (Bachtler et al., 2010; Cappelen et al, 2003; Ederveen et al, 2006; Milio, 2007). The different stages that make up the overall RIS3 cycle are strongly interrelated: decisions made in the programming phase have a direct impact on project selection, and influence subsequent implementation stages. Yet, each stage requires a separate set of competencies and administrative processes. As a result, the correct division of tasks between structures combined with effective formal and informal communication rules and routines in the organization play a vital role. Moreover, there is a clear need for flexibility of the organisational arrangements, which is extremely important to deal with workloads in certain processes.

The second mode i.e. intra-system learning refers to policy learning processes occurring at the level of networks between the relevant innovation stakeholders. The RIS3 agenda is not just about learning within the public sector but also through the public sector (Morgan, 2016c). Here it is about changing and improving practices of innovation at the system level. Community involvement can be seen as a proxy for a region's ability to learn collectively (Healy and Morgan, 2012). The goal is to move from a state-centric vertical approach to a network based one, and promote collaborative learning processes. Actors such as firms and SMEs, universities, civil society, and so on, play a fundamental role in facilitating the EDP required by the RIS3 agenda. This learning mode is fundamental to guarantee collective discoveries and experimentation as well as innovation diffusion, and requires an overall major reflexive and institutional capacity of the regional innovation system (Borras, 2011).

Additionally, policy learning can occur through inter-system learning. This mode entails both a horizontal dimension i.e. between regions or countries, and a vertical dimension i.e. from the regional level to the national and European level, in both directions. It is essentially about the system's capacity to guarantee effective horizontal and vertical coordination and governance mechanisms. The horizontal dimension emphasises the importance of learning between peers. Evidence shows that regions often tend to rely on existing strategic documents and data that are likely to be consistent with existing plans and practices but not critical enough and therefore not really useful to discover new innovation possibilities. Comparison with others, even when accompanied by the feeling of frustration due to, for example, a new awareness of a region's position in the global value chain, can help the emergence of fresh perspectives and opportunities, and stimulate the introduction of innovations and discontinuities, as required by the agenda. Vertical inter-system learning instead refers, on one side, to the capacity of regions to absorb and draw lessons through the transferring of national and EU indications; on the other, it entails the capacity of the EC to constantly learn from regional experiences and practices, both in terms of successes and failures.

Figure 1.Modes of policy learning within the RIS3 framework

Modes of policy learning	Intra-organisation learning	Intra-system learning	Inter-system learning	
			Horizontal between regions or countries	Vertical between regions and the national and EU level
Who is learning	Government and public-related organizations in the innovation system	Stakeholders of the regional innovation policy	Actors and organisations of the multi-level polity system	
Relevant capacities	Administrative capacity: structures, human capital and tools	Institutional capacity of the innovation system: the quality of network mechanisms	Major coordination capacity: horizontal and vertical governance mechanisms	

Own elaboration based on Borras (2011), Moodysson et al., (2015) and Nauwelaers and Wintjes (2008).

1.2.3 General and empirical aim

The thesis investigates how smart specialisation theory finds realisation in the policy practice by proposing a policy learning based approach to investigate the implementation of the new agenda in two case study regions of the South of Italy, Apulia and Sicily.

The general aim of the research is to discuss the extent to which the RIS3 paradigm is able to trigger a collective learning process and a durable change of strategy-making processes in EU regions, and if so, under what conditions. The main assumption behind this general question is that a certain amount of learning is a prerequisite for introducing policy innovations and changes. Accordingly, if able to facilitate policy learning, RIS3 is a suitable framework to open up the policy-making process and make it more diverse and dynamic, thus resulting in better policy interventions under the on-going Cohesion Policy programming period.

In empirical terms, the thesis explores the on-going RIS3 practice, and identifies and discusses the key elements influencing its successful implementation. This is done through a qualitative field analysis conducted in the two regions of Apulia and Sicily. Apulia and Sicily represent a paradigm example of less advanced innovation systems. The two regions have been for long periods characterized by poor, inefficient and often corrupt institutions that undermined their development potentials and their capacity to effectively use ESIF opportunities (Trigilia, 1992), and entered the on-going programming period mired in deep developmental problems related to unemployment, emigration, inefficient public administrations and clientelism-based political systems, as shown by the low performances registered in terms of economic and innovation indicators compared to the Italian and EU average (European Commission 2014c, 2016; Trigilia and Viesti, 2016). Both regions have interpreted the new agenda as the opportunity to innovate their engagement in innovation policies. But due to differences in the regional repertoires of the last decade, the on-

going challenges are very different from each other. Apulia has been invested in by a renewal process over the last 10 years, that made it emerge as the most dynamic region of the Italian Mezzogiorno (IPRES, 2016; Svimez, 2016). The region thus looks at RIS3 as a tool to guarantee continuity and support a virtuous path of recovery that still has to fully show its concrete results. Sicily on the other hand, is conventionally seen as one of the most problematic contexts in the EU (European Parliament, 2015a; European Commission, 2016). The region is locked into a severe recession further exacerbated by global crisis, and as a result putting into the RIS3 the ambition to introduce a radical change in the regional approach towards innovation policy, both within the public administration and at the system level. The two regions selected represent a significant and interesting laboratory. Namely, because they offer the opportunity to discuss the capacity of the new agenda to address the underlying and mainly institutional problems of less performing regions, and, at the same time, its ability to address place-specific challenges, promoting tailored reforms and structural changes in those settings where there is more need for change.

The aim of the case study analysis is to investigate if, what and through which mechanisms the two regions are effectively learning in the design and implementation of RIS3, thus testing the capacity of the new agenda to offer what is really needed by regions. A conceptual framework based on the different modes of policy learning occurring at the intra-organisation, intra-system and inter-system level and during the different phases of the RIS3 policy cycle – i.e. design, implementation and assessment - is proposed and adopted to conduct the fieldwork and compare the main findings, as presented in chapter 4. The main assumption is that in order to be successfully designed and implemented, RIS3 require the presence of policy learning at all the different levels i.e. within the public sector, at the regional innovation system level and between different systems horizontally and vertically, and throughout all the phases of the policy cycle, from its design to its implementation and evaluation. The absence of one or more of these dimensions might weaken the original spirit of the RIS3. In addition, the main risk is that when passing from the strategic to the operational and implementation phase the weight and emphasis of the smart specialisation principles decreases, resulting in the repackaging of old strategies more than in real improvements in policy-making practices and routines.

CHAPTER 2. THE EVOLUTION OF EU REGIONAL INNOVATION POLICIES: THEORY AND PRACTICE

Smart specialisation is a multidisciplinary concept lying at the crossroads of a rich set of social science and economic disciplines: economic geography, growth and innovation economics, industrial and development policy studies, political science, institutional economics, strategic and development planning, multi-level governance, participatory decision-making, social capital (McCann and Ortega-Argilés, 2014). More precisely, it can be seen as the point of arrival, though eclectic to a certain extent, of the significant advancements made both in the theory and practice of innovation policies during the last three decades.

The first part of the chapter goes through the most relevant turns that have been cited in the scientific debate on regional growth and innovation since the 1990s. More precisely, a sketch of this wide literature is offered for the purpose of delineating the path towards the emergence of the smart specialisation principle and the rationale behind its adoption as the key approach inspiring the latest generation of EU regional R&I policies. The impacts of endogenous theory on policies meant to generate growth and innovation; the emergence of regions as key actors within global economy; the interplay among institutions, innovation and economic development; the role of relational assets; and the recent advancements that invested the industrial policy agenda, are highlighted. The second part of the chapter focuses on the influence that these scientific advancements have had on the history of EU regional innovation policies over the last 25 years. The main lessons learned from these first round of experimentations that precede the introduction of the RIS3 agenda are discussed, and the recent reform of the EU Cohesion Policy and, as part of it, the introduction of the RIS3 ex ante conditionality is presented.

2.1 Towards a new generation of EU regional innovation policies

The links between innovation and economic growth are widely acknowledged by the scientific and policy community. The rise of endogenous growth theories makes innovation the main factor driving economic development, and thus prosperity at both national and regional level. But the way knowledge is generated, transmitted and translated into innovation, and consequently, the way public policies can promote it, are crucial issues that continue to nurture pronounced dialectics across the economic and political world. In order to set the foundations for this study it is preliminary to frame the smart specialisation concept within this wider debate, delineating the most relevant evolutions that occurred within the literature on regional innovation policies. For each scientific turn, its analytical dimension i.e. the nature of the discovered phenomenon, and its prescriptive dimension i.e. the related policy implications will be discussed.

Figure 2.Towards smart specialisation: scientific turns

Scientific turns	Analytical dimension	Prescriptive dimension
Endogenous	The importance of endogenous factors in explaining the persisting differences in economic performances among countries and regions	Need for endogenous growth policies
Innovation	The recognition of innovation as the key driver of economic development	Need for place-based innovation policies
Spatial	The role of regions as key economic and political actors	Need for regional innovation policies
Relational	The role of networks and relational assets	Need for network-based innovation policies embracing a systemic approach
Institutional	The role of institutions in shaping development and innovation trajectories	Need for incorporating an institutional dimension into innovation policies
Industrial	The resurgent role of manufacturing and the New Industrial Policy agenda	Need for industrial policies

2.1.1 The endogenous turn

The elaboration of the endogenous growth theory around the mid-1980s represents a fundamental step within the debate on policies aimed at generating economic development, and is still advocated as the main theoretical backing and justification for public sector interventions in directly fostering growth both at the EU level and globally. In contrast with neoclassical theories, under which no role should be played by the State because knowledge and technology are considered exogenous assets available to everybody and everywhere (Solow, 1956; Swan, 1956), endogenous models focus on the role of internal and non-transferable factors in governing opportunities and incentives to create technological progress. Technology improvements are not exogenous to the economic system, but rather the product of economic actors' actions, and thus influenced by choices taken at the individual, business and systems level (Romer, 1990).

In explaining the mutual influences between knowledge and economic growth, the basic assumption is that knowledge can be both transferable (in the case of formalized knowledge through, for example, patents or publications) as well as not transferable (in the case of tacit knowledge). Both knowledge bases influence innovation and growth trajectories. Additionally, differences in the endowment of knowledge and research assets that cannot be transferred without significant transaction costs (like in the case of non-formalized knowledge) are recognised as the main source of inequalities. Their accumulation in some places is the determinant of lasting disparities in productivity and prosperity levels across geographical areas (Arrow, 1974; Kaldor, 1972; Lucas, 2001; Romer, 1990).

The main policy implication is that the convergence of national and regional economies may not happen spontaneously. Rather, there is a need for public sector interventions in order to eliminate semi-persistent differences in prosperity levels that could otherwise last over extended periods of time. Achieving economic development is a matter of investing not solely in physical capital (Solow, 1956) but, even more significantly, in factors such as innovation (Romer, 1990) or education (Lucas, 2001), which are determinant for technological progress.

The impact of the endogenous growth theory has been particularly profound in the EU. As highlighted by new economic geography literature (Krugman, 1991) in the context of increasing international integration, like in the case of European integration, territories with a better comparative position in terms of endowment (education, infrastructure, legal system and security, natural resources, and so on) may have been able to capture more lucrative shares of markets and increase their portion of the total production base. This resulted in agglomeration phenomena, which increased inequalities amongst EU countries and regions. As a reaction, in order to pursue a reduction of differences in prosperity levels without bearing the human costs associated with workers relocation, convergence begins to be conceived as a public good itself and emerge as a key feature of the EU social model. The need for a dedicated policy meant to achieve such an objective becomes widely accepted by EU policy makers. On top of that, an increasingly richer and diversified menu of public interventions aimed at filling the prosperity gap starts to be developed under the umbrella of Cohesion Policy, but not exclusively.

2.1.2 The innovation turn

Within endogenous theories, a wave of innovation-based scientific models appears according to which innovation is accepted as the main driving force behind economic growth.Amongst the additional factors that the endogenous models identify as possible explanations for enduring differences in the levels of development across territories, a central role is assumed by innovation. Innovation is recognised as the main driving force behind economic growth due to its capacity to increase the degree of product variety and/or create improved versions of old products, and so impacting on aggregate productivity (Aghion and Howitt, 1998; Romer, 1990). These studies have their main theoretical backing in the form of Schumpeter's work (1943), in which the creative activity of inventing is for first time distinguished from its application to the market, i.e. innovation in its different forms, namely: product innovation, innovation in methods of production, source of supply, exploitation of new markets, and new ways to organise business.

The emphasis placed on knowledge creation processes that translate into outcomes of innovation that benefit the whole economy, stresses the relevance of investments embedding research and

development (R&D) into the industrial and research base of countries and regions. Innovation-based theories imply that the way to grow rapidly is not to save a large fraction of output but to devote a large fraction of it to R&D (Aghion and Howitt, 1998). The need for dedicated public interventions is reinforced by the presence of market and system failures, which tend to constrain spontaneous innovation processes. Due to lock-in situations regions endowed with particular resources, competences and institutional structures are unable to spontaneously match changing market requirements. Evidence shows that functional lock-in, entailing close inter-firm relationships, which may eliminate the need to develop critical boundary-spanning functions, such as research and development and marketing, and prevent them from reacting quickly and effectively to stimulus from outside; cognitive lock-in, with regards to a common world view that might confuse secular trends with cyclical downturns; and political lock-in, i.e. thick institutional tissues that aim at preserving existing traditional industries and thus slow down industrial restructuring and hamper the development of indigenous potential and creativity, may produce a situation of underinvestment in the innovation domain with respect to what would be optimal for competition and economic dynamism (Hassink, 2010; McCann and Ortega-Argilés, 2013; Morgan and Nauwelaers, 1999; Tödtling and Trippl, 2005). This is particularly relevant for private investment choices. Firms do not innovate solely because of their natural attraction to innovation. They do so when they consider that the cost/benefit ratio is favourable and that the risks associated with changes are manageable. Innovation benefits appear too uncertain and need too much time to materialize and be appropriated by entrepreneurs, making the activation of public incentives crucial to increase the attractiveness of potential investments (Arrow, 1974).

As a consequence, policy-makers all over the world come to realise that innovation-enhancing policies are absolutely necessary in the current international economic climate (Bellini and Landabaso, 2007; Cooke and Piccaluga, 2006; McCann and Ortega-Argilés, 2013). Promoting innovation by providing firms with real services, which improve the business environment, facilitate access to external markets, offer managerial training, ensure technical standards or access to credit, is key to the attempt to drive economic growth and development in the knowledge economy (Barca, 2009). At the EU level, investing in R&I assets in both more and less advanced economic systems is perceived as a possible, if not the only, way to bridge between the need to facilitate the transformation of Europe into a knowledge-based economy, and the idea of keeping the cohesion effort going. Expenditure in R&I is a fundamental instrument to make territories converge on a curve of economic development characterized by higher added value without competition on cheap labour costs, and as a result avoid the social and political costs related to labour mobility (European Commission, 2010). Notwithstanding the enthusiasm by which

innovation-based endogenous growth models are received by most of the scientific and policy world, many doubts remain as far as both the modes of implementation and their very effectiveness are concerned. Much more work needs to be done before having a reliable explanation for why economic development is faster in some countries and in some time periods than in others. Nevertheless, the fact that much of the cross-country variation in growth rates is attributable to differences in productivity growth rather than in the rates of capital accumulation, suggests that endogenous growth theory, which aims at providing an economic explanation of these variations, and the innovation priority will continue to attract attention for the forthcoming years. This is fully reflected in the strategic and financial commitment and in the trend of widening and deepening that has been investing EU innovation policies since the 1990s (Grillo and Nanetti, 2016; Nauwelaers and Magro, 2015).

2.1.3 The spatial turn: regions, regionalism and regionalisation

A region is defined as "a territory less than its state(s) possessing significant supra-local administrative, cultural, political or economic power and cohesiveness differentiating it from its state and other regions" (Cooke and Morgan 1998, p. 64). In the sense identified here, as elaborated by the discipline of regional studies, regions are meso-level entities acting between the central and the municipal level of government (the so-called statistical Nuts II level in the Eurostat terminology). Regions draw from both the local and the national and supranational level. Particularly, the bottom-up process by which territorial identities come-up within unitary states is referred to as regionalism. Regionalism is the expression of a common sense of identity and purpose combined with the top-down process of creation and implementation of institutions demanding territorial autonomy (Keating, 1998). This special formula of delocalization and top-down devolution of power to meso-level governments splitting political activities from national to regional level is indicated as regionalisation.

In understanding the direction and the intensity of growth trajectories in knowledge-based economies, the dynamics and the geography of innovation are widely recognised as extraordinarily important issues. Regions are a key level at which the competing demands of economic competitiveness and social cohesion are played out (Bramanti and Fratesi, 2009). There is a huge amount of literature and scientific debate surrounding regions, regionalism and regionalisation. Economic geographers and innovation scholars are interested in regions as the focus of growth and innovation processes in the knowledge economy. Likewise, political and cultural geographers study the concept of the region and the processes of regionalisation, especially across the EU.

The role of regions has evolved over time. Due to the emergence of the phenomenon of globalization and institutional changes, especially the European integration process, since the 1980s, a spatial turn occurred within the debate on economic development. Regions have started to emerge alongside states as strategic actors for economic growth leading (Martin and Sunley, 2011). If on one side globalism leads to a sort of de-territorialisation of the economy, the other sees new economic theories start to place a strong emphasis on the interactions between global trends and local factors that govern the adaptation of specific places to these influences, perfectly summed up in the idea of glocal. Many authors emphasise the importance of localities and the significance of proximity between productive activities due to the presence of geographically identifiable externalities that facilitate knowledge sharing and innovation, as reflected in concepts like industrial districts (Beccattini, 1998; Brusco, 1992), clusters (Porter, 1990), innovative milieu (Camagni, 1991), regional innovation systems (Cooke, 2002), and learning regions (Asheim, 1996; Morgan, 1997a; Storper, 1993). Regions are acknowledged as the basic level at which there is a natural solidarity and where relations are easily forged through meaningful flows and linkages between economic actors, as a result emerging as key production systems rather than simple locations of economic activities (European Commission, 1995). Some authors go even further, questioning the role of nation states as optimal units for organising economic activity (Ohmae, 1993).

The increase in the economic importance of regions results in the design of new and complex patterns of regulation. A trend of decentralization of competences in different policy fields occurs in most EU countries. If initially regions were adapting national programmes and plans, in various member states the regional level begins to strengthen its capabilities for developing tailor-made interventions, gaining more weight in programming and coordination. Furthermore, during the 1990s the idea of a Europe of the Regions starts to attract attention, legitimating the emergence of regions as a third key level of government alongside the European Union and its member states. The Treaty on European Union (1992) recognises the regions right, subject to national law, to participate through the consultative Committee of the Regions to the Council of Ministers. This signals a “re-scaling of state spaces and new meanings being assigned to territories” (Paasi 2009, p.1). The EU Cohesion Policy framework also contributes to re-define the political role of regions across the EU. The requirement to set up mechanisms to manage and deliver Structural Funds at the regional level encourages the development of new policy approaches inspired by bottom-up dynamics rather the traditional top-down logics, in which regional governments play a key role (Paasi, 2009). But the centrality of regions cannot and should not be considered as given (Keating, 2004). The need for regional policies is continuously questioned as part of a scientific and political dispute between those who see region versus national states as the most appropriate geographical

unit of analysis (Bristow, 2005). One major criticism relates to the inconsistencies between the administrative boundaries of a region and the natural limits of a proper local system of innovation. Knowledge and innovation are not spatially bounded, thus rendering a geographically based view problematic (Martin, 2003; Yu and Jackson, 2011). Moreover, the Europe of the Regions label seems to have recently fallen out of favour, and limitations for regional mobilisation have become apparent in many member states, together with the recognition that national states are still powerful and capable (Elias, 2008). Despite criticisms, due to the presence of a mix of embedded economic, institutional, political, cultural and social factors, regions continue to be widely acknowledged as an adequate, although not the only, level to observe the complex interactions that innovation processes require to happen. For this very reason, and due to the specific topic covered by this study, a regional perspective is taken in the framework of this thesis.

2.1.4 The relational turn

During the last three decades, growth and innovation theories have gradually evolved towards a systemic approach that is referred to as a relational turn (Fløysand and Jakobsen, 2010). Its distinctive features are the recognition that knowledge exploitation processes require dynamic interactions between the various components of inventions, research, technical change, learning and innovation (Soete et al., 2010); and the evidence of the economic importance of the so-called relational assets: trust, voice and reciprocity (Morgan and Henderson, 2002).

The system of innovation (SI) approach is the main expression of this relational evolution, emerging as a relevant lens to explore and promote innovation processes (Edquist, 2005; Lundvall et al., 2007). The basic idea behind its conceptualization is that knowledge, and especially an essential component, which is tacit knowledge, cannot be understood or even created in terms of independent decisions made at the level of single firms or inventors. It is instead the result of complex interactions and learning dynamics across different organisations and actors from the public and private sphere (Lundvall, 1992; Morgan, 2004, 2007; Nelson, 1993). First framed under the umbrella of the National Systems of Innovation (NSI) theory, there are at least other three declinations of SI commonly used in the literature: regional innovation systems (RIS), which focus on the concentration of innovation activities and dynamics within specific geographic areas (Cooke et al., 1998; Maskell and Malmberg, 1997); sectorial innovation systems, which emphasise sectorial specialisation's impacts on innovation (Breschi and Malerba, 1997); and technological innovation systems, which consider the influence of particular technologies on innovation paths (Carlsson and Stankiewitz, 1991).

As far as the regional declination is concerned, the RIS literature investigates the set of interrelations occurring among the relevant stakeholders that make up the regional innovation system. RIS focus not just on the firm level but also on the role of universities, research institutions, technology centres, and so on, questioning how these can jointly contribute through networking to economic growth (Bellini and Landabaso, 2007; Cooke et al., 1998). A particular emphasis is put on the role of networks in facilitating knowledge sharing and transfer. Networks permit the diversification of participants' risks and the minimisation of transaction costs, and facilitate information exchanges and the efficacy of voice mechanisms, thus ultimately enabling collective learning processes (Morgan and Henderson, 2002). The growing interest in networks goes hand in hand with the increasing appreciation of social capital and trust as relevant elements of innovation policies (Morgan, 2007). Within innovation and policy learning theories, regions are addressed as a special case of learning economy characterised by specific attributes. Concepts such as learning region (Asheim, 1996; Morgan, 1997a; Hassink, 2004; Landabaso et al. 2000; Storper, 1993) and regional milieu (Camagni, 1991) were coined to stress the essence of innovation as a socially and territorially embedded learning process that cannot be understood independent of its institutional and cultural contexts. The learning region model focuses on info-structure instead of infrastructure, and on opening minds instead of roads (Morgan, 1997a). According to the learning region prism, innovation actors (politicians, policy-makers, chambers of commerce, trade unions, higher education institutes, public research establishments and companies and so on) should be strongly but flexibly connected with each other, as well as open to intra-regional and inter-regional learning processes (Hassink, 2004; Morgan, 1997b). Spatial proximity is not a sufficient condition to encourage learning. If it is recognised that talk and confidence are more likely to succeed when geographically localised, evidence suggests that the boundaries of a RIS or a learning region can hardly be framed into its administrative confines (Cooke and Morgan, 1998). The role of geographical proximity is further complicated by the implication of the wide diffusion of Information and Communication Technologies (ICT). ICT make it, in theory, less valuable for a firm to be geographically closer to its competitors, partners or suppliers, highlighting the feasibility of developing logically very compact agglomerations instead of geographically localised ones (Cairncross, 1997; Quah, 1997). The relational turn points out that networks can and should not be spatially limited to regional or national institutional borders but capable of guaranteeing a constant inflow and outflow of knowledge through internal and external connectivity. If framed as closed and exclusive, networks might in fact generate functional, cognitive or political locks-in, ultimately resulting in negative effects on the system's capacity to learn and innovate (Hassink, 2010).

In policy terms, adopting a relational perspective means recognising that growth and innovation are not primarily or solely dependent on R&D efforts but, even more importantly, the result of the capacity to absorb and diffuse knowledge at the system level. The impacts of R&I enhancing interventions, in terms of who gains and who loses from technological progress, and how these gains and losses occur, depend on social arrangements that affect society's willingness and ability to create and cope with innovation dynamics and changes. Public policies are called to promote the development of innovation ecosystems characterised by a high number of interactions among a wide range of participants and resources. The ecosystem approach emphasizes the role of private and public actors in nurturing the innovation process, and the need for a high degree of openness in order to be able to capture the knowledge that is also located outside the regional physical space (Yu and Jackson, 2011). These arguments represent the main theoretical background for the need of RIS policies, and more precisely, aspatial network-based regional innovation policies. But despite the inclusion of relational aspects advocated in order to increase the effectiveness of public interventions in the field of innovation, its operationalization remains problematic. Building linkages between the relevant actors at the system level and promote intra and extra-regional knowledge circulation is a major challenge for policy makers (McCann and Ortega-Argilés, 2013). Less clear concepts though largely adopted as a label for the new generation of regional policy such as learning regions, for example, have often resulted in ideal models being pursued more than being actually feasible in practice (Cooke et al., 2011; Hassink 2004). The way networks evolve, and even more relevant, how networks can be constructed and consolidated through judicious policies, still represents a key open issue (Morgan and Henderson, 2002).

2.1.5 The institutional turn

Since the 1990s new attention has been paid to the interplay among institutions, innovation and economic development. The isomorphic approach to development, which fundamentally neglected the role of institutions, starts to be questioned on both a theoretical and empirical basis (Rodrìguez-Pose, 2013). The role of relational assets, together with the evidence that R&D investments show radically different returns across regions and countries, inspires an institutional turn within a wide range of disciplines, from sociology to political science and economics. On one side, in emphasising the role of networks, the innovation system literature stresses the influence of institutions such as the national or sub-national education system, industrial relations, technical and scientific organisations, government policies and cultural traditions, that in many ways are what makes each system and its functioning unique (Asheim, 2012). Besides, achievements of development policies across the world, and especially in Europe, have been shown to be limited and

often controversial. Despite public intervention, disparities are persistent. Strategies result in more or less effective results according to the a wide range of factors such as the typology of involved industry, the nature of investments, the degree of commitment of actors that have the responsibility to implement them, and so on. This leads to a reconsideration of the missing links that can explain differences in results, amongst which the institutional element starts to attract increasing attention (Jutting, 2003; Percoco, 2005; Rodriguez-Pose and Fratesi, 2004).

But despite the growing scientific commitment, the inclusion of an institutional dimension in the economic literature generates more questions than answers (Rodriguez-Pose, 2013). Problems arise for several reasons. First, there is still no consensus about what is meant by institution (Jutting, 2003). The most common distinction is based on the degree of formality. Formal institutions (also known as hard or society institutions) are defined as "the rules of the game in a society; (and) more formally, (as) the humanly devised constraints that shape human interaction" (North 1990, p. 3); while informal tacit institutions (also known as soft or community institutions) include a series of features of group life such as social norms and values, individual habits, traditions and social conventions, inter-personal contacts, relationships, informal networks, and so on (Amin, 1999; Farole et al., 2011b; Rodriguez-Pose and Storper, 2006). The classification of society and community institutions differentiates societal rules and regulations from culture, traditions and routines characterising communities of individuals. Although originated by different sources of causes, the two forces are strongly inter-dependent on each other and co-evolve. Investigating their interaction is seen as an important lens through which to analyse and interpret development paths and economic growth (Farole et al., 2011b). Other authors distinguish between public and private institutions, or between economic, political, legal or social ones, according to the field of action. Moreover, classification criteria may refer to the degree of organisation i.e. organised or individual institutions, or to their hierarchical role in society, i.e. institutions related to the social structure of the society; to the rules of the game; to how the game is played; or to allocation mechanisms (Jutting, 2003). Second, there is no unanimous understanding of the overall role and functioning of institutions. On one side institutions are perceived as a given factor. Authors refer to their influence on the functioning of societies, given that institutions incentivise political, social, or economic human exchange (North, 1990). Institutions, and especially their quality and density, trump more traditional development factors such as trade or geography in determining the levels of income and growth prospects (Rodrik, 2004b). The concept of institutional capital emerges as a crucial determinant of the development potential of any territory. Solid institutions are recognised as "key enablers of innovation, mutual learning and productivity growth" (Putnam 2000, p.325). On the other side, institutions are addressed as a by-product of development. Institutions are not an isolated

and permanent element but conceived as path-dependent, which means that they are the product of long-term evolution and tend to be self-reinforcing. Institutions not only shape but are also shaped by the environment, and their place-specific dimension is stressed (Fukuyama, 2000; North, 2005; Storper, 2005). The literature in the field of political science for example highlights how political processes shape institutions and economic outcomes (Acemoglu et al., 2005). Institutions are conceived as the product of a political process laden with power asymmetries that conditions the development of the economy (Marques, 2015). Furthermore, though initially seen as incomplete substitutes for formal ones, the role of place-based informal institutions such as habits, conventions and routines emerges as crucial in generating the "ability (or lack of it) to learn and adapt to changes and to seek joint solutions to problems" (Morgan, 1997a, p.496). Institutions, and especially informal institutions, are linked to the concept of social capital, and understood as "features of social organization, such as networks, norms and trust that facilitate co-ordination and cooperation for mutual benefit" (Putnam 2000, p.19). Particularly, institutions generate place specific forms of trust among economic actors thus reducing transaction costs (Fukuyama, 2000), facilitating information flows, and ultimately leading to greater economic efficiency (North, 2005). Trust breeds economisation of time and effort, an increase in the efficiency in relations; a reduction of risk and a disclosure of possibilities for action, which would otherwise have been unattractive, helping to cope with uncertainty; and fosters thicker information flows, thus increasing capacity for learning (Cooke and Morgan, 1998). These mechanisms assume particular relevance at the regional and local level because at these scales informal institutions emerge more easily and with greater emphasis than at the national or international scale (Farole et al., 2011b; Rodriguez-Pose, 2013). An emblematic example is the industrial districts of Central and Northern Italy. The unique institutional setting of the area has been frequently described as the main determinant of its success. The presence of virtuous informal institutional arrangements permitted to transform, what could have been mere agglomerations of Small and Medium-sized Enterprises (SMEs), into dense networks of externalities that fostered inter-firm cooperation and resulted in the development of competitive economic activities (Becattini, 1990).The recent scientific contributes focus on dynamic aspect of institutions. A distinction is proposed by Acemoglu and Robinson (2012) between extractive institutions, which are designed to extract incomes and wealth from one subset of society to benefit a different subset; and inclusive institutions, that encourage a large number of people to participate in economic activities by giving them the opportunity to develop their skills, talents and interests. According to a dynamic view of development, what impacts most on growth trajectories is not the scarcity of conventional factors such as capital, education or entrepreneurship but the ability to employ resources that may be hidden, scattered, or badly used within an economic system

(Hirschman, 1958). In this respect, institutions assume the key function of compensating for basic deficiencies in organisations, and facilitate cooperation between actors or organisations (Morgan, 2007).

Moving on to policy implications, a role is thus suggested for both formal and informal institutions. A regional strategy that aims at maximizing the potential for innovation robustly requires taking into account the role of institutions (Farole et al., 2011b; Morgan and Henderson, 2002). But acknowledging their importance does not mean that transforming the abstract reasoning into policy guidelines and tools is an easy task. Institutions are place and time specific. What works in a given place or stage of development may not work in another, making it almost impossible to find regularities. In addition, beyond a certain threshold the role of institutions is relatively limited. Institutions and economic growth co-evolve, with changes in capacity building and improvements in governance contributing to the development of economic activity and vice-versa (Farole et al., 2011b). Plus, even more crucially, measuring institutions and, most of all, informal institutions, is complex, and carries the huge policy implication of squandering public funds on an issue with uncertain results (Rodriguez-Pose, 2013). Nevertheless, whatever the adopted definition is and despite the absence of solid empirical evidences, there is a firm belief that incorporating an institutional dimension helps to design policies that are more responsive to the needs of the local environment. Institutions more than any other factor determine the learning capacity of a region (Morgan, 1997a), helping to generate the necessary adaptive efficiency to absorb new knowledge and to engage in innovative and creative activities (North, 1990). Additionally, well-formulated policies might be ineffective if not able to match the institutional setting in which the development intervention takes place (Rodriguez Pose, 2013).

2.1.6 The industrial turn

After being in decline for many years, in the wake of the global financial crisis and driven by general trends such as competition dynamics and the fast rise of technologies, the modernisation of manufacturing re-entered the debate about restoring growth (Aghion at al., 2011; Bramanti, 2016b; EC, 2014c; Rodrik, 2004a). Manufacturing forms a key pillar of the EU economy, representing almost 80 per cent of the total of EU export, and a fundamental source of productivity growth and skilled jobs demand (European Commission, 2014b). Moreover, the sector is an engine for innovation processes and R&D investments. Industrial activities are all the more important to preserve innovation capability being central in fostering capabilities and knowledge dissemination across the Global Value Chains (GVC), and a powerful instrument for addressing grand societal challenges (Bramanti, 2016a). Following many years in which the best intervention was widely

accepted to be none at all, industrial policy issues were positioned back on the top of the EU political agenda. A new attention to the design of plans and programs aimed at reviving the EU industrial base and re-gain a competitive position at the international level emerged. Strategic rather than defensive policies are needed in order to address emerging challenges. The systemic nature of modern manufacturing given the overcoming of traditional sectorial boundaries and the increasing connections between products and services, together with the complexity of governance mechanisms and the sophistication of products and technologies, ask for interventions able to support these new interdependencies and create linkages among systems, networks, institutions and capabilities rather than focus just on market restrictions (Rodrik, 2004a). Due to technological, informational and coordination externalities a new role is suggested for the state in acting as facilitator in the face of complexity and uncertainty (Mazzucato, 2013; Rodrik, 2004a). Well-designed industrial policies allow for directly targeting market failures; reduce the costs of risks for firms; encourage transformations; and complement competition policy in fostering innovation (Aghion et al., 2011; Cappellin et al., 2015).

The emergence of the so-called new industrial policy agenda is heavily influenced by Rodrik's paper "Industrial Policy for the 21st Century" (2004a), in which a list of principles for the design of effective interventions is proposed. Under the new agenda the main purpose of industrial policy is to diversify economy and generate new areas of competitive advantages. Incentives must be targeted to skill-intensive, dynamic and competitive activities. One of the main distinctive elements of the new approach lies in the way in which it seeks to solve the identification problem. The agenda advocated reconciliation between top-down sectorial policies targeted on high-tech sectors, and more horizontal approaches. The need for vertical priority setting is put together with the evidence that innovation also comes from grass roots. Making choices around which economic activities to support should not be the job of government alone, but instead on new forms of private-public interaction. More precisely, industrial policies are conceived as a process of self-discovery designed to elicit areas where policy actions are most likely to make a difference (Aghion et al., 2011; Hausmann and Rodrik, 2003; Rodrik, 2004a, 2007). Within this context, the Industry 4.0 label was recently launched at the EU level. Also referred to as the fourth industrial revolution, Industry 4.0 entails the digitization and interconnection of products, value chains and business models in the manufacturing sector (European Parliament, 2016). It is essentially about creating the so-called smart factory of the future, and promoting the industrial renewal under a revised competitive framework based on interoperability, virtualisation, decentralisation, real-time capability, service orientation, and modularity. Furthermore, in addressing the issues of sustainability, societal challenges and living standards, Industry 4.0 puts a strong accent on demand-

pull innovation processes (Bramanti, 2016b), emerging as a systemic, all-encompassing and inclusive answer to the need of advanced systems to maintain global industrial competitiveness and generate increases of productivity (Deloitte, 2014; OECD, 2015).

2.2 Lessons from 25 years of regional innovation actions

This section highlights the influence of the above-described conceptual changes on the EU policy practice. In line with the advancements detailed in the literature, the innovation agenda has gradually evolved from a science and technology based-paradigm (S&T) towards an innovation-based one. A wave of regional experimentations has been supported by the EC during the last 25 years. Regional Innovation and Technology Transfer Strategies (RITTS), Regional Technology Plans (RTP), Regional Innovation Strategies (RIS) and derived exercises are financed in the attempt to design a new generation of policy instruments in several dimensions and with different rationales. Their nature, the main lessons learned and the way forward i.e. the changes introduced as part of EU 2014-2020 Cohesion Policy reform, are here below discussed for the purpose of highlighting the historical evolution that has led to the elaboration and adoption of the RIS3 agenda.

2.2.1 The historical evolution of EU innovation policies

Europe has led the world in the design and delivery of innovation policies (Morgan and Henderson, 2002). Community initiatives such as the European Strategic Programme for Research and Development on Information Technologies (ESPRIT), the Basic Research in Industrial Technologies (BRITE), the Community Programme in Education and Training for Technology (COMETT) and the SPRINT initiative were launched in the 1980s and the 1990s. These first programs were prompted by an increasing demand for policy solutions to growth and equity issues at EU level, and focus on the goal of increasing competitiveness. Plus, innovation is mainly supported by fostering the supply and transferring research and technological skills (Mytelka and Smith, 2001).

The argument in favour of a spatial dimension, and particularly, a regional dimension of innovation, appears in the mid-nineties. The main rationale for launching a proper regional innovation policy is to simultaneously make economic growth more balanced and stronger, in line with the spatial turn that was cited in R&I theories. Regions start to be perceived as laboratories for the exploitation of knowledge and technological innovation as a means to promote economic development (Bellini and Landabaso, 2007; Morgan and Henderson, 2002). A rich set of pilot actions is financed by the EC within the framework of Cohesion Policy. Their evolving nature reflects the changes that interested the very role of EU Cohesion Policy, passing from the original compensation towards the current

capabilities and competitiveness-oriented focus. The reduction of regional imbalances as one of the missions of the EU can be traced back to the founding Rome Treaty Preamble of 1957, stating the need to "strengthen the unity of EU economies and ensure their harmonious development by reducing the differences existing between the various regions and the backwardness of the less favoured regions" (EEC Treaty, 1957). The originally redistributive approach is inspired by the necessity to compensate for the absence of preconditions for growth such as infrastructure, accessibility, education and health care in lagging regions. Ad hoc programs such as STRIDE (1990) were launched, aimed at addressing the technological deficit of less favoured regions; along with the Regional Innovation and Technology Transfer Strategies and infrastructures (RITTS) and the Regional Technology Plans (RTP) exercises (1994), which were focused on exploring the technological demand of SMEs by ascertaining their needs through a factual evaluation of the strengths and weaknesses of the region's industry carried out by a team of experts and local players. Based on a neo-Keynesian approach to development, this first round of experimentations finances the transfer of resources and the provision of basic infrastructures to disadvantaged regions in the name of cohesion objectives (Bellini and Landabaso, 2007).

In the late 1990's the compensation approach gradually left the place to a development-centred logic. Inspired by endogenous and innovation growth theories, Cohesion Policy increases its distinctiveness as an intervention aimed at reducing inequalities not just through redistributive measures but creating of the conditions under which the potentials of less advanced areas can be untapped. Cohesion Policy starts to emerge as a support policy, positioning itself as a vehicle for a wider scope linked with other economic and social development policies (Pessoa, 2014). Following the Lisbon Strategy (2000) the centrality of innovation was stressed with increasing emphasis by the EC. The Lisbon Strategy's objective was to make the EU "the most dynamic and competitive knowledge-based economy in the world" and reach the target of a 3% of GDP to be spent on R&D by 2010 (EC, 2010). Innovation is embraced as the key priority area of intervention for more or less advanced regions. Investing in innovation in lagging regions is perceived as pivotal, not only to reduce inequality but also to contribute to Europe's economy as a whole (Camagni and Capello, 2014; Pessoa, 2014). Starting from the 2000-2006 programming period, this has resulted in the choice to gradually increase the share of the EU budget, and particularly the money meant to produce economic convergence of regions, i.e. European Structural and Investment Funds (ESIF), into R&D investments. Aside from that, innovation policies are implemented by a process of widening, being spread overall several policy-domains, and deepening, entailing the design of increasingly complex and sophisticated instruments (Borras, 2009; Nauwelaers and Magro, 2015). If originally programs focus on pre-competitive research and technology, innovation comes to

include multiple aspects of business and the economy such as finance, training, knowledge management, design, reengineering, consulting, intellectual property rights, and so on (Bellini and Landabaso, 2007). A definition that captures the wide breadth of innovation is the one offered by the EC Green Paper on Innovation (1995). Innovation is "the successful production, assimilation and exploitation of novelty in the economic or social spheres" (EC 1995, p.1), and thus can be produced by a process of adaptation as well as by imitation. More recently, a great emphasis has been put on the innovation process. Due to the influence of the relational and institutional turns, innovation passes from being perceived as a linear process, like in its initial Schumpeterian theorisation, towards an "evolutionary, cumulative and feedback process which can only be realised in the cooperation and in the economic and social interaction of different actors, and as a result produces technological, organisational and social innovations" (Koschatzky, 2004, p. 62). Therefore, innovation can either be about localized (incremental, minor, and guided) and structural (radical, massive, and unpredictable) changes (Boschma, 2006). The recognition that innovation is not entirely about S&T, and that not all innovation is produced within an explicit and linear knowledge creation process or that, inversely, not all R&D produces innovation, increases complexities in the design of policy interventions. Decisions about the optimal size and type of investments pose important challenges to policy-makers that are charged with the responsibility to choose. In the search for new policy solutions a second set of experimentations were launched, namely the Regional innovation and technology transfer strategies and infrastructures (RITTS) initiative, the Regional Innovation Systems (RIS) initiative and the Regional Information Society Initiative (RISI). These differ significantly from past research and technological development (RTD) policy in the attempt to capture inputs from the demand-side through new participatory methodologies, and in the focus put on new priorities. Evidence shows that the majority of traditional RTD funds had exacerbated rather than redressed socio-economic disparities across the EU. Resources were mainly distributed according to the principle of scientific excellence, traditionally lacking in less advanced contexts, and as a result tending to target just the most prosperous regions. The RIS and RISI pilot actions instead aim at creating the right environmental conditions, institutional in particular, and also to increase innovative capacities in less advanced systems. A participative policy learning approach is embraced in order to stimulate co-operation links among firms, and between firms and the regional R&TDI actors (Landabaso et al., 2000; Morgan and Henderson, 2002). These so-called "social engineering actions" (Bellini and Landabaso 2007, p.5) are financed under the new established article 10 of the European Regional and Development Fund (ERDF). Starting from the 2000-2006 programming period, the article has allowed the funding of pilot studies characterised by a certain degree of risk, thus opening up the

possibility for the EC to draw upon lessons from policy experiments across EU regions and work directly with regional actors to explore new support measures (Morgan and Henderson, 2002). The innovative dimension of regional policy is addressed by promoting partnerships between the private and public sector; enabling the internationalisation of regions and local authorities; and facilitating the transfer of know-how in the technical, economic and scientific fields. Under the ERFD 2000-2006 another operation was developed by the EC in 2001. A two-year program to design innovative actions was financed by the EU15 regions at 50% of eligible costs. This experimentation was specifically for EU less developed regions (LDR), defined as those regions where GDP per inhabitant is less than 75% of the EU-27 average, and puts a strong emphasis on strengthening public-private partnerships for policy planning and implementation and the creation of innovative environments. The requirement to develop an R&I strategy that is agreed upon by the different regional actors is also incorporated. This second round of initiatives boosted a further increase in the financial commitment towards R&I based policies within the 2007-2013 period. The amount of investments dedicated to innovation, in its new wider meaning, more than triples compared to the previous period, counting for about 25% (€86.4 billion) of the total allocation of Cohesion Policy[3]. The regulation of the ERDF 2007-2013 introduced a new policy priority i.e. "Innovation and the knowledge economy, through support to the design and implementation of regional innovation strategies conducive to efficient regional innovation systems", stressing the importance of strategies aimed at stimulating more intangible competitive factors such as innovation capacities. The original S&T emphasis definitely gives way to a wider conception of innovation under which infrastructure improvement, direct grants and foreign investment attraction are replaced by the provision of services aimed at facilitating the collective diffusion and absorption of knowledge (Bellini and Landabaso, 2007).

As a consequence of these latest evolutions ESIF has become a tool serving not one, but two objectives. On one side, the equity goal, pursuing cohesion and the reduction of disparities among more and less developed areas. On the other, the efficiency goal, aimed at enhancing the overall levels of prosperity across the EU by making full use of the potential of people and areas that may be underutilized (Barca, 2009). EU Cohesion Policy today is not conceived as a passive policy that redistributes income. It assumes instead the rather peculiar meaning of a dynamic tool that seeks to create resources by targeting the factors of economic competitiveness and employment, especially

[3] Source: http://ec.europa.eu/regional_policy/en/ [Accessed on 10th January 2017].

where unused potential is high (EC Third, 2005, Fourth, 2006, Fifth, 2008, and Sixth, 2009, Cohesion Reports).

Figure 3. Towards RIS3: the practice of EU innovation policies

Community programs (1980s and 1990s)	European Strategic Programme for Research and Development on Information Technologies (ESPRIT); Basic Research in Industrial Technologies (BRITE); Community Programme in Education and Training for Technology (COMETT); SPRINT initiative	Competitiveness goal: interventions supporting the supply and transfer of research and technological skills, and in this way innovation
The first round of regional experimentations (mid-nineties)	STRIDE (1990), Regional Innovation and Technology Transfer Strategies and infrastructures (RITTS); Regional Technology Plans (RTP)	Redistributive goal and S&T emphasis: actions compensate for the absence of preconditions for growth and innovation in disadvantaged regions by providing basic infrastructures and facilities
The second round of regional social engineering actions (2000-2006)	Regional innovation and technology transfer strategies and infrastructures (RITTS); Regional Innovation Systems (RIS); Regional Information Society Initiative (RISI)	Efficiency goal and demand side focus: pilot actions to create the environmental conditions that enhance innovative capacities through participative policy learning approaches
Experimental actions of regional strategies under the ERDF 2000-2006	Two-year program to design innovative actions for EU15 regions	Emphasis on strengthening regional public-private partnerships for policy planning and implementation: the first strategies for defining innovative actions agreed between the different regional actors
The incorporation of the innovation focus into mainstream Regional Policy programmes (2007-2013)	The increase in financial and strategic commitment towards innovation: 25% of the Cohesion Policy budget allocated on the priority Research and Innovation	Adoption of a wide meaning of innovation and recognition of the need for strategies that stimulate more intangible competitive factors and facilitate the collective diffusion and absorption of knowledge

2.2.2 Lessons learned

Notwithstanding the amount of investments in R&D, empirical data leaves doubts regarding the capacity of ESIF to act as a lever to achieve both convergence of LDR and higher competitiveness of the EU as a whole. Evaluation exercises display dissimilar returns in the levels of induced growth rates. The correlation between R&D expenditure and economic growth acceleration is not as robust as expected, and seems even weaker in the case of LDR, where the capacity of ESIF to implement policies for catching-up and reduce disparities proved to be insufficient. Emblematic in this respect is the persistent poor performance of the Italian Mezzogiorno where, notwithstanding the huge

amount of dedicated public resources, a high volatility in the R&D projects' impacts is registered (Rodriguez-Pose and Fratesi, 2004; Percoco, 2005; Veugelers and Mrak, 2009). It is the very regions that mostly need to grow through innovation that show poorer outcomes of the investments that they succeed in financing. This contradiction is commonly referred to as regional innovation paradox (Oughton et al., 2002). LDR show difficulties both in spending resources that may be allocated to them for R&I projects, and in absorbing the related benefits. This is mainly imputable to the combination of disadvantages affecting less advanced systems, such as the institutional gap, especially in terms of lack of skills and competences of public administrations; a low capacity to reach the critical mass required to yield robust results able to last in time; and the crowding out of private investments due to a general weakness of the local economy. These constraints make the managing of innovative programmes like the ones dedicated to investing in research particularly difficult (Kroll et al., 2014; Milio, 2007).

But despite the uncertainty in terms of impacts and added value of ESIF, it would be unfair to disregard the intangible but significant effects generated through regional innovation policy investments. The traditional proxy for innovation based on R&D expenditures is not able to capture the whole share of investment in innovation. Innovation policy is much more than money, it's about what happens in spending the money. Other un-measurable and possibly unexpected impacts such as benefits in terms of social capital, cultural changes and learning dynamics, have been shown to be meaningful. It is worth recognising that actually ESIF have been revolutionary in transforming our economies and societies in a historically unprecedented way and within a very short period of time (Bellini and Landabaso, 2007). Pilot exercises such as RIS contributed to building trust and social capital; promoted new partnerships and business networks inspired by consensual policy-making practices; and, in some cases, enhanced the institutional capacity of the administrations in charge of innovation (Socintec, 2005). Working groups to identify R&D development needs and technology foresight exercises were launched as part of these experimentations, generating a diffused evaluation culture able to ensure a long-term commitment towards innovation at the regional level. The importance of public-private cooperation and university-enterprise connections and clusters emerge as key in increasing the regional knowledge generation, diffusion and absorption capacities. A new form of associational governance model, rather than hierarchical or market-based, appears, thanks to the experience of those regions which saw the exercise as an opportunity to facilitate new linkages and learning between actors, rather than simply a source of funds for existing activities (Morgan and Henderson, 2002).

A series of significant policy lessons can be drawn from these regional experiments. Firstly, one-size-fits-all approaches that target sectors which are considered worldwide fashionable but occupy a

rather peripheral position in the industry space of a region, are failing strategies. Investing on priorities such as nanotechnologies, biotechnologies or ICT in contexts that do not have the minimum scale to compete on these factors does not contribute towards bettering their innovation performance (EC, 2013b). Imitating other's best practices at the expense of a critical understanding of the region's specific challenges and of an informed discussion on the most appropriate ways to address them, is not effective in building successful innovation systems, especially where these are not already in place (Morgan and Henderson, 2002). During the last two programming periods, funding priorities have been characterised by a relative homogeneity of policy mixes across countries and regions despite the differences in technological and economic development levels characterising the EU panorama. This suggested that there is often a mismatch between the innovation needs and the implemented policy models. Moreover, R&I policies, in particular at regional level, often appeared too inward looking and fragmented. The need to rethink regional policies along the lines of a more innovative and context specific development strategy thus emerges (European Commission, 2013b; Rodriguez Pose and Fratesi, 2004). Another key lesson concerns the setting up of effective strategy making processes. Regional innovation policies are difficult to manage in relation to both planning and policy delivery. Complex governance mechanisms are required, characterised by inter-institutional cooperation, vertically through the subsidiarity chain (national governments and the EU as well as municipalities and provincial governments) and horizontally across Ministries or Regional Departments. In addition, the capacity to develop processes based on the interaction among regional actors and inspired by consensus and open discussion emerges as a key element (Morgan and Henderson, 2002).

Notwithstanding the success achieved through some pilot actions, past policy approaches have been unable to build the necessary institutional and administrative architecture and guarantee an adequate level of policy learning to meet the challenge (Bellini and Landabaso, 2007). The need for regional innovation policies appears to be widely accepted, and ESIF seem to work better when used to funding R&D as opposed to other possible aims such as infrastructure or direct aids to enterprises (Crescenzi and Rodriguez Pose, 2012). Nevertheless, policy makers are still looking for the adequate policy responses. Innovation investments are confirmed to be a necessary, although not sufficient, condition for both more and less developed territories in order to pursue growth trajectories. However, a reorientation is needed to guarantee a more efficient use of resources (European Commission, 2013b). Addressing inefficiencies is even more urgent in times of crisis and budgetary constraints. For the first time, under the on-going programming period the whole EU budget is lower than in the previous one, making growth-enhancing investment more needed than ever in order to rebalance the negative spatial effects that the crisis is generating in terms of

interregional convergence trends (Camagni and Capello, 2014). Avoiding duplications through the identification of realistic and precisely defined objectives; nurturing a more diverse innovation system through links and cross-fertilizations that facilitate knowledge spill-over; taking into account the local institutional, organisational and political arrangements; embracing a greater accountability for results before, during and after the programs implementation; and overcoming the persisting divide between academic thinkers and regional planners by adopting a more practice-oriented approach able to really help policy-makers, are some of the key lessons to be drawn from 25 years of experience in EU regional innovation policies. This is a field with objectives that remain a huge task to fulfil, and requires robust feedback and policy learning to succeed (Bellini and Landabaso, 2007; European Commission, 2013b; Grillo and Nanetti, 2016).

2.3.3 The way forward: the EU Cohesion Policy reform 2014-2020

Investing more in innovation is at the heart of Europe 2020 (European Commission, 2010) and a crucial part of Europe's response to the economic crisis. As part of the hugest reform that has always incorporated the Cohesion Policy framework, important changes have been introduced in the managing of ESIF under the on-going programming phase. Cohesion Policy reforms occurred in 1993, 1999 and 2006, each starting a new seven years programming period. Priorities have been accordingly modified over time, both in terms of their weight in the EU budget, and in the composition of the portfolio of investments (European Commission, Second, 2003, Third, 2005, Fourth, 2006, Fifth, 2008, and Sixth, 2009, Cohesion Reports). However, impacts have been less pervasive and comprehensive if compared to the current one.

The key principles that inspire the 2014-2020 reform are: result-orientation to reach a better visibility on the expected added value; thematic concentration to grasp critical mass through the establishment of specific targets and thresholds for each fund; a sound economic governance inspired by a new notion of partnership and the introduction of strategic plans negotiated between the EC and national authorities (Partnership Agreements); the increase of synergies with other policies and programs; and the adoption of Common Provisions Regulations (CPR) for the five ESIF. Amongst these, two novelties especially deal with regional innovation policies. The first, a further shifting of resources towards the innovation goal occurs. Innovation-related measures have been the fastest growing theme in the past twenty-five years. From accounting for just 8% of total regional policy expenditure in 1988-1994, currently about 30% of the total allocations of Cohesion Policy is deployed for R&D and, more broadly, innovation, a sum that more than doubles when taking into account the co-financing by beneficiaries. Additionally, in order to achieve thematic concentration, minimum allocations are set for a number of priorities and according to the level of

development of the regions. As far as the ERDF is concerned, between 50% in the case of LDR and 80% for more developed regions (MDR) of the budget has to be allocated to the 4 Thematic Objectives (TO): TO1 - Strengthening research, technological development and innovation; TO2 - Enhancing the access to and the use and quality of ICT; TO3 - Enhancing the competitiveness of SMEs; and TO4 - Supporting the shift towards a low-carbon economy, thus further reinforcing the engagement towards the innovation goal. The second, general and thematic ex-ante conditionalities are introduced. General conditionalities relate to the adoption of transversal principles applicable to all programmes, namely: anti-discrimination, gender equality, disability, public procurement, state aid, environmental legislation, statistical systems and result indicators. Thematic conditionalities instead are established as part of each fund's specific regulations (European Commission, 2013) Amongst these, the submission of RIS3 by EU Member States and regions is declared ex-ante conditionality for receiving funding for investment priorities aiming at strengthening research, technological development and innovation (TO1) under the ERDF (Regulation (EU) No 1303/2013, Annex XI). RIS3 are defined as "integrated, place-based economic transformation agendas that should: focus policy support and investments on key national/regional priorities, challenges and needs for knowledge-based development; be built on each country's/region's strengths, competitive advantages and potential for excellence; support technological as well as practice-based (non-technological) innovation and aim to stimulate private sector investment; get stakeholders fully involved and encourage innovation and experimentations; and be evidence-based and include sound monitoring and evaluation systems as learning tool" (Foray et al. 2012, p. 8).

In a moment in which Cohesion Policy is under pressure because of perceived problems with its performance, RIS3 are introduced with the specific aim of maximising the results of investing in R&D and innovation through a "well-conceived comprehensive and targeted policy strategy that takes into account all national/regional assets, competitive advantages, and potential of businesses, researchers and universities" (EC 2014a, p.5). More precisely, RIS3 are expected to address three key issues affecting research and innovation strategies in the 2007-2013 period, namely: avoiding fragmentation and increasing synergies between different European, national and regional policies and programs supporting innovation; preventing imitations and duplications, promoting instead the specialisation around credibly competitive advantages; and making innovation a priority for all regions, promoting feasible and realistic strategies not only in leading R&I hubs but also in less developed and rural regions (Foray et al., 2012).

As far as their very essence is concerned, RIS3 are neither an industrial nor an innovation policy in its original meaning. RIS3 are instead envisioned as extensive development strategies characterised by a strong territorial dimension and aimed at pursuing the general objective of growth through

innovation. The 2014-2020 reform represents a turning point. Cohesion, competitiveness and innovation are welded together thanks to the wide view of innovation and the necessity to look for opportunities behind disparities (Capello, 2014). The general goal of RIS3 is to facilitate transformations and adjustments towards a stronger development path across a range of economic, environmental and social dimensions, emphasising diversity based on existing knowledge bases and particularism. By matching the development, innovation, relational and institutional dimensions to the regional scale, RIS3 encompass the main objectives of a modern regional policy in terms of maintaining, increasing, reshaping or creating economic, innovation, political, cultural and identity spaces (McCann and Ortega-Argilés, 2013). This represents, at least in theory, an important advancement in the design of research and innovation strategy. The new requirements have already had a major impact on programming in most EU member states and regions. There is a significant increase in ERDF allocations to the first four TOs, while infrastructure investment is less prominent compared to 2007-2013. The concept of innovation has been interpreted in a more substantial way, embracing social innovation and its target, such as societal challenges, climate change, food security, ageing societies, elderly care. Moreover, the development of an integrated industrial policy is currently one of the 7 Flagship Initiatives under Europe 2020, emphasizing the need to promote "an integrated industrial policy for the globalisation era, by prioritising competitiveness and sustainability" (European Commission, 2010). The importance of maintaining a strong industrial base as key driver for economic growth and jobs is further reinforced by the 2012 Communication "A Stronger European Industry for Growth and Economic Recovery", which launched new partnerships between the EU, member states and industry, and by the 2014 Communication "For a European Industrial Renaissance", calling for a modernisation of manufacturing.

In the RIS3 era most of the debate has definitely shifted from being focused on the why of innovation and industrial policies to how to redeploy it in a more effective manner. Although built on the past, the new agenda represents a welcome novelty in the modes it addresses the key topic of promoting more focused investment able to stimulate the exploration and exploitation of the EU innovation capacity.

CHAPTER 3. THE PROMISE OF SMART SPECIALISATION

This chapter introduces the RIS3 European agenda and its theoretical ambitions. The advent of RIS3 is inspired by concrete problems affecting innovation policies in the past decades and responds to the need to increase the innovation capacities of EU regions. Once framed as a scientific principle, within a very short span of time, the concept of smart specialisation was translated into a mainstream policy framework to be applied to all EU regions, currently in the heart of its implementation phase. As highlighted in chapter 2, the main intellectual merit of smart specialisation lies in the re-combinatory effort i.e. in the way the concept incorporates, in an analytically ambitious way, the design principles that have been theorized by the literature during the past three decades (Camagni and Capello, 2013; McCann et al. 2014). But when moving to its deployment, a disconnection between the rhetoric of the innovation discourse and the reality of policy practice emerges. The RIS3 agenda calls for a more experimental public sector and for the improvement of regional administration capacities and governance structures. This is particularly challenging in LDR, due to the lack of initial preconditions. The new approach emerges as a strategic-planning operation launched on a big-scale and supported through strong political and financial commitment by the EC, which takes, especially in less advanced settings, the shape of experimentation more than consolidation. But if RIS3 are experimental in nature (Foray, 2015) it has to be noticed that by its very nature an experimentation should include incentives and supporting schemes that allow for failures, something that is partly in contrast with the choice of making RIS3 a legal conditionality for accessing ESIF innovation resources. Moreover, the RIS3 official Guide stresses the need to put in place a coherent, rigorous and transparent set of indicators and metrics that allow for a continuous review of the strategies and the introduction of correctives and changes when necessary, according to a learning by doing approach (Foray et al., 2012). Nevertheless, at the time of its introduction, and even two years later, the RIS3 evaluation agenda is yet by no means complete (Foray, 2015). It looks like the concept has been translated into practice before the theoretical changes have been completely absorbed and metabolised. Some steps were probably less mature than thought, especially in those regions that are affected by strong institutional deficits. The RIS3 approach thus appears more the arrival point of an un-concluded process, now having to tackle the difficult challenge of demonstrating its effectiveness in the real world, while at the same time continuing to nurture the scientific debate around its theoretical consolidation.

The first part of the chapter presents the RIS3 origins by distinguishing between the economic, political and social rationale behind its adoption. The second part discusses its two main practical novelties, namely the EDP and the principle of inclusiveness. The role to be played by the public

sector and the other stakeholders that make up the EDP in nurturing the strategy making process is debated in the third part of the chapter. The last part highlights the quantity and quality of institutional learning challenges to the regional decision-making process that characterise its deployment, namely the methodological governance challenge, the policy-mix challenge and the political challenge.

3.1 The advent of the RIS3 agenda

This section discusses why, in which context and by whom, the concept of smart specialisation is developed. The economic and political rationale behind its adoption and the strong social dimension characterising its very essence are highlighted.

3.1.1 The economic rational: related variety and knowledge spill over

The question of how regions can promote innovation i.e. through specialisation or diversification has a long history within the economic geography debate. The benefits of spatial clustering in promoting growth due to external agglomeration economies have been recognised since Marshall (1920). Localization economies underpinned by Marshallian externalities emphasise the virtues of specialisation suggesting that specialised regions are more conducive to innovation as compared to regions with more diversified industrial structures. Agglomerations are explained by the perceived embeddedness of tacit knowledge in regional or local clusters as a source of competitive advantage (Uyarra, 2007), and specialisation is recognised as conducive to size and critical mass effects in R&D due to economies of scale and economies of scope. In contrast, the diversification thesis stresses the role of regional diversity in stimulating innovation. Diversified production structures are more innovative, thanks to the virtues of the so-called Jacobian diversification externalities, which trigger new ideas by inducing knowledge spill over and providing valuable resources required for innovation.

The principle of smart specialisation instead is based on growing theorising and empirical support around the importance of knowledge spill over between sectors that are technologically related, and is inspired by the idea of related variety (Boschma and Jammarino, 2009; Frenken et al., 2007; Hausmann at al., 2011; Neffke et al., 2011). Related variety is basically about the economic importance of bringing together different but complementary pieces of knowledge. Accordingly, it is neither specialisation nor diversification per se but "regional specialisation in technologically related activities that is more likely to induce interactive learning and innovation" (Asheim et al., 2011, p 895). Variety matters for knowledge spill-over conducive to useful re-combinations (Jacobs, 1969) but only if the different industries in a region are technologically related to each

other and complementary in terms of competences (Frenken et al., 2007). Within an economic system differentiated knowledge bases coexist, namely analytical, synthetic, and symbolic knowledge. These contain different mixes of codified and tacit knowledge, being hence characterised by different degrees of context-sensitivity. More precisely, analytical knowledge refers to strong codified science-based knowledge, where break-through products and radical improvements happen more frequently; synthetic knowledge relates to engineering research, where innovation tends to proceed per marginal improvements, and knowledge is partially codified although also relies also on a certain amount of the tacit component; and symbolic knowledge refers to the creation of meanings and desire, often related to the production of culture and art, and is characterized by a distinctive tacit component. Each knowledge base requires a different proximity mix for learning, from real geographical proximity (in the case of highly context specific knowledge) to more virtual ones. Consequently, different but equally relevant modes of innovating are pursuable, according to the firms, systems or regions specific needs (Asheim et al., 2011).

The idea of relatedness is intended in terms of the right level of cognitive proximity, avoiding excessive distance as well as too much proximity that may lead to lock in mechanisms. Similarly, other forms such as organisational, institutional, or social proximity are proposed as important drivers of competitive advantages and economic growth (Boschma, 2005; Cohen and Levinthal, 1990; Maskell and Malmberg, 1997; Oerlemans et al., 2007). To construct regional advantages based on related variety countries and regions should therefore diversify into activities that are close by in terms of knowledge bases. Today products are made of productive knowledge. The more connected the activities the more knowledge transfer and spill over might be generated, and the higher the probability of increasing the overall amount of productive knowledge available at the country or regional level (Hausmann et al., 2011). Under smart specialisation thus long-term development of regions will depend on the ability to diversify into related activities that somehow complement existing structures, focusing on the missing connections potentially able to foster the upgrading of the economic systems towards the knowledge economy convergence frontier. The smartness of new paradigms lies in the capacity to choose the right investment priorities linked to regional knowledge bases (smart), and in which critical mass and opportunities for competitive advantages are perceived (specialisation) (Foray, 2015). One-size-fits-all models have failed because of the inability to recognize the role of knowledge asymmetries. Replicating the same policy mix as other leading regions, even in the absence of appropriate assets, gives little chance of becoming world leaders in the chosen fields. RIS3 aim at avoiding precisely this institutional panacea. Differentiation and technology diversification are key to supporting the positioning of the variety of European regions in the highly dynamic and changing global context, making their

innovation and development strategy stand out from the others. Interventions should capitalize on region-specific assets rather than be selected from a portfolio of policy recipes that owed their success to different environments (Todtling and Trippl, 2005).Following the new agenda, EU regions are encouraged to adopt strategies realistically tailored to their capabilities, opportunities and needs, focusing on areas of strength where already some scale, experience and assets exist, instead of promoting worldwide tendencies in industry and sectors (Asheim et al., 2011). Smart specialisation is therefore essentially about strategic and specialised diversification (McCann and Ortega-Argiles, 2013), leading to a revised version of both regional innovation systems theories - in terms of how new knowledge is produced and transferred - and policies - in terms of how policy-makers across EU regions can best support and foster more rapid knowledge diffusion and technological advancements.

3.1.2 The political rationale: the place-based approach to innovation and development

The transposition of the smart specialisation concept into the domain of regional R&I policy is the result of an animated debate that took place during the past two programming periods at the EU level, and especially within the DG REGIO. The questions of which sectors, fields of actions and activities are more likely to benefit from R&I public support, and how to translate the related variety approach into policy prescriptions, nurtured a fertile thinking around the future of Cohesion Policy. Plus, even more critically, given the high innovation divide affecting the EU, with certain leaders competing worldwide on the scientific and technological frontier and other followers adopting and adapting innovative solutions to their specific situation to move closer to that frontier (European Commission, 2010), is the question of the extent to which, if at all, peripheral regions can innovate (Morgan and Nauwelaers, 2016).

Past experiences show that spending on R&D per se does not necessarily produce economic growth, especially in LDR. On the other hand, the emergence of specialised peripheral cores suggests that the knowledge factory is, and can be still, more spatially dispersed. Signs of innovative vitality increasingly come from the periphery of Europe. Indicators such as the levels of participation to the 5th Framework Programme or the number of science parks do not coincide with the core-periphery relationship that is standard in the geography of innovation. The evidence of unexploited potentials provides the background for the need of more offensive regional policies inspired by the necessity to look for opportunities behind disparities by putting at work factors that were underused (Bellini and Landabaso, 2007). As a consequence, to maximize the EU knowledge base, the EC stresses the importance of exploiting the full innovation potential of all regions instead of reinforcing a virtuous circle of innovation-driven growth in core regions (OECD, 2011). Within the Lisbon Strategy

innovation is for the first time recognised as a core priority for all regions: for advanced ones to remain ahead and for lagging ones to catch up (European Commission, 2010). As highlighted by the theory of different knowledge bases, no policy mix model is superior to any other in fostering innovation performance. What matters is the responsiveness to each region's specific innovation challenges (Asheim et al., 2011). The best strategy for maximizing aggregate growth is neither to invest solely in excellent regions in search of the highest efficiency, nor in lagging ones in search of equity, but to focus on the development potential of all places, represented by their material, human, cognitive, social and relational assets (Camagni and Capello, 2014).

The need to promote context-sensitive policies is heavily advocated by the Barca Report, the independent report released in April 2009 by Fabrizio Barca at the request of the Commissioner for Regional Policy Danuta Hubner. Two key policy recommendations are outlined. First, "any policy for innovation needs to be place-based" (Barca 2009, p.130). The geographical context, in terms of institutional, cultural and social characteristics, matters. Different settings require different strategies and the knowledge bases on which interventions are built need to be strongly linked to the places themselves. The main argument behind the place-based approach is that many aspects of economic development, and in particular innovation, are inherently local in nature. Because of regional specificities and complexities, policies are more effective if designed and shaped at the regional/local level. This assumption represents a critical response to the view proposed by the Sapir report – An Agenda for a Growing Europe (Sapir et al., 2003), which questioned not only the ability of regional policies to realize convergence objectives but even their contribution to the growth of targeted regions, advocating the need to move back to a national and space-blind approach through a number of re-nationalizations of the structural funds programs. The second key suggestion relates to the embrace of a holistic view of space, encompassing the economic, social, cultural, identitarian and institutional context. The place-based approach reflects a combination of economic geography and institutional approaches by arguing that both play a role. In particular, it assumes that the institutional context both shapes and is also shaped by economic geography, and that the most powerful responses to local development challenges typically involve finding ways to best enhance the capacity and the workings of the local institutional context to respond to the challenges associated with geography (McCann and Ortega-Argilés, 2013). Most of the knowledge for the development of a place is not readily available in situ, but must be fashioned through a participatory and deliberative process (Morgan, 2013). Neglecting these characteristics would mean forgoing the full comprehension of local development potentials, and the synergies arising from the sense of belonging to a community (Barca, 2009).

The depth and urgency of the political debate created the conditions for smart specialisation to gain political attraction like few other concepts have done in the past (Morgan, 2015). First adopted as a strategic principle within the Europe 2020 Flagship Initiative, and further framed by Foray et al. (2009) through the introduction of the notion of EDP, the idea of smart specialisation is adopted as a strategic multi-domains and multi-level policy approach supporting the development of place-based innovation strategies at the EU level, and not only (OECD, 2011). Although designed in continuity with past experiences, RIS3 signal a radical modification of previous approaches asking for the design of strategies, which are both priority and place-specific (Morgan, 2013). The search for uniqueness and originality and the emphasis put on building on internal capacities are what differentiates RIS3 from previous RIS exercises, and particularly from the wave of cluster policies that have been implemented in Europe in the last decade. Clusters are based on the recognition of the benefits deriving from spatial agglomeration of activities (Porter, 1990). However, as highlighted by the place-based approach, these externalities are not sufficient to justify a policy. If inspired from vertical and voluntaristic approaches, cluster policies have in fact been shown to be unable to fully capture the local entrepreneurial dynamics and translate investments into economic knowledge and innovation, with the risk of leading to the phenomena known as cathedrals in the desert (Foray, 2015). The RIS3 agenda instead incorporates the necessity for tailoring interventions to address the diversity of EU regions, stressing the need to reflect the different routes to growth through innovation that regional diversity asks for (Landabaso, 2014).

3.1.3 The social dimension: innovation as a collective social endeavour

Smart specialisation is based on the idea of innovation as a collective endeavour where different actors collaborate and interact (EC, 2010). Innovating is about incorporating and exploiting knowledge, the most valuable commodity in the new economy. Our societies hold an increasing amount and diversity of knowledge, which tends to be dispersed in brains and human networks. The ability to recombine it to create a larger variety of smarter and better products is a collective, rather than individual, phenomena (Hausmann et al., 2011). Innovation is the result of systemic interactions, which are not limited to the development or adoption of new technologies nor confined to particular sectors or clusters, being instead understood as a complex, open, lateral and pervasive process, shaped by a variety of institutional routines and social conventions (Morgan, 2007). Consequently, innovation policies have become a "messy and complex, multi-level, multi-actor reality" (Flanagan et al. 2011, p.19), which require the presence of coordination mechanisms linking ideas, people, resources, markets, and promote effective alliances to be effectively designed and deployed.

RIS3 embrace this wide view of innovation, encompassing not only product and processes but social and organisational innovations (Foray et al., 2012). Particularly, social innovation is a key field of action under the new agenda. Social innovation is about developing new forms of interaction to respond to social and societal issues (European Commission, 2013a). First coined to refer to innovations in the organisation of work and society, social innovation re-emerged as a broader concept and practice in the 1990s as a way to address major structural transformations and complement the more traditional technological and economic innovations. Social innovation is defined as "a novel solution to a social problem that is more effective, efficient, sustainable, or just than existing solutions and for which the value created accrues primarily to society as a whole rather than private individuals" (Phills et al. 2008, p.39). A social innovation can be a product, a production process, a technology, but it can also be a principle, an idea, a piece of legislation, a social movement, an intervention, or some combination of these (Phills et al., 2008). The concept stems from the need for change both in terms of the outcomes that innovation is expected to deliver and the process through which these outcomes are generated (European Commission, 2013a). Social innovation contributes to re-shaping society in the direction of participation, empowerment, co-creation and learning. The necessity to strengthen relations with the demand side, the so-called innovation users is particularly stressed. All the actors of the society are likely to play leading roles in the discovering process possessing the local skills, materials, environmental and market access conditions to promote gathering localized information and the formation of social capital assets, which represent at the same time, a condition and an objective of an effective innovation process (Foray et al., 2012). Involving citizens is a core element of effective governance models. It allows tapping new sources of ideas and resources; contributes to building public trust in Government; and raises the quality of democracy and civic capacity (OECD, 2001).

Under the RIS3 umbrella innovation capacities are thus about personal engagements, institutions, networks and cooperation more than narrowly focused on individual S&T efforts (Morgan, 2013). Social accumulation of knowledge where it has happened, has underpinned an incredible increase of living standards (Hausmann et al., 2011). If the secret to development is the exploitation and collection of productive knowledge at a societal rather than individual level, then the process necessarily requires the involvement of many explorers, not just a few planners. There is no smart specialisation if there is no smart cooperation. Accordingly, the capacity to work in concert is confirmed as one of the most critical ingredients for the effective deployment of the new agenda (Morgan, 2007).

3.2 From theory to policy-practice: key components of smart specialisation processes

In theory, smart specialisation processes might also happen without the need of any public policy. In a world of perfect information and efficient markets, discoveries may be promoted by private agents (firms or network), which in the medium-to-long term may be followed by the imitative entries and agglomerations of other firms around the new activity and its growth. Yet, the evidence shows that due to market and coordination failures such as knowledge externalities and dispersion, appropriability problems and difficulties in the access to finance, spontaneous smart specialisation processes are uncommon, thus making public interventions essential in order to facilitate their emergence and consolidation (Foray, 2015).

This section presents the key operational elements of the RIS3 agenda as prescribed by the EC. The very essence of the EDP and the principle of inclusiveness are discussed, and the expected goals and ambitions of a successful smart specialisation policy are highlighted.

3.2.1 Centrality of entrepreneurial dynamics: the EDP

As part of the RIS3 agenda, the EC requires EU regions and member states to identify investment priorities that could become the object of resource concentration, through the setting up of a process of entrepreneurial discovery (EDP) (Foray et al., 2012). The EDP is the most innovative element as well as the most demanding operational step of the RIS3 agenda. Inspired by the new industrial policy discipline, and particularly by the works of Hausmann and Rodrik (2003) on the view of development as a self-discovery process led by entrepreneurs, the EDP is characterised by two important features: it is business-centric and puts the process of discovery at the heart of the priority setting activity.

The first key element is the entrepreneurial-driven nature of the process. Adopting a business centric logic means putting existing and potential needs of firms at the core of programs and public instruments aimed at promoting innovation. Those who are in the best position to know which new economic activities can profitably be pursued in a given country or region are the entrepreneurs. Entrepreneurs are intended in a broad sense, including innovative firms but also research leaders in higher education institutions, independent inventors and innovators, and recognised as the crucial mechanism by which economies turns demand into supply (Foray, 2015; Hausmann and Rodrik, 2003). Practically, the EDP is about the mobilisation and structuring of the entrepreneurial knowledge base available in the society to produce economic knowledge. Entrepreneurial or productive knowledge involves much more than knowledge about science, technology and techniques. Rather, it combines it with "knowledge of market growth potential, potential competitors as well as the whole set of inputs and services required for launching a new activity"

(Foray et al., 2011, p.7), thus representing the most precious input of the priority-setting process. Economic knowledge instead relates to what works or does not work economically i.e. targets the market needs, and can be seen as the EDP main output (Foray, 2015; Hausmann at el, 2011).

The second key component concerns the emphasis put on the idea of discovery. Within RIS3, discovery is conceived as the activity of looking for opportunities through the economic exploration of new activities. The surprise element of noticing something that is already available but was overlooked before is what differentiates it from the systematic search for something whose nature is known, as well as from an unexpected surprise generated by pure chance. Discoveries are intended as the source of information about what is possible (Hausmann et al., 2011). In entailing the possibility of opening a new domain where innovation might occur, discoveries can be seen as the stage that precedes an innovation, and its principal source of information (Morgan, 2016b). The EDP is thus about exploring, experimenting and learning. To be successful it should be informed by local knowledge and capabilities and characterized by a strong degree of openness in order to capture all the relevant entrepreneurial knowledge fragmented and distributed over many sites and organisations and increase the likelihood for discoveries. At the same time, the EDP has to be focused and selective. RIS3 ask for the identification of a limited, though undefined, number of priorities that are realistically tailored to a region's capabilities and able to reach critical mass (Foray et al., 2012). In this way, the new agenda attempts to make two critical and somehow conflicting requirements compatible: identifying priorities in a vertical logic (specialisation) while not dissipating the extraordinary power of market forces working in revealing domains and areas where priorities should be selected (smart) (Foray and Goenaga, 2013). The EDP offers a practical response to the long-standing debate on how to prioritize some R&D and technological activities while at the same time guaranteeing market-driven resource allocation boosted by decentralized entrepreneurial experimentations. The strategic interaction between all the relevant entrepreneurial actors from both the public and the private sector is seen as the way to avoid the risk of lock-in into traditional activities that a rigid interpretation of the idea of specialisation could generate. Within the RIS3 paradigm, the selection exercise is instead interpreted as a way to discover and support diversification potentials in new areas of productivity, quality, enabling technology and go-to-the-market strategies (Foray et al., 2012). The right functioning of the EDP in enlarging these potentials for discoveries that may in turn ultimately lead to innovations and growth, is paramount to the success of any RIS3. Indeed, it could be said that under the new agenda policies for facilitating EDP are more important than setting the specialisation priorities themselves.

3.2.2 The inclusiveness principle: towards a Quadruple Helix collaborative leadership model

RIS3 are inclusive strategies, meaning that each sector has a chance to be included in the priority setting through the presentation of promising projects or ideas (Foray, 2015; Foray and Goenaga, 2013). The inclusiveness principle reflects the wide view of innovation embraced within RIS3. Both traditional and modern sectors have equal opportunities to be selected as domains. Not just the dynamic, fashionable and already competitive clusters (the so-called excited goblins, such as ICT start-up), but also mature and less innovative sectors (the so-called sleeping giants, such as tourism) and SMEs (the so-called hungry dwarfs such as new start-ups) can be selected as promising areas of specialisation (Foray, 2015). Particularly, a strong emphasis is put on the co-invention of application. The co-invention of application is considered a knowledge-intensive activity as desirable as the invention of a new General Purpose Technologies (GPT). It involves the capture and use of external knowledge and spill-over for the purpose of improving the production function of a specific sector or activity. Key in this respect is the notion absorptive capacity intended as the mechanisms through which a system effectively metabolizes external knowledge. It is not about the mere acquisition but about the ability to acquire, assimilate and use knowledge to construct local capacities and competitive advantages (Foray, 2015; Thomas and Wood, 2014). Rather than just apply existing technological capabilities, RIS3 should prompt the development of new advanced solutions to significant and distinctive problems of the regional economy related, for example, to the quality and efficiency of the production process within some relevant sector or activity (Bellini, 2015; Foray and Goenega, 2013). Moreover, the inclusiveness principle responds to the need to increase opportunities for innovation. The more sectors are included, the greater the likelihood of discoveries and the higher the probability of capturing different types of innovation, i.e. not only industrial and scientific but also social and institutional innovation. Broadening the process as much as possible is thus critical for the success of the RIS3. Likewise, discoveries require cooperation, confidence and the sharing of common values, making the existence of appropriate organisational forms such as networks, associations and partnerships, fundamental (Morgan, 2016b).

In practice, this translates into the need to set up a truly inclusive governance structure that allows for active participation for the relevant public and private stakeholder. The EC stresses that not only industry, research institutions and Government exponents, as the tripartite model of the Triple Helix suggests (Etzkowitz and Leydesdorff, 2000), but also the demand side should be included, according to the so-called Quadruple Helix governance model (Foray et al., 2012). The Quadruple Helix refers to a four-tiered organisational structure for governing research and innovation resource allocation patterns. It entails the involvement of four types of actors in policy-making: institutional bodies, research sphere, business sector, and citizens.

Under the RIS3 agenda, developing such types of coalitions is introduced as a coercive requirement. The main novelty lies in the request to adopt a strong demand-side approach. Involving the final users in the strategy making is in fact considered essential to capture competencies and information from different domains, especially in the field of innovation, making practical challenges more complex than in the past (Barca, 2009; Foray et al., 2012).

3.2.3 Aspirations and expectations: potentials for RIS3

The RIS3 ambition is to support the growth of new economic activities that have an impact on innovation capacities and that ultimately translate into a structural evolution of the whole regional economy, thanks to a knowledge-based economic transformation that opens up new growth paths. These may take different forms, namely: the transition of a sector towards a new promising market through the use of existing productive capabilities (e.g. via the introduction of the needed scientific or entrepreneurial knowledge into an old and/or declining sector); the modernisation of a mature sector through the application of technological (GPTs) or other types of solutions that improve processes and products (e.g. ICT applications for the tourism sector); the diversification into growing and profitable markets through the exploitation of economies of scope and knowledge spill-over via the hybridisation and cross-fertilisation between old and new activities; or the radical foundation of a new research and innovation domain, which concerns the discovery of a completely new industry and/or service with no direct link with the existing structure (Foray, 2015).The impacts are expected to vary according to the initial pre-conditions in terms of regional assets and capabilities. The aim of the RIS3 agenda is to exploit the innovation potentials of both innovation leaders and followers, promoting a higher degree of diversity at the EU system level. More precisely, it is not about pursuing the perfect distribution of resources among complementary specialisations, promoting instead a more efficient - although not perfect - system in which there is less duplication - but still some - and more variations, in line with the diversities and specificities of EU territories (Foray et al., 2012). The S&T based mode of innovation (STI) and the learning-by-doing mode of innovation (DUI) are equally desirable within RIS3. The DUI mode of innovation is seen as particularly suitable for LDR because it requires less investment in R&D and is more based on the exchange of information and interactions among firms along the production chain. In MDR instead, RIS3 are expected to support the exploration of new possible paths beyond the current routines of innovation, even if those are successful, and in this way reinforcing their competitive advantages. Although apparently more achievable, this second route emerges as more complex, but valuable. Reinventing itself is not an easy task and path-dependence often acts as a huge obstacle in changing practices, even if these are perceived as obsolete (Foray, 2015; Iacobucci, 2014).

The potentials of the new agenda, as a result, strongly depend on the involved domain of application and on the specific context. RIS3 can be about consolidating a specific R&D activity or field through a selective concentration of resources on few specific measures. It can result in the promotion of large-scale projects in emerging sectors or around a set of core activities, like in the creative and cultural industries for example, with the aim of developing territorial networks that involve small firms driven by the larger actors. Or, it can aim at the enhancement of the visibility of a specific sector or market niche on the global market, investing in image and reputation according to an outward-looking perspective. The relevant element thus is the capacity to use RIS3 in a place-specific and focused way. It is under these conditions that RIS3 have the potential to promote the gradual upgrading of the whole regional innovation system, especially in LDR, given the size of available financial resources.

3.3. Institutions for RIS3 policies

RIS3 are characterized by a high degree of institutional context sensitivity. Innovation policies are no longer conceived as static and defined as ex-ante but as a dynamic phenomenon of creating and gradually modifying a joint understanding of the what, why and how of certain public activities in an on-going communication process (Morgan, 2013). Therefore, institutions and their quality exercise considerable influence, directly and indirectly, on the degrees of success or failure of the RIS3 agenda, and will be affected by its implementation (Foray, 2015; Kroll, 2015; Rodriguez-Pose et al., 2014). This section focuses on the institutions for RIS3. As already highlighted (chapter 2), there are different definitions of institutions in the literature. For the purpose of this study, institutions are defined as the system of public and private organisations and actors that make up the EDP. These can be economic, political and social institutions. Their role in setting in motion the RIS3 process is discussed, making a distinction between the government and the innovation community sphere.

3.3.1 The Government sphere: what role for the public sector?

In Europe, there is an explicit recognition of the public sector role in the development of innovation policies. The state, and, more generally, public agents are acknowledged as critical players in providing the support structure for regional innovation systems (Cooke, 2002). Reasons for the public sector's role being fundamental lies in the presence of market and coordination imperfections that generate difficulties in the different phases of discovering and its exploitation and translation into economic knowledge. Innovating is about capturing the dispersed entrepreneurial knowledge within the society. It requires the presence of aggregation and coordination mechanisms that

compensate for the lack of connections and foster the quality of networks, especially in LDR, where coordination externalities are often more critical than informational externalities. Furthermore, access to finance and appropriation problems are particularly severe in the case of innovation. Public support is fundamental, on one side, in order to compensate for difficulties in capturing private returns from discoveries; on the other, to maximise the social spill-overs arising from innovations through incentives that regulate the entry of new firms around the discovered activities, and promote its translation into a collective phenomenon (Foray, 2015; Morgan, 2016b; Rodrik, 2004a; Romer, 1990). More precisely, in the RIS3 operationalization the public sector is asked to play a new, complex and to a certain extent ambiguous role (Morgan, 2016b). The new paradigm embraces a mid-way position between the neo-liberal critiques inspired by Hayekian insights and based on informational (i.e. the state cannot be a surrogate for the decentralised information processing capacity of markets) and behavioural (i.e. industrial policy induces rent-seeking behaviour, so states should not engage in picking winners) arguments, and the Entrepreneurial State view (Mazzucato, 2013), which admits the role of government in actively shaping and creating markets and its capacity to engage in high risk activities. RIS3 are based on the idea that if it is true that the state lacks the necessary knowledge to elicit information about new activities (the state is not omniscient) so does the private sector (Rodrik, 2004a, 2004b). Therefore, an effective appreciation of the entrepreneurial dynamic of a territory can only be performed if entrepreneurial actors and management and governance bodies engage in direct discussion and learn together in a continuous trial-and-error process of experimentation (Foray et al., 2012; Morgan, 2016c).

The difficult task of orchestrating such a collaborative process and crafting a more inclusive governance arrangement to enhance the diversity of voices, while at the same time supporting in a preferential way the selection of promising new activities, is the main novelty of the RIS3 agenda. RIS3 advocate a change in the way we talk about the state, to the point that states can be innovative. The public sector is asked to become itself a smart player, deeply involved in the social learning process it is trying to stimulate (Foray, 2015; Morgan, 2016b). A good government for RIS3 should be experimentalist, i.e. be able to take risks; embedded, i.e. able to engage in strategic cooperation with the private partners; and characterised by a dynamic and long-term vision, allowing for review of the RIS3 and reallocation of resources where necessary. These requirements generate unprecedented demands on public sector bodies, and particularly on regional authorities, broadly responsible for the design and implementation of RIS3 (Foray, 2015; Morgan, 2016b). The public sector is a complicated partner to involve when it comes to unpredictable and recombinant dynamics like innovation processes. Dealing with knowledge creation and diffusion implies unusual activities characterized by a high degree of uncertainty and requiring the capacity to routinely

absorb risk and mistakes. Feedback, failure and learning are the three main barriers to the embedded state. Feedback mechanisms are critical because fear, power and hierarchy tend to stymie it; failure is politically problematic, if not impossible, to be tolerated; and learning is complex because time and space are not properly afforded to monitoring, evaluation and reflection (Morgan, 2015).

RIS3 break with past approaches with the intention of incorporating trial and error mechanisms from the economic theory into policy programmes, along with stronger conditionalities attached to the use of public funds (Landabaso, 2014). Policy-makers are expected to act not only with the entrepreneurs but also as the entrepreneurs (Bellini, 2015). This entails changing the modus operandi of administrators and elected officials, and the need to address the cultural gap between innovators and bureaucrats, which stems from a long tradition of civil service being risk adverse and keen on the predictability of outcomes. Under the new agenda the issue of public sector innovation i.e. innovation throughout the public sector is given priority and put at the very heart of the innovation process. The design and implementation of RIS3 significantly relies on public sector's capacity to deliver. If on one side this represents the opportunity for regional governments to take things in hand again (Foray, 2015), on the other it may be too much to ask for, especially for LDR, where the lack of institutional capacity could undermine the promise (Morgan, 2015; Rodríguez-Pose at al., 2014). Moreover, the fact that regions want to change and innovate is anything but certain, and path dependence and inertia have a strong influence, as well as in more advanced settings (Morgan, 2013). Huge contradictions emerge between the reality of strategy making and the degree of creativity and risk the operationalization of the new agenda, which it requires. Besides, alongside old and unsolved issues such as the regional innovation paradox, new ones such as austerity are heavily undermining the public sector's capacity to act, slowing down its capacity to think smartly and to be more agile and creative, thus making the task even more arduous (Morgan, 2015).

3.3.2 The innovation ecosystem: the other helixes

If the public sector is a strategic player in crafting more collaborative and inclusive forms of innovation partnerships (Morgan, 2016b), the very protagonist of the EDP is the innovation community. The reasons for the importance of including the local innovation community lie in the following considerations. Firstly, the traditional principal-agent model according to which the government i.e. the principal agent that has innate ex-ante knowledge about which sectors to invest, is replaced by a multi principal-agent logic. In the 2.0 World the new frontier of innovation-led growth requires many principal actors and few executors in a sustained collective effort of mass

specialization (Grillo and Nanetti, 2016); secondly, the necessary entrepreneurial knowledge is located in a wide array of firms, agents and institutions, such as universities, public laboratories, communities of practice, which may be located inside or outside the region (Morgan, 2015); thirdly, the kind of innovation support needed has changed: it is no longer just about the supply-side but also about the demand-side; fourthly, involving those who are going to be affected by the outcomes of a policy maximizes commitment to the process and gives rise to internal motivation that is more powerful than that which is imposed (Arrowsmith et al, 2004).

The RIS3 agenda asks to set up a collaborative leadership approach in which each stakeholder contributes to generate intensive experimentation and discoveries in the contest of social and ecological innovation. In line with the Quadruple Helix model, the involved actors may be: national and/or regional authorities and their agencies, universities and research institutions, clusters, business networks, enterprises; in particular SMEs and their associations, banks and credit institutions, financial incubators, consumers and users, communities of practices, opinion leaders, professional associations, and so on. Particularly, the EC stresses the need to promote empowerment of those actors that are usually not involved in the design of innovation policies, like the civil society and its representations. Emerging social groups who are not represented by the traditional routines of consultation, such as younger generations, women, and immigrants, are considered key as they express significant dynamics of contemporary societies and economies (Foray et al., 2012).

The EDP is about nurturing contaminations between regional and/or extra-regional stakeholders. Contamination, intended in the sense of positive contagions, can be sought within existing relationships or require new knowledge exchanges between actors that are usually not in touch (Foray, 2015). Furthermore, the EDP is not just about interactions between organisations. Individuals are also active change agents. It's the type of relationship developed among the involved actors that makes the difference, and not just their presence or absence. The literature often focuses on the nature of the institutional landscape rather than focusing on what actors or organisations really do, which is instead the determinant factor (Uyarra, 2010). Under RIS3 an increasing emphasis is put upon the critical role played by innovation intermediaries or connectors. In order to catch experimentations, it becomes more and more important for policy makers to introduce mediators, animators, and facilitators that may fulfil the important brokering and connecting role. This is particularly important in the field of social innovation, for example. Effective alliances between small organisations and entrepreneurs who are mobile, fast and can cross-pollinate, and the bigger organisations with roots, resilience and size who can grow ideas to scale, are essential in creating the conditions for experimentations that may ultimately lead to

innovation. These intermediaries do not always conform to labels or categories such as public, private or non-profit organisations, nor are they always territorially bounded or defined by particular sectors or clusters of activity. It is therefore essential, that their involvement is not inspired by the need to fulfil normative prescriptions, being instead aimed at fostering flexibility and adaptability to the needs of the EDP in each specific context (Bristow, 2015; Clark, 2014)

3.3.3 Quality of institutions: pre-condition and outcome

The influence of institutions on innovation system failures is intensively investigated by the literature. The capacity institutions, as a precondition to enjoy Cohesion Policy programmes, was first stressed during the negotiations for the 2004 accession process, when it clearly emerged that weak administrative competences slow down the capacity of States in accessing and managing EU funds (Hughes et al, 2004). Institutional fragmentation, describing a lack of networks across social groups; organisational thinness, occurring when important components of RIS are missing, both in their quantitative and qualitative dimensions; and lock-ins, i.e. typical problems for specialised regions that may provide incentives or disincentives to engage in networks and coordinated action, are advocated as key barriers for the effectiveness of innovation investments (Isaksen, 2001; Tödtling and Trippl, 2005). Evidence showed that the quality of government and regional development and innovation performances are interrelated. According to the subnational European Quality of Government Index (EQI), based on data on corruption, rule of law, government effectiveness and government accountability, correlations emerge with the patenting capacity across EU regions (Charron et al., 2014, 2015). The low quality of government may undermine potential effects of measures aimed at promoting innovation in the periphery of the EU (Rodríguez-Pose et al., 2014), whilst regions with strong administrative capacity tend to benefit more from policy interventions (McCann and Ortega –Argilés, 2013).

The presence of institutional capabilities and skills is confirmed as crucial in order to fulfil the requirements for information and coordination imposed by the RIS3 agenda. The quality of institutions is expected to be decisive in order to: create an EDP conducive context by supporting the formation of stable relationships between policy makers and entrepreneurial actors, and among entrepreneurial actors; promote the formation of new firms and the emergence of new actors, building on the existing environment to transform it; contribute to restraining market failures such as picking the winners, rent-seeking behaviour, corruption and lock-ins, which typically inhibit the processes of exploration and discover; promote trust, cooperation, interaction and dialogue in order to facilitate the internalisation of knowledge through open and flexible channels of communication between regional actors; and effectively fulfil the multi-level coordination i.e. manage the

responsibilities at the different levels of government (Charron et al., 2014; Ederveen et al., 2006; Foray et al., 2009; McCann and Ortega-Argilés, 2013; Rodríguez-Pose et al. 2014; Rodrik, 2004b). Particularly, two dimensions are stressed as most significant in determining the potentials for structural changes within innovation systems: the degree of institutional diversity and integration. Diversity is intended as the number of different institutions present in a given socio-economic system, and the extent to which these differ from each other. Institutional diversity encompasses not only regional institutions but all those that intersect in a region. Therefore, it influences also the capacity to learn from extra-regional sources. The degree of institutional integration instead refers to the extent to which institutions promote or constrain interactions between different social groups, associated for instance with social class, education, professions, organisations, industry, nationality or religion, and which are seen as crucial in influencing the collective discovery process. For succeeding within innovation policies both dimensions play a role. On one side, the higher the degree of diversity, the more the amount of knowledge for related variety that is available within the society. On the other, a certain degree of institutional integration is required in order to enable knowledge exchanges and interactive learning. Accordingly, interventions aimed at increasing the likelihood for a successful EDP should focus on the missing dimension, compensating for excessive or insufficient diversity or integration (Boschma, 2014; Frenken et al, 2007; Grillitsch, 2015).

Acknowledging that the impacts of RIS3 are mediated by the quality of local institutional arrangements then poses a question about the feasibility of the new agenda in modest or moderate innovators. In less advanced regions the organisational fabric is often fragmented, and sectors are un-related. Fostering contaminations both within the existing interactions as well as in order to build new forms of relations is of primary importance, making the role of institutions even more decisive in differentiating success from failure (Blazek and Morgan, 2015). Due to un-favourable context conditions, LDR might require preliminary investments to reinforce the institutional environment and create triple-helix platforms as "a vehicle to kick off an entrepreneurial discovery process" (Blazek and Morgan 2015, p.3) before initiating the priority setting. Recent studies confirm that countries and regions with known weaknesses in their institutional arrangements are facing difficulties in designing and implementing RIS3. But these also suggest that the new agenda is helping to promote key notions of participatory policy and evidence-based thinking, and supporting the introduction of new elements of governance (Kroll, 2015).

Hence, the quality of institutions emerges as a valuable and desirable output of RIS3, especially in LDR. Enhancing institutional capacities is a de facto innovation policy (Rodriguez-Pose et al., 2014). The diverse EU patterns of institutional arrangements pose local contingent policy challenges in which "regional capacities are at least as important an issue as techno-economic

potentials" (Kroll 2015, p.1). In order to contribute to the achievement of the main objectives of a modern regional policy in terms of maintaining, increasing, reshaping or creating economic, innovation, political, cultural and identity spaces, the institutional dimension of the RIS3 cannot be overlooked. Though being the worst equipped to fulfil the requirements, it's LDR that could benefit most from this opportunity, not just from a quantitative point of view but, even more important, from a qualitative one.

3.4 Institutional learning challenges to the regional decision-making

RIS3 change the approach to innovation policies with a promise of increased efficiency and effectiveness. An expectation that relies on an un-tested congruence between the reality of strategy making, crafted by the institutions in charge, and the multiple demands that the new agenda makes in regard to the continuous engagement of the innovation community in the policy formulation and implementation (Grillo and Nanetti, 2016).To respond to the call, adaptive political, administrative and cognitive reforms might be required (Bellini et al., 2015; Morgan, 2016b). Three main challenges to regional decision-making characterize the practice of RIS3: a governance challenge, a policy-mix challenge and a political challenge. As effectively synthesized by Morgan (2013) the adoption of a RIS3 entails a triple challenge: conceptual (do the core theoretical arguments stack up?), operational (is the approach really feasible for all regions?) and political (which discontinuities are emerging?), each one referable to one of the three realms of RIS3 policies: the process, the program and the political dimensions. Their very essence and the related practical issues are here below discussed.

3.4.1 The governance challenge

Governance is the process surrounding the making of choices and decisions that orient strategies. It is about coordination models and mechanisms between actors, organizations, markets, networks, and levels (Bailey et al., 2006). The quality of governance is strongly correlated with the absorption capacity of ESIF. Poor governance reduces Cohesion Policy impacts, hinders economic growth and entrepreneurship (European Commission, 2014c). Differences in the RIS3 deployment will largely depend on differences in the regional modes of governance (Kroll, 2015). The new agenda requires to set up dynamic governance models through which they nurture a process that is alive, constantly evolving and able to engage a broad range of agents at different levels in the strategy definition, implementation and evaluation. These requirements represent a huge task for policy makers. It entails the need to guarantee stakeholder inclusiveness and engagement, so that the strategy is the

result of an EDP rather than a technocratic exercise; and the necessary multi-level coordination and synchronization with the outside (European Commission, 2014a; Morgan, 2015), as discussed in the following two paragraphs.

3.4.1.1 Inclusiveness and effectiveness in stakeholder engagement processes

The EDP concept is open to multiple interpretations. This leads to difficulties when moving from the vague idea of crafting an economic process to its realisation. The ideal governance structure for RIS3 is inclusive, allowing for the engagement of a wide range of stakeholders; dynamic, fostering experimentations and discoveries; and focused, preventing the capture by specific interest groups or lobbies (Foray et al., 2012). The huge challenge lies in guaranteeing the needed degree of openness, participation and ownership of the process together with its effectiveness. As already stressed, a complex role must be played by the public sector not only in supporting the EDP but also in influencing its direction (Foray, 2015). This activity has to be undertaken while avoiding the government failures usually associated with the top-down and centralised bureaucratic processes of technology choices and selection, and based instead on stakeholder engagement. Important methodological issues thus emerge, namely:

- How to start: there may be different ways of starting an EDP. The innovation community can be included from the very beginning, according to a truly bottom-up approach but with the risk of over-complexity of information; or within just a moment, but with the risk of not being inclusive enough (Foray, 2015);
- How to identify participants: consultations are biased by the selection of participants. It is important to prevent rent seeking or moral hazard behaviour by avoiding an inclusion based on criteria different than the relevance in the process, such as the actor's role in the economic or political hierarchy (Morgan, 2016b; 2016c);
- How to nurture the process: the EDP implies an approach of looking for new forms of stakeholder involvement through which encouraging and facilitating the behaviour of experimentation and discovery. Particularly, different sectors and actors may require different tools to be woken up and involved (Foray, 2015);
- How to synthesise results: the existing or imagined views and ideas emerging from the consultations have to be translated into concrete investment priorities in the framework of RIS3. This requires the ability of governments to collect and assess the received information in order to align policy measures to the selected specialities (Morgan, 2013).

Transversally, a critical aspect is the timing of the process. RIS3 are progressive strategies meaning that today's new activities will no longer be new tomorrow and could be replaced by other more suitable priorities (Foray, 2015). Likewise, participants may be transformed through interactions with each other over time, requiring the continuous adaptation of tools and means. Guaranteeing continuity over time is therefore essential, and consolidating the EDP in a routine of public private cooperation within the administration is desirable (Grillo, 2017).

3.4.1.2 Multi-level and cross- border coordination and synchronization

RIS3 signal a challenge to all levels of the polity system calling for constant multi-level coordination (Morgan, 2013). A first practical issue concerns the need to synchronise the RIS3 with the EU meta-priorities and national plans and roadmaps. This requires shared management between the EC and the national and regional level. Priorities and incentives existing at the other levels have to be considered when selecting regional projects, being part of the opportunities and potential sources of additional financing. Likewise, this must not influence regional choices. RIS3 should not be developed to respond to national or EU priorities but to exploit the related opportunities when it comes to financing specific projects in the selected domains (Foray et al., 2012). A second key aspect concerns the need for horizontal coordination between regions. In order to avoid overlapping and instead foster cross-border collaborations, a constant exchange of information with other regions should take place during the strategy making processes. RIS3 policies of the other regions offer a fundamental additional set of missing information that should not be overlooked (Bellini, 2015). Knowledge transfer mechanisms tend to have a strong local bias (Boschma and Frenken, 2011), thus making the case for launching the EDP within the regional, but at the same time, the relevant entrepreneurial knowledge could also be located elsewhere outside the region (Baldwin, 2006). As Morgan (2007) put it, in the era of open innovation and global value chains "endogenous does not mean indigenous". The space of innovation partnerships cannot be limited to the local dimension. It should embrace an expanded territorial perspective. Connectivity to the outside is equally important as internal connections, especially in the case of strategies focusing on the opportunities of application of innovation inputs located in other regions (Bellini and Hilpert, 2013). Moreover, adopting an outward looking perspective allows for considering the relative position of each region and its competitive advantages in relation to other contexts of Europe, thus representing a fundamental feature of a serious innovation strategy (Bellini, 2015; Foray et al., 2012).

3.4.2 The policy-mix challenge: the evolutionary logic of prioritization

Building an effective policy mix is at the heart of the RIS3 implementation phase. The policy mix is "the combination of policy instruments, which interact to influence the quantity and quality of R&D investments in public and private sectors" (Nauwelaers et al. 2009 p.3) in a given policy system. The RIS3 policy-mix challenge entails the complexity attached to the multiplicity of goals and means that may characterise a modern innovation policy. Innovation policies are not assigned to specific sectors but spread through various and multi-disciplinary domains. Likewise, tools have become sophisticated and encompass more than just a combination of concrete measures to achieve overarching objectives, instead involving the processes by which instruments of different priorities and levels emerge and interact (Flanagan et al., 2011). The RIS3 toolbox is voluntarily maintained open and flexible by the EC in order to favour the design of place-based policies. But this makes the concrete delineation of its components and modes of delivery problematic (Nauwelaers and Magro, 2015). Firstly, ambiguities emerge in the very meaning of the word specialisation. Under RIS3, specialisation is not intended in its relative Ricardian meaning i.e. specialising in a particular set of existing industries. It refers to the developing of new specialities that are realistically tailored to a region's assets, stressing the necessity to bring together different but related activities and find innovative solutions to specific local problems, specialising and particularizing in this sense a region's economy (Asheim, et al., 2011; Foray, 2015). Smart specialisation is actually a story of diversification around a core set of activities, and these semantic contradictions make it prone to a series of misinterpretations (Bellini, 2015; Boschma and Giannelle, 2014; Foray and Goenaga, 2013; Kroll, 2015; Morgan, 2016b). A second issue concerns RIS3 boundaries. In also supporting non-technological innovation, the new agenda addresses a huge variety of domains. Regions may embrace a narrow view of RIS3 focusing on S&T - intended as sectorial and GPT based policies, such as mechatronics, ICT, domotics, new materials, nanotechnologies - and innovation domains - intended as sector-based policies in strategic areas such as automotive, chemistry, and aerospace. Or a broad view, addressing a wider range of domains such as energy and environment, health and sustainable living, tourism, culture and creative industries, mobility and transports, and so on. Besides, thematic and functional priorities are combinable within each field, making the strategy design and implementation process even more intricate (Nauwelaers et al., 2014). Thirdly, inspired by related variety, RIS3 should focus on activities located within or at the intersections of different sectors, whose positioning in the global value chains can lead to exploring new market or technology opportunities. Activities are the level at which a group of enterprises together with other innovation partners collectively explore and discover new pathways to transformation. RIS3 are about identifying a meso level between the sectorial i.e. supporting all the firms of a sector without

taking into account their capacity to implement new and risky innovative projects, and the individual one i.e. subsidising micro-projects according to a horizontal approach, with the risk of not being selective enough. Perceiving this granularity opens up the number of opportunities and favours collaboration instead of competition (Foray, 2015). Nevertheless, recognising it in the real world is an arduous task. Fourthly, no strong indication is given in respect to the ideal number of specialities to be chosen. RIS3 are about resource concentration. The selection should be based on the ability to reach critical mass (Foray et al., 2011). However, at the same time RIS3 are about stimulating experimentations, making the investment in many and smaller market niches more valuable. It is also not clear if there is a rationale between the size of a region and the appropriate number of specialisations, and if, for example, in less specialised innovation systems the number is expected to be higher (Iacobucci, 2014). Also, RIS3 are dynamic strategies. Priorities are expected to evolve over time after a suitable period of 4 or 5 years (Rodrik, 2004a), asking for the activation of ad hoc mechanisms and incentives that allow for their entry and exit.

As a consequence, in practice policies decided under RIS3 may result in a broad combination of interventions and instruments, and pursue a plurality of goals that affect different innovation domains and levels. To serve the expectations, the RIS3 agenda requires the design of tools that address thematic and functional goals; embrace mission and system oriented approaches; and are able to evolve over time. The RIS3 framework is inspired by a systemic and holistic approach, but the policy-making reality is not always following the same path (Braun, 2008). The main on-going risk thus is that instruments in place might not be perfectly aligned with the RIS3 strategic goals and the expected outcomes against which its effectiveness should be evaluated (Nauwelaers et al., 2014).

3.4.3 The political challenge: balancing continuity, stability and change

Political leadership is arguably one of the most important factors influencing RIS3 effectiveness. Robust politics can make the difference between a transactional ethos, focused on ticking the box of smart specialisation requirements chasing related resources, and a transformational one, based on a strong commitment in using the process to effect real changes in strategy making. The political level is expected to play a catalytic role, to break policy silos and better synchronise its multiple roles as producer, regulator, and procurer. If on one side this represents the RIS3 biggest strength, on the other the obstacles and disincentives to act in such a way are many and diverse (Morgan, 2016c). Selecting in a non-neural manner the desirable areas of specialisation is a costly action, exposed to pressure and uncertainties. Predicting the future developments of markets and technologies; favouring some regional actors while making others lose; promoting collaborative

leaderships that affect vested interests; allowing for the reallocation over time of priorities and resources; and inserting discontinuities that entail the risk of failing, are difficult tasks when located in political cycles dominated by a short-term vision and by the need for consensus and legitimation (Grillo and Nanetti, 2016; Morgan, 2016c). Political distortions arise for example in respect to the type of desirable RIS3 priorities. There is both a resource concentration and an appropriateness issue. The political tendency is not to concentrate but to disperse resources, making the choice of macro-themes able to include a high number of projects and actors preferable. Likewise, political decisions may not lead to the selection of the more realistic and pragmatic priorities. Recycling available programs such as existing clusters and local research capabilities by simply presenting them under a new form for example might represent a much safer option to be pursued by political elites in order to obtain visibility in the short term (McCann et al. 2014). Nevertheless, RIS3 are introduced precisely to avoid politically inspired approaches biased by power and patronage, especially in the face of novelty (Morgan and Nauwelaers, 2016). Hence, the very essence of the RIS3 political challenge lies in the capacity to reduce the costs of possible failures associated with the introduction of policy changes and innovations, which is something different from reducing failures (Foray, 2015; Morgan, 2015).

Being aware of the political threats is essential in order to fulfil the potential of RIS3 as an opportunity to redefine and enlarge the constituency of innovation policies via the development of more customised and experimental strategy making processes. It might be said that RIS3 are an invitation to specialise policies and their objectives rather than regional economies (Bellini, 2015). RIS3 in fact are not about developing new measures along with existing ones, with the risk of resulting in the accumulation and coexistence of many and confused tools, calling instead for the transformation of existing policies through the introduction of positive discontinuities. Discontinuities are particularly difficult to be accepted due to the role of inertia and path-dependency. What regions do in the future partly depends on what they have done in the past, and more importantly on what they have learned in the past. More devolution, more powers and more money to regional governments is not enough to guarantee more effective and tailored policies. What is needed is a change in the political culture moving from a transactional culture, which is obsessed with compliance issues, towards a transformational culture, which is outcome-oriented and informed by the place-based policy paradigm (Morgan, 2013). Moreover, smart specialisation asks to engage in policy learning processes whilst at the same time requiring continuity and resilience on other aspects. This implies a continuous balance between the need for stability and change, making the political challenge the most difficult step to address (Grillitsch, 2015).

Figure 4. RIS3 institutional learning challenges to the regional decision making

Institutional learning challenges	Key features	Practical problems
Governance challenge	The importance of setting the process of engagement right: regional and multi-level coordination and synchronization mechanisms	Balance between inclusiveness, effectiveness and openness of the strategy-making process
Policy-mix challenge	The selection in a non-neutral manner of a limited number of desirable areas of specialisation	Define the adequate policy-mix components and related modes of delivery (policy tools)
Political challenge	The importance of robust political commitment and leadership	Balance between stability and the need for discontinuities and creativity

CHAPTER 4. RESEARCH DESIGN AND METHODOLOGY

This chapter presents the research design and methodology. For the purpose of highlighting the rational behind the methodological choice of the thesis and add an international perspective, the first part of the chapter offers a synthetic overview of the main findings emerging from the scientific assessments and evaluation projects that have so far been developed to dig deeper around the challenges involved in setting in motion the RIS3 agenda at the EU level. The second part introduces the case study methodology adopted to conduct the fieldwork in the two selected regions, i.e. Puglia (IT) and Sicily (IT). The criteria and the reasons behind the selection of these cases and the methods and sources used to collect data are discussed. The final section develops and explains the conceptual framework that guides the empirical analysis.

4.1 State of the art: RIS3 scholarly assessments

Since its launch, a number, though limited, of scientific assessments have been developed in the attempt to investigate the on-going RIS3 practices across the EU. These exercises offer a first partial overview and some initial evidence of the main strengths and weaknesses when passing from the RIS3 design to the implementation phase, which, at the time of this research, has for most of EU regions and countries just commenced.

Figure 5.State of the art: RIS3 scholarly assessments (documentary review closed on January 31, 2017).

Study	Adopted methodology	Analysed sample	Main findings
Asheim B. and Grillitsch M. (2015), Smart specialisation: Sources for new path development in a peripheral manufacturing region, Centre for Innovation, Research and Competence in the Learning Economy, Lund University	Case study approach: desk analysis and 17 semi-structured interviews to regional stakeholders as part of the FP7 project SmartSpec	Regions of Møre (NO) and Romsdal (NO)	Identification of key elements for smart diversification in peripheral regions i.e. developing a shared vision; building on the existing knowledge bases; scouting for global knowledge
Baier E., Kroll H., Zenker A. (2013), Templates of smart specialisation: experiences of place-based regional development strategies in Germany and Austria, Working papers Firms and Region No. R5/2013; Fraunhofer ISI	Case study approach: cross-regional comparison focused on: dialogue EU-region; priority on innovation; focus of investments; evidence-based policy making; involvement of stakeholders	Regions of Bavaria (DE), Saxony (DE) and Upper Austria (AT)	Positives: RIS3 forces to make processes more explicit and based on evidence; negatives: un-sufficient dialogue between the regional level and the EU; complexities in implementation and risk of being misunderstood as a one-time and rigid exercise
Bellini N. (2015), Smart Specialisation in Europe: Looking Beyond Regional Borders, SYMPHONYA Emerging Issues in Management, n. 1, 2015	Best practice analysis: desk analysis of RIS3 documents and field work	EU regions with focus on the Italian case	Negatives: disappointing results in terms of inter-regional complementariness and connectivity (lack of identification of potential candidates for cooperation; insufficient attention to positioning within value chains, and relational assets)

Bellini N., Bertini S., De Crinito A., Baccan, M., Pillarella, M., Villa E. and Guccione E. (2015), Smart Specialisation: l'esperienza delle regioni italiane, Uscire dalla crisi. Città, comunità, specializzazioni intelligenti, Franco Angeli, 1(1), pp. 189-199	Qualitative analysis based on documentary analysis and field work	Regions of Emilia Romagna (IT), Lombardy (IT), Molise (IT) and Sicily (IT)	Positives: RIS3 has prompted innovations in the techniques adopted to identify specialisations and in the governance mechanisms; negatives: lack of capacity to insert political discontinuities
Bellini N., Grillo F., Lazzeri G. and Pasquinelli C. (2017), Tourism and regional economic resilience from a policy perspective: lessons from smart specialization strategies in Europe, European Planning Studies, 25(1), pp. 140-153	Qualitative approach: review of the approved RIS3 and qualitative analysis based on the Eye@RIS3 open data tool	Regions from Spain, Portugal, Italy, Poland, Germany and France and countries of Slovenia, Hungary and Malta	Negatives: tourism is not systematically addressed within RIS3. Suggestions: pursuable policy approaches: tourism modernization; tourism for innovation culture; tourism-pulled innovation; tourism-generating innovation and tourism moderation
Capello R. and Kroll H. (2016), From theory to practice in smart specialization strategy: emerging limits and possible future trajectories, European Planning Studies, 24 (8), pp. 1393-1406	Qualitative desk analysis	EU regions through the analysis of secondary sources	Bottlenecks: lack of local pre-conditions; locks-in; unclear policy prioritisation; lack of match between functional and political regions; political inclination towards bottom up processes; lack of the necessary capabilities.
Caramis A. and Lucianetti L.F. (2016), Scoperta imprenditoriale e strategie di specializzazione intelligente: dalla teoria alla pratica, Scienze Regionali, Italian Journal of Regional Science, 15(3), pp. 67-84	Content analysis: systematic review of the official RIS3 and related documents (strategic documents, calls for action etc.) run between March and May 2014	Italian regions	Huge territorial differences regarding the level of advancement of the 6 steps and the nature of decision-making mechanisms Negatives: ambiguities in the interpretation of the EDP; low presence of demand side; difficulties in the selection of specialities and unclear definition of the policy mix
Charles D., Gross F., Batchler J. (2012), Smart specialisation and Cohesion Policy - A strategy for all regions?, IE-Net Thematic Paper 30(2), European Policies Research Centre, University of Strathclyde, Glasgow	Qualitative analysis: documentary review and interviews to national and regional authorities and organisations	14 EU regions and countries as partners of the IQ-Net network	Variations in the interpretation of RIS3 and related goals. Positives: evolution of management arrangements towards more effective coordination; Negatives: unclear allocation of resources; uncertainties regarding practice
Cooke P. (2016), Four minutes to four years: the advantage of recombinant over specialized innovation – RIS3 versus 'smartspec', European Planning Studies, 24 (8), pp. 1494-1510	Case study approach: documentary analysis and semi structured interviews conducted with key central state actors in Lisbon	Regions of lgarve (PT), Centro (PT) and Norte (PT)	Negatives: conceptual ambiguities in the RIS3 practice. Suggestions: relevance of multi level governance and political locks in and intra-region and extra-region collaborations
CREATIVE MED (2014), Analysis of Smart Specialization Strategies in selected Mediterranean coastal regions and countries, Schrittwieser Consulting, Graz	Qualitative assessment: desk analysis of RIS3 based on the 6 steps defined by the RIS3 Guide	39 EU Mediterranean costal regions and countries	Variations in the stages of the process; step 4 (defining priorities) as the most performed; sustainable innovation, KETs and cultural and creative industries as the most selected priorities
D'Ambrosio A., Montresor S., Quatraro F. (2016),	Quantitative analysis of the correlation between	26 EU countries	Positive impacts of KETs on the construction of new technological

Tecnologie abilitanti fondamentali e strategie di specializzazione intelligente. Un'analisi regionale sulla base di brevetti Europei. Italian Journal of Regional Science, 15(3), pp. 47-66	KETs and RIS3 using patent data	(1980-2010)	advantages
Dubois A.,Teräs J., Sörvik S. and Pertoldi M. (2015), Implementing Smart Specialisation in Sparsely Populated Areas. S3 Working Papers Series No. 10. Seville: European Commission – JRC	Case study approach: desk analysis and empirical work based on thematic workshops and interviews to representatives of the selected regions	Regions of Aragon (ES), Lapland (FI), Nordland (NO), Highlands and Islands (UK), Vasterbotten (SE)	Positives: RIS3 foster the creation of innovative environments in sparsely populated and remote areas and opens up processes. Suggestions: increase extra-regional knowledge and networking pipelines; more focus on human capital and the key role of universities
Healy A. (2016), Smart specialization in a centralized state: strengthening the regional contribution in North East Romania, European Planning Studies, 24(8), pp. 1527-1543	Secondary data and interviews with key regional stakeholders as part of the FP7 project SmartSpec	Region of North East Romania (RO)	Positives; RIS3 highlight potential new mixes of activity; strengthen actor's commitment; raises region's international profile and cooperation; generates learning benefits. Negatives: continuity in time and the capacity to secure implementation in the absence of supporting political power
Iacobucci D. (2014), Designing and implementing a smart specialisation strategy at regional level: Some open questions, Scienze Regionali, Italian Journal of Regional Science, 13(1), pp. 107-126	Desk analysis: review of the documents about the definition and implementation of the RIS3 and the early RIS3 developed by 36 EU regions	36 EU regions	Negatives; contradictions between theoretical underpinnings and practice; scant importance given to critical mass; broadness of specialisations; difficulties in balancing top down and bottom up approaches. Suggestions: maintain focus on R&D-based innovation (narrow view of S3).
Iacobuci and Guzzini (2016), Relatedness and connectivity in technological domains: missing links in S3 design and implementation, European Planning Studies, 24(8), pp. 1511-1526	Qualitative content analysis of the approved RIS3 integrated by statistical data (ISTAT and Eurostat)	16 Italian regions	Negatives: absence of systematic analysis of relatedness and connectivity of technological domains (except of references to KETs and ICT); confusion regarding the methodology to be adopted to identify these links
Kleibrink A., Gianelle C. & Doussineau M. (2016), Monitoring innovation and territorial development in Europe: emergent strategic management, European Planning Studies, 24:8, 1438-1458	Qualitative analysis: desk analysis and qualitative survey to policy makers from conducted between May-June 2015	68 EU regions and 12 EU countries	Positives; monitoring is supporting trust building and long-term mutual commitment. Suggestions; more attention to following meaningfully the implementation phase, and inclusion of stakeholder in monitoring activities
Komninos, N., Musyck, B. & Reid, A. I. (2014), Smart specialisation strategies in south Europe during crisis, European Journal of Innovation Management, 17(4), pp. 448–471	Cases study approach: analysis of key aspects such as the selection of specialisation priorities, bottom-up governance, private sector leadership, and engines of innovation and competitiveness	Regions from Greece, Slovenia, and Cyprus	Mixed results as far as the ability of RIS3 to help recovering from crisis is concerned. Negatives: RIS3 poorly understood in technical terms and options for related variety not taken on board; positives: advancements in the consultation processes. Suggestions; three potential routes i.e. RIS3 and industry diversification; RIS3 and innovation; RIS3 and higher value added
Kroll H. (2015), Efforts to Implement Smart Specialization in Practice—Leading Unlike Horses to the	Mixed approach: desk analysis and two surveys (run from July to September 2013 and	EU regions and countries	Diversities in implementation are determined by differences in institutions and modes of governance. Positives: RIS3 contribute to changing routines

Water, European Planning Studies, 23(10), pp. 2079-2098	from May to August 2014) and various phone interviews		governance; negatives: locally contingent challenges for different typologies of regions (i.e. starters, active beneficiaries and drivers); too little time for optimal consultation
Kroll H., Boeke I., Schiller D. and Stahlecker T. (2016), Bringing owls to Athens? The transformative potential of RIS3 for innovation policy in Germany's Federal States, European Planning Studies, 24(8), pp. 1459-1477	Case study approach	German regions	Positives: advances in methodology; improvement of communication; reconsideration of existing policies. Negatives: unclear implications for practical policy design; no new instruments designed; lack of cross-innovation; complexities in multi-level governance system
Kroll H., Muller E., Schabl E. and Zenker A. (2014), From Smart Concept to Challenging Practice – How European Regions Deal with the Commission's Request for Novel Innovation Strategies, Working Papers Firms and Region No. R2/2014, Fraunhofer ISI	Mix methodology: broad-based survey with EU policy-makers (conducted from July to September 2013) and in-depth case study analysis through qualitative, semi-standardised interviews	About 130 EU regions (through questionnaires) and case studies from 7 EU Central, South and East countries	Positives: consultations and exchanges among stakeholders. Negatives: the process outcomes remain less that certain. RIS3 is a good fertilizer but yet far from being a new policy paradigm.
Lindqvist M. et al. (2013), Implementing the Concept of Smart Specialisation in the Nordic Countries An Exploratory Desk Study, Nordregio working papers	Case study approach: desk research and a limited number of telephone interviews	Nordic countries (Denmark, Finland, Iceland, Norway and Sweden)	Negatives: limited levels of implementation; variations in the degrees of commitment; positives: development of well-functioning and inclusive governance structures securing long-term ownership of RIS3
Marlow D. and Richardson K. (2016): How smart is England's approach to smart specialization? A policy paper, European Planning Studies, 24(8), pp. 1478-1493	Qualitative analysis of published strategies and funding documents	England	Negatives: RIS3 tools and techniques remain loose; difficulties in applying it in a complex multi-level leadership and governance context
McCann P. and Ortega-Argilés R. (2016b), The early experience of smart specialization implementation in EU cohesion policy, European Planning Studies, 24 (8), pp. 1407-1427	Qualitative desk analysis based on Eye@RIS3 tool and on surveys undertaken by the S3 Platform and the Fraunhofer ISI	EU Member States and regions	The early RIS3 design phase led to positives but doubts emerge in terms of its continuation due to a perceived distance between theory and practice. Positives: great variations in the priority-setting and objectives; negatives; obstacles affecting the choice possibilities in LDR
Morgan K. (2013), The regional state in the era of Smart Specialisation, EKONOMIAZ Revista vasca de Economía, 83 (02), pp. 103-126	Case study approach: critical review of regional innovation policy repertoires	Basque Country (ES) and Wales (UK)	Relevant elements: the presence of specific regional challenges and the importance of the capacity to learn from past policies; the variations in the role of the regional state in RIS3 from region to region
Morgan K. (2016a), Collective entrepreneurship: the Basque model of innovation, European Planning Studies, 24(8), 1544-1560	Case study approach	Basque Country (ES)	Positives: RIS3 prompts the right mix between continuity and novelty; nurtures collaborative learning at intra regional level. Negatives: insufficient demand side measures; complexities in coordinating the regional system; little extra regional learning. Suggestions: need for a more network oriented governance approach
OECD (2013), Innovation-driven Growth in Regions:	Case study approach: policy review and	17 case studies from 12	Differences in the ability to design and implement RIS3 (i.e. in the adopted

The Role of Smart Specialisation, OECD Publishing, Paris	surveys as part of OECD's Working Party on Innovation and Technology Policy (TIP) on smart specialisation	worldwide countries	tools; degrees of adaptability of the system of governance; capacity to identify local strengths; ability to build critical mass). Criticisms: low links between policy instruments and priorities and the budgetary process.
Reimeris R. (2016), New rules, same game: the case of Lithuanian Smart specialization, European Planning Studies, 24 (8), pp. 1561-1583	Case study approach	Lithuania	Positives: RIS3 led to the set up of an inclusive, expert-led, bottom-up and foresight based policy prioritisation process. Criticism; no substantial changes to the landscape or performance of the R&I system.
Rodriguez-Pose A., di Cataldo M. and Rainoldi A. (2014), The Role of Government Institutions for Smart Specialisation and Regional Development, S3 Policy Brief Series No.04/2014	Quantitative econometric study on the links between government institutions (using the Quality of Government index) and innovation (using annual change in patent's application data)	225 NUTS2 regions covering all EU countries for 1995-2009 period	Relevant elements: sound institutional frameworks. Criticism; urgent need for institutional reforms especially in peripheral territories where significant gains could be achieved through relatively small improvements in the governance system
Sörvik J. and Kleibrink A. (2015), Mapping Innovation Priorities and Specialisation Patterns in Europe, JRC Technical Reports, S3 Working paper series, No.08/2015	Mixed approach: analysis of the selected domains based from the Eye@RIS3 open data tool and sectorial data on firms, employment and patents	218 EU and non EU regions and countries (20 EU countries, 174 EU regions, 6 non-EU countries and 18 non-EU regions)	Evidences: average number of RIS3 selected priorities is 6; clusters of popular categories connected to broader EU objectives emerge; no significant copycat. Negatives:weak connections between priorities and the economic and innovation structures
Valdaliso J.M., Magro E., Navarro M., Aranguren M. J. and Wilson J.R., (2014), Path dependence in policies supporting smart specialisation strategies, European Journal of Innovation Management, 17(4), pp. 390 - 408	Case study approach: qualitative analysis by applying the path dependence theoretical framework to STI policies that support RIS3, and semi-structured interviews with different Ministers and policy makers	Basque Country region (ES)	Relevant elements: continuity and change in institutions and policy-making: policy learning around RIS3. Negatives: inertia and resistance to new approaches

Most of these works suggest that the main merit of RIS3 lies in the improvement of consultation and governance practices. Both optimists and sceptics recognise that the introduction of the new agenda is forcing regions to make policy making processes more explicit; more based on concrete evidence; and nurtured by the involvement of a wider ray of stakeholders than in previous planning routines. This results in the design of strategies that better adapt to regional potentials, resources and challenges (Baier et al., 2013; Iacobucci, 2014; Kroll, 2015; Lindqvist M. et al., 2013; Morgan, 2013; OECD, 2013; Reimeris, 2016). Significant gains emerge especially in contexts, which possess a less advanced background in terms of stakeholder consultation routines, where there is more room for improving governance (Kroll, 2015). Likewise, more developed settings register improvements in polity communication and coordination (Kroll et al., 2016), suggesting that RIS3

is potentially a good catalyst able to facilitate knowledge exchanges and contaminations between actors and organisations, and also generate learning benefits in already advanced innovation systems, that are often complex to be managed (Healy, 2016).

Nevertheless, a list of shortcomings emerges, which are putting the RIS3 deployment potentials at serious risk. The presence and quality of supporting institutional and governance structures is advocated as one of the main determinants for succeeding within RIS3, and is referred to as an explanation for ambiguities in the so far achieved results (Kroll, 2015; Healy, 2016; Reimeris, 2016). Uncertainties emerge in regard to the modalities by which the EDP and, within it, the priority setting and the policy mix definition, should take place. This results in the design of strategies that tend to be affected by: an excessive number of selected domains, a lack of critical mass and an unclear allocation of resources (Charles et al., 2012; Iacobucci and Guzzini, 2016; OECD, 2013; Sörvik and Kleibrink, 2015); a tendency to replicate priorities that are considered strategic at national or global level (Capello and Kroll, 2016); insufficient relatedness and connectivity among technological domains, harming the likelihood for promoting related variety around existing local specialisations (Iacobucci and Guzzini, 2016); little attention to potential synergies with other EU regions (Bellini, 2015; Dubois et al., 2015); and low vertical dialogue and exchange with the EU level due to difficulties in managing the complexities of the multilevel governance coordination mechanisms (Baier et al., 2013; Kroll et al. 2016). Weaknesses appear even more critical in backward regions where the lack of local pre-conditions tends to constrain choices (Capello and Kroll, 2016; McCann and Ortega-Argilés 2016b). Too little time has been given to fully absorb the new paradigm and develop optimal consultation. Preliminary reforms to enhance the institutional and administrative capacity would have been required in order to guarantee the RIS3 effectiveness (Rodriguez-Pose et al., 2014). Similarly, in other cases the RIS3 is misunderstood as a one-time and rigid exercise. The commitment towards smart specialisation tends to slow down after fulfilling the ex ante conditionality, with the risk of generating strategies that are more declarations of intent to apply the methodology rather than being actual plans for its application (Caramis and Lucianetti, 2016; Iacobucci, 2014; Kroll, 2015).

What emerges from these first assessment exercises is that the EU agenda is neither a radical revolution nor the solution to all the inefficiencies affecting ESIFs absorption and implementation in past programming periods. Many doubts are raised regarding its ability to really renew routines and prompt durable changes in policy-making across the variety of EU regions, questioning both its feasibility in LDR and its very usefulness in MDR (Kroll et al., 2014; Reimeris, 2016). The RIS3 is not a policy template offering prescribed steps regardless of the specificities of the regional context. In line with its theoretical ambitions, evidence shows significant differences in the way in which EU

regions have interpreted the EC prescriptions and designed their strategic documents (Bellini, 2015; Charles et al, 2012; Kroll, 2015; Iacobucci, 2014; Morgan, 2016b). Regions embrace different views of RIS3, from a narrow S&T centred interpretation to the broader idea of a territorial growth strategy focused on innovation. Accordingly, different goals are pursued and different tools are proposed. Place-specificity varies even within categories of regions, and so the expected outcomes significantly depend on local-specific challenges (Asheim and Grillitsch, 2015; Komninos et al., 2014; Kroll et al., 2016; Morgan, 2013; OECD, 2013; Dubois et al., 2015).

Concluding, two considerations are advanced. Firstly, the intellectual debate is dramatically late in respect to the advancements made by the practice, and thus currently not really able to contribute to its knowledge needs. With the exception of a group of scholars, who have been involved in the RIS3 analysis since its launch, the most part of the scientific community has just started to engage in similar exercises. The EC underlines the need for well-timed monitoring of the RIS3 policy cycle to allow learning and steer processes towards goals (Foray et al., 2012). Nevertheless, four years after its launch, with the most of the EU regions being already in the heart of its implementation phase, there is no common evaluation framework available. This makes it imperative to offer suggestions and insights in respect to methodologies and tools through which assessing the benefits of the new agenda. Secondly, a more in depth analysis of the RIS3 strong process dimension is required in order to fully understand its potentials. Positives regarding the enhancement of governance practices remain less than certain because they are complex to be measured, especially through traditional tools. These potential benefits often tend to be presumed rather than really explored (Kleibrink et al., 2016). In order to provide a more comprehensive picture of the state of the art implementation of the RIS3 and grasp its very essence, studies should instead enter into the processes. More relational aspects such as the role and contributions of the involved actors and the factors that can facilitate their interactions should be investigated, in this way also capturing the intangible aspects of the RIS3 practice.

4.2 The RIS3 on-going implementation process: insights from the European landscape

In addition to the review of the cited scholarly assessments, the research is based within the European sphere through a constant discourse and knowledge sharing with the team leading the Smart Specialisation for Regional Innovation (Smart Spec) project. Funded by the EC under the EU's 7th Framework Programme for Research and Technological Development (FP7) and

coordinated by Cardiff University, the Smart Spec project was launched on 1st July 2013 and concluded on 30June 2016[4]. It involved an international panel of researchers who, through a mix of academic and more practice-orientated activities, made the effort to investigate in-depth, and on a large scale, the RIS3 on-going implementation processes by focusing on the related economic, social and political challenges. Over a three-year period the project explored RIS3 practices in a sample of 16 regions (figure 6) characterised by diverse productive and innovative settings and institutional terrains, which provide a strong basis in which to gain insights from the operationalization of the new agenda in various types of contexts and to stress the common features and emerging institutional and systemic bottlenecks for smart specialisation that are shared by several cases. The project details information compiled from direct interviews, living laboratories and learning journeys. Moreover, it was based on a constant information exchange with the S3 Platform team and included the rich set of materials produced as part of its activities.

Hence, at the time of this research the Smart Spec laboratory was taken as a precious source of information so as to add an international perspective and gain a stronger perception of how different settings are engaging in the RIS3 approach, besides having permitted the search for content and methodological confirmations and denials before and during the conduction of the thesis fieldwork. The main findings of the Smart Spec projects in terms of positive elements and missing links are here below briefly presented and discussed.

Figure 6.Smart Spec project case study regions

Region	**NUTS code**	**Country**
Basilicata	NUTS 2 (IT F5)	Italy
Bremen	NUTS 2 (DE 50)	Germany
Flanders	NUTS 1 (BE 2)	Belgium
Great Plain Region	NUTS 2 (HU 32)	Hungary
Limburg	NUTS 2 (NL 42)	Netherlands
Lodzkie	NUTS 2 (PL 11)	Poland
More and Romsdal	NUTS3 (NO 053)	Norway
Murcia	NUTS 2 (ES 62)	Spain
Navarre	NUTS 2 (ES 22)	Spain
North East Romania	NUTS 2 (RO 21)	Romania

[4] The project description and materials (thematic seminars and conferences presentation as well as publications, briefing papers and newsletters) are available at the following link: https://www.cardiff.ac.uk/research/explore/find-a-project/view/461391-smart-specialisation-for-regional-innovation-smartspec

Northern Ireland	NUTS 1 (UK N0)	UK
Provence-Alpes-Cote d'Azur (PACA)	NUTS 2 (FR 82)	France
Scania	NUTS 3 (SE 224)	Sweden
Slovenia	NUTS 1 (SI 0)	Slovenia
South Moravia	NUTS 3 (CZ 064)	Czech Rep.
Tampere (Pirkanmaa)	NUTS 3 (FI 197)	Finland

Source: Trippl et al., 2016

4.2.1 Place-specific transformation ambitions

A first element resulting from the in-depth analysis of the introduction of the new paradigm, made as part of the Smart Spec project, is its capacity to allow for territorial declinations of policy challenges, goals and domains for action. It is found that most of the drafted strategies are characterised by distinctive configurations and unique implementation challenges, which reflect the regions different innovation systems structures and capacities. RIS3 is confirmed as a place-based approach able to respond, at least on paper, to local needs and opportunities. In fact, the transformation ambitions and need for changes vary considerably between innovation system types, and even within the same categories of regions (Trippl et al., 2016).In regions with relatively weak innovation capacities, that is the group of moderate and modest innovators often characterised by organisationally thin R&I systems (Tödtling and Trippl, 2005), a variety of systemic bottlenecks to RIS3 also emerge (Trippl et al., 2014; Vallance, 2016). In the Eastern European regions included in the project for example, difficulties associated with institutional capacity continue to be very real. But at the same time, in these very contexts, the RIS3 methodology has shown its potentials in bettering self-assessments and the identification of the most relevant failures affecting regional performances. The added value of RIS3 also appears to be particularly marked throughout southern Europe regions, encouraging regions to develop more long-term and strategic development approaches. Interesting reflections are stimulated, sometimes for the first time, around intangible aspects explaining the limited tradition of cooperation and the low levels of trust among key stakeholders both within and between quadruple helix actors, like in the case of the Polish region of Lodz; or around the effects of political instability in chronically weakening the governance mechanisms, as it happens in the case of Slovenia (Trippl et al., 2016). In the more advanced northern European regions however, innovation strategies are frequently aimed at adjusting and reorienting policy set-ups to different extents, such as: strengthening coordination structures between large number of government departments as for the Northern Ireland innovation follower region (UK); enhancing the collaboration and coordination between intermediary organisations in the case of highly diversified economic structures like Provence-Alpes-Côte d'Azur (FR) and

Scania (SE);promoting the diversification of rather specialised systems like in the case of Tampere (FI) or Navarre (ES); solving coordination problems between university colleges in order to support diversification of economies dominated by traditional manufacturing industries, such as in the region of More and Romsdal (NO); and increasing the bottom-up dimension of strategy making by activating EDP actors at sub-regional level in robust economy and innovation settings like Baden Württemberg (DE) (Trippl et al., 2015; Trippl et al., 2016).

Hence, a first remark is that RIS3 emerges as the right approach for every region if the significance of places and history is taken into account. Lessons from practice prove that the new agenda has worked well in both less and more advanced systems when it has resulted in the adaptation of the EC prescriptions to the local policy context (Giannelle et al., 2016; Moodysson et.al, 2015). Moreover, the new paradigm brings back attention to the importance for territories to have a distinctive strategy in place. Where specific expectations have been attributed to unique regional conditions, RIS3 is qualifying the strategy making and regions are making positive steps towards a more strategic approach to research, development and innovation (Morgan, 2016a; Sörvik and Kleibrink, 2015; Trippl et al., 2016).

4.2.2 The governance issue

The governance sphere appears as a central concern in smart specialisation debate. In almost all EU regions efforts were made to include non-policy stakeholders in the process of formulating their RIS3.Their involvement has been in the form of organizing meetings, tailored thematic workshops, working groups or extensive interviews in which actors could give their input to the strategy making; and range from mainly industry panels or cluster organizations to the inclusion of a wider set of actors and organisations interested in regional development (Giannelle et al., 2016).However, except for those contexts, which rely on some kind of inclusive approaches to the identification of policy priorities and where the adoption of the RIS3 principles did not invoke any major changes in this regard, the triple Helix remains a big challenge, considering that in many settings not even a double helix is in place (Blazek and Morgan, 2015).

Common relevant criticisms emerge in relation the governance issue. One relates to the role played by the public sector in leading the process. In some regions there is still the risk for government biased EDP, which could result in the continuation of a merely reactive role of stakeholders, despite their formal inclusion. This is often influenced by the degree of decentralization and the variations in the decisive power and governance competences of the national governments and/or the local level in different countries. The role for regional government in innovation policies is more dominant in regions with higher autonomy (Aranguren et el., 2016; Trippl et al., 2016). Another

challenge relates to the need to widen and deepen the universities participation. Despite their role in shaping RIS3 being widely acknowledged, their presence varies strongly across regions. This reflects not only differences in traditions of universities to engage in third-mission activities, and the lack of reward systems and technology transfer structures that facilitate such activities, but also the varying degrees of demand for knowledge residing within universities expressed by the local productive system (Goddard et al., 2013). The minimal role played by higher education institutions is particularly worrying considering that, besides perpetuating past deficiencies, the RIS3 agenda may even risk increasing the gap between the innovation community and academia, especially if the latter remains outside the process. This also holds true for more advanced systems. For example, the cases of Navarre and Provence-Alpes-Côte d'Azur (PACA), both classified as innovation followers, are particularly interesting in this regard. Both regions show low university-firm connections due to the absence of favourable incentives and an under-appreciation of third mission activities within academia. In PACA knowledge organisations, despite having played a powerful role in the development of R&I strategies in the past, have only weakly been involved in the design of the RIS3. This shift is justified by the fact that the RIS3 represents an explicit attempt to move beyond traditional technology push models and adopt a wider concept of innovation, which in policy makers' opinions could have been curtailed by the presence of academia. Whereas in Navarra, universities were involved from the very beginning in the virtuous public-private collaboration process set up for the RIS3 purpose, but their contribution has been inspired more by vested interests in maintaining a status quo than prompting changes. Likewise, where universities played a proactive role, benefits have been significant. The case of Northern Ireland (innovation follower), for example, provides evidence of the positives of directly consulting universities and distributing them throughout process through their members sitting on various boards. This practice has been facilitated by the long-standing tradition in knowledge transfer activities by research institutes in the region (such as collaborative and contract research, establishment of competence centres, consultancy, spin-offs) and supported by the establishment of administrative units at university and by policy initiatives such as, for instance, the knowledge transfer partnership scheme. Well-established patterns of engagement with industry and policy also facilitated the university involvement in the case of Scania (SE) and Tampere (FI). In the latter, the University has recently engaged in research activities in areas that align well with priority fields defined in the RIS3 i.e. smart city, renewing industry and future healthcare (Moodysson et.al, 2015; Trippl et al, 2016). Also, Catalonia (ES) emerges as a best practice for its capacity to foster links between the academy, the local productive sector and society through the setting up of dependent entities called Campus Sectorials, which are engaged throughout the RIS3 policy cycle (Giannelle et al., 2016). Even more

valuable is the contribution of higher education institutions in less-favoured regions, when activated. In North East Romania (RO), for instance, the dialogue between the research world and firms has been, for long time, almost absent due to inappropriate incentives and a low demand for knowledge by local firms. But thanks to its reputation, the university assumed a strategic role throughout the RIS3 process by maintaining close links to policy actors and other key stakeholders. Also in the case of Eszak Alfold (HU)the university played the role of initiator of cooperation projects, initiating new collaborations with local clusters, chamber of commerce and industry and spin-off firms (Trippl et al., 2016). Another positive example of strong universities in weak economies is Wales (UK), where despite being historically characterised by mistrust between the research world and firms, the university of Cardiff is emerging as a valuable example of 'connected university' (Morgan, 2016b).A third remark regards the inclusion of the businesses world. Bigger firms or multinational companies actors tend to be more present in regional innovation governance compared to other types of business actors such as SMEs. Moreover, their role is observed to be mainly directed towards private interests and either unconnected to regional strategy or taking the form of lobbying regional government (Aranguren et al., 2016). Beyond a few exceptions, such as Northern Ireland (UK), where it is stated that the process of formulating the RIS3 has empowered industry, especially SMEs, an all too optimistic view of the possibilities to leverage private sector sources of finance emerges. Not enough efforts are made by regions in setting in motion the appropriate incentives and reward systems to permit a clear appraisement of opportunities by single entrepreneurs (Lindqvist et al., 2013; Trippl et al., 2016). This is exacerbated by the crisis conditions that, together with the low reputation of regional authorities, especially in Southern East Europe, make the availability of private investment to support RIS3 deployment critical, such as it happens in the regions of Greece (Komninos et al., 2014). Besides the missing elements in the composition of the RIS3 partnerships, a few regions have taken associational governance a step further, toward an institutionalized way of working with innovation issues. Where this has happened, positives have been remarkable, especially when entailing the formalisation of radically new forms of collaborations. E.g. this is the case of Scania (SE) where a Research and Innovation Council composed by policy and non-policy actors in charge of developing the RIS3 was created, which includes a sounding board for innovation through which innovation support organizations take part in discussions and workshops (Moodysson et.al, 2015); as well as PACA (FR) which promoted the establishment of the Regional Committee for innovation; and Navarre (ES) where the Moderna Foundation, a public-private entity composed of business associations, firms, trade unions and banks, was responsible for developing the Moderna Plan in which the RIS3is located (Trippl et al., 2016). Another positive example in this respect is Molise (IT), which is the only Italian region,

in which the EDP has been conceived as a permanent tool, ensuring its continuity beyond the prioritisation phase (Bellini, 2015). However, these bodies exhibit great variations in terms of institutional arrangements, power structures and intended use. Their consolidation remains an un-concluded step in most of the EU region, conditioned by general features related to the size and degree of regional specialisations, and more contextual factors specific to innovation policy governance, namely the existing power relations within and between the different constellations of actors that make up the regional quadruple helix and the strength of policy path dependence (Aranguren et el., 2016).

4.2.3 The policy-mix issue

In most regions participating top the Smart Spec research, the selection of RIS3 priorities has been based on analytical efforts to assess the strengths and weaknesses of the regional economic structures through quantitative and qualitative techniques and studies conducted in-house or by external consultancy firms. Knowledge about place-specific factors and regional conditions was gathered for the sole purpose of priority setting. Depending on the regional context under consideration, elected domains support existing strongholds (path extension) and, though less frequently, the promotion of new or emerging specialisations (path renewal and new path creation). Nevertheless, vertical priorities still show an insufficient concentration of activities by encompassing an excessive number of sectors; and often tend to reflect the strongest sectors in terms of economic value, being the result of both rent-seeking behaviour of regional stakeholders and a wish to enhance political legitimacy (Moodysson et al., 2015; Trippl et al., 2016). A low incorporation of social innovation is also signalled. Social innovation is seldom prominent within the RIS3 policy mix and where a social accent exists, this has often been prevalent in policies for some time, meaning that the focus on social innovation is not often a change due to RIS3. This is mainly due to a lack of shared understanding of the concept and because it is not always easy to align business innovation activities with innovation that has predominantly social goals. There is still a need to recognise the value of social innovation and develop a consensus on its very meaning and potentials to integrate it with the smart specialisation principles (Bugge et al., 2016; Marques et al., 2012; Richardson et al., 2014). An excessive focus on STI policies and an underrepresentation of DUI policies also emerged in less performing regions, showing that traditional views on innovation have not yet been fully overcome. In the Spanish region of Murcia (moderate innovator), for example, social innovation is mentioned within the RIS3as a means to capture all non-technological innovation and address issues such as poverty, unemployment, ageing and climate challenges. But as a result of a government-centric EDP, discussion remains at the theoretical level

and has not yet been integrated in the envisaged actions. Conversely, there are cases like Tampere (FI) where, though the notion of social innovation is not explicitly inserted in the document, societal challenges are addressed through specific prioritised areas i.e. Personal Health and Smart and Sustainable Cities (Trippl et al., 2016). A different interpretation of the concept was adopted by the region of Provence-Alpes-Côte d'Azur in France, where social innovation is used to complement more traditional policy instruments and create new opportunities for not only social but also economic development (Giannelle et al., 2016).

A sound adoption of the new agenda would instead require a more radical shift towards platform policies, which are demand-driven, solution-centred and combine several competence areas both in terms of policy and technology (Cooke, 2007). Elements of cross-sectorial innovation activities are evident in most of the well-performing regions but not a core trait of the RIS3. Some form of prioritisation with new path creation based on related variety in mind (Tödtling and Trippl, 2013) has occurred, as an example, in already advanced settings such as Scania (SE) and Tampere (FI), focusing on the creation of an innovation ecosystems, which shifts away from sectorial logic; or in Lombardy (IT), where the RIS3 has prompted a change in the way of reading and interpreting the complex scientific and technological territorial system, that in turn stimulates the adopting of a more horizontal approach based on the identification of competence systems able to better grasp on-going transformations (Bellini, 2015). Another example is PACA (FR), which introduces the concept of meta-projects that cross several policy domains and rely on enterprises as their engines (Trippl et al., 2016). But these tend to remain isolated cases in the wider EU landscape (Giannelle et al., 2016).

An insufficient degree of trans-regional knowledge exchanges is also recorded. The external dimension of RIS3 is a pending issue, often representing a marginal addition. Some systematic, but quite concise, discussion on the relative situation with regard to others exists within the regional strategies but without deepening the factors, which can explain these differences in positioning (Bellini, 2015). Even the more advanced Northern European regions, which are considered forerunners in the adoption of the RIS3 principles, register a low analysis of economic potential in relation to other contexts (Lindqvist et al., 2013). Nevertheless, there is evidence that the creation of such linkages is gaining importance in the strategy thinking (Nauwelaers et al, 2014). A good example is Sweden, where the OP tops up to 15% of resource reserve for regions collaborating within Sweden or with other Baltic Sea regions. Another case is Emilia Romagna (IT), which identifies for each of the RIS3 selected domains a number of potential collaborators both among competitive and converging regions. Also micro regions such as Molise and Umbria in Italy may

emerge for their ability to foster an outward looking perspective. The latter dedicates a specific resource reserve to develop partnerships with other regions (Bellini, 2015).

Two last considerations regard evaluation and timing. Monitoring was confirmed as the 'Cinderella' of RIS3 policies. Regional authorities acknowledge the need to activate ad hoc evaluation mechanisms and the majority have plans to do so in the near future. As an example, Lombardy (IT) has recently launched an informative system to monitor the RIS3 progresses on the basis of three levels - from the over-reaching goals to the specific priority areas[5]. Well-developed plans also include those for South Moravia (CZ), Murcia (ES) and North-East Romania (RO), in which lists of indicators and practices are covered. But these are not yet established nor effectively incorporated into the dynamicity of the RIS3 process, focusing instead on measurable statistical units related to productivity, innovation and business creation outcomes. Insufficient focus is put on developing better metrics and short-term interactive indicators on soft processes able to capture cross-sectorial challenges, public-private cooperation, stakeholder participation and engagement, diversification of the system, and the development of new entrepreneurial activities, especially those linking SMEs to larger actors and markets. Lastly delays seem, overall, confirmed. Progresses vary across regions but for the majority the deployment of the strategy is still in its infancy. Action plans are often formulated in a broad sense and make use of existing policy instruments, thus leaving implementation in practice an open question (Trippl et al., 2016).

4.2.4 The importance of policy learning

Active learning practices emerge as a strategic element for an effective RIS3 implementation. Smart specialisation is about learning to upgrade existing policies, to think more critically, to narrow the sights, and to go beyond the double or triple helix in stakeholder involvement. Learning emerges as particularly important in weaker regions, where RIS3 are primarily about drawing lessons from the past and building on previous inefficiencies. Despite the difficulties that may initially constrain its adoption, the new agenda is perceived as a tool to stimulate learning processes in terms of policy-making capabilities and network building by initiating and broadening the dialogue with the local stakeholder (Trippl et al, 2016).

Policy path dependency is a universal feature in this respect. Learning does not occur in a vacuum but from a given context of previous institutions, policies and actors, and requires the ability to deal

[5]Source: http://www.s3platform.jrc.ec.europa.eu/ [Accessed on 10th February 2017].

with such preconditions (Moodysson et.al, 2015). The following suggestions emerge as relevant. Firstly, more attention needs to be paid to how policy makers gain knowledge of new procedures and theories. The S3 Platform has produced a lot of material and guides with the contribution of well-known experts and academics. Peer reviews, for which policy learning requirements are particularly high, allowed to get a mirror effect on the RIS3 design, learn from others' mistakes and achievements and get policy recommendations that are validated by experts and practitioners. But more focused training sessions and courses need to be developed, as well as Living Journey consisting of direct visits to peers, which have proven to be very informative. There might be a role in this respect for universities in producing, as an example, short courses that can be used towards degrees and postgraduate qualifications and support the professionalization of the regional human capital. The use of external top-down forces also emerges as a key source of change especially in LDR. Whilst in MDR the mechanisms for incremental (path extensions) or radical changes through layering or recombination mechanism seem to primarily rely on internal forces in less advanced settings external forces play a strategic role for learning, especially the European Commission (Nauwelaers, 2015; Trippl et al., 2015; Valdaliso, et al., 2014).Secondly, the role of local facilitators for stakeholder learning is strategic. Smart specialisation needs smart people. Having the best people on board, and namely actors that are involved not because of their role in organizational associations but due to their personal engagement in innovation issues, which are on the field and connected to networks, is key. A mix and rotation of leadership with a dual reference frame, being RIS3 a territorial strategy; and the presence of leaders from different parts of the Quadruple Helix are essential to create RIS3 partnerships that combine trust, responsibility and professionalism. As an example, the region of South East Ireland has identified for each of the five selected RIS3 domains a person who is engaged in the theme and is already recognised at regional level for his work in that field, a so-called champion, who is responsible for the development of the specific action lines (Bristow, 2015; O' Gorman et al., 2016). Thirdly, capacities of policy learning are strongly politically biased. Capacities of policy learning depend on the political motivation supporting it. In almost all EU regions, political worries about changes in government priorities arise. Politics has often hampered learning potentials, such as for example in the Wales region, where a too state-centric culture is arguably one of the reasons why the RIS3 process has been so poor, at least initially (Morgan, 2016b). Or, political changes have generated interruptions that have negatively impacted on the virtuousness of the launched processes, as it happened in the case of Navarre in Spain, where following the elections of 2015 the new ruling party decided to move the RIS3 management responsibilities to the regional development agency SODENA, generating uncertainties and delays that resulted in weaknesses in the prioritization plan (Giannelle et al.,

2016). Likewise, in other cases politics has played a catalytic role. As an example, the Basque Country (ES) has been documented as a successful regional transformation story for its capacity to combine a pervasive role of the public sector without being invasive (Morgan, 2016c), as well as the case of Castile Y Leon (ES), where, building on established practices of EDP within R&I strategies during the 2007-2013 period, the reliability of the process has been guaranteed by the continuous political and technical leadership of the Commissioner for Science and Technology and its office[6].

4.3 Methodology: a qualitative process-centred approach

An overwhelmingly qualitative approach to collecting, analysing, and interpreting data is considered the best fit for this research. The research deals with a new approach in respect to which an on-going collective learning process about policies potentially characterized by discontinuities is taking place (Morgan, 2016b). Dealing with a multifaceted issue such as policy learning, and even more, learning about complex policy networks, entails huge problems as far as methodology is concerned. Learning dynamics can be investigated by observing and identifying behaviours, relations, routines, practices, emerging trends, cultural changes, and so on, and how these eventually evolve in terms of their quantity and quality. These multifaceted elements are hard to be captured through standard quantitative indicators, calling instead for a qualitative approach. Qualitative methods are particularly appropriate to investigate phenomena centred on people as actors and that need to be understood in their context. Qualitative research allows for the examining of patterns of knowledge exchange and transfer, and gaining insights on how these phenomena play out (Richards, 2005). Furthermore, it allows for the integration of tacit and intangible elements such as inter-personal dynamics, trust and social capital formation, partnerships functioning and governance mechanisms, which, for the purposes of this particular study, represent key factors to be considered in order gain a deeper understanding of the RIS3 policy learning dimensions. Besides, RIS3 is an on-going process. At the time of this research, this makes it impossible to measure its medium and long-term outcomes, in terms of regional innovation performance and induced structural changes (using, for example, patent data and their evolution) (Foray, 2015). Moreover, in a learning perspective, quantitative measures can hardly contribute to timely suggestion adjustments

[6] Source: http://www.s3platform.jrc.ec.europa.eu/ [Accessed on 10th February 2017].

and improvements in the process, which is instead possible through qualitative investigations as the one proposed within this thesis.

4.3.1 Case-study analysis

For the purpose of this research the case-study methodology is considered the most suitable. Case study is "an empirical inquiry that investigates a contemporary phenomenon (the case) in depth and within its real-world context" (Yin 2014, p. 16). Case study is an all-encompassing method that allows both researchers and policy makers to take a holistic view of complex social, political and economic phenomena by increasing knowledge about individual, group, organisational, social, political and related settings (Simons, 2009; Yin, 2014). There are at least three reasons behind this methodological choice. Firstly, case studies allow for a place-specific discussion of the conceptual and operational challenges related to the RIS3 implementation. Under smart specialisation, context is king (Morgan, 2016b). The concrete benefits of the new agenda cannot be understood as one-dimensional, being instead highly contingent on the regional context. The practice of RIS3 should be followed up in a place-sensitive manner, and thus evaluated case by case (Kroll, 2015). The case study approach can help to understand the features assumed by the strategy making process within each region, rather than viewing it as an isolated phenomenon separated from the people who created it and the historical and geographical setting. Secondly, the methodology allows for the collection of relevant data and information through different means and sources according to a mixed method approach. Mixed methods are regarded to be both practical and appropriate because they are able to increases the likelihood of capturing the complexity of process dynamics (Yin, 2014). Dealing with a variety of evidence such as documents, interviews and observations enables the bringing together of different perspectives around the same issue, leading to a more robust and critical understanding of the studied phenomena (Denzin and Lincoln, 2005; Richards, 2005; Silverman, 2010). More precisely, the two methods selected for the purposes of this study are documentary desk analysis and qualitative interviews with key stakeholders, as explained in paragraph 4.3.3. A third relevant strength of the case study methodology is its ability to take into account the wider context, allowing for comparisons with similar exercises conducted in other EU regions and countries. The uniqueness of regional contexts in terms of legal, economic, social, cultural assets make it difficult to conduct a general comparison among RIS3. A targeted qualitative evaluation of differentiated approaches to common issues is more appropriate and effective, as it may be possible through a case study approach. Moreover, case study analysis allows for the providing of insights that could be of broader relevance to other regions elsewhere, and better the comprehension and theorising about a larger collection of cases.

4.3.2 Country and regions selection

This thesis offers a qualitative comparative analysis of the on-going RIS3 practice in two regions of the South of Italy, Apulia (chapter 5) and Sicily (chapter 6). The case study selection is guided by two main criteria: the relevance with respect to the research goals; and the feasibility in terms of accessibility to the relevant documentation and information and interaction with the regional administrations and the other actors of the innovation system. As far as relevance is concerned, Italy represents an interesting setting to investigate the benefits of the new agenda for several reasons. Ranked among the least effective governments in Europe (World Bank Government Effectiveness Index, 2013) and characterized by one of the lowest rates of ESIF absorption (https://cohesiondata.ec.europa.eu), Italy is overall lagging behind with respect to the opportunities provided by Cohesion Policy. So far, this has been mainly due to the slow path of realization of the planned projects and, correspondingly, to the inability to use the available resources (European Commission, 2012). Corruption and inefficiency of public administrations is a major theme of political debate, especially when referring to its southern regions, the so-called Italian Mezzogiorno (Trigilia, 1992). Despite the adoption of several measures aimed at reducing the administrative burden and improving transparency and efficiency, the weaknesses in terms of quality of governance continue to affect the implementation of reforms and the business environment (European Commission, 2012; 2013c). According to the Inclusive Growth and Development report of the World Economic Forum (2015), Italy registers among the worst performances in terms of: political and business ethic; entrepreneurship; basic infrastructure and technology; and instruction. Italy is also the country with the greatest regional variation in the EQI and shows a persistent inability to promote convergence at the national level (Charron et al., 2014).This goes hand in hand with the political crisis of regional institutions and the weakening of the federalist, or at least regionalist, trend of recent years. Among other factors, histories of inefficiencies in the use of ESIF during the past programming periods have contributed to undermine trust and credibility in regional governments, and affected also their relations with Europe. Against this background, for the 2014-2020 period Italy can expect to benefit from €42.7 billion of ESIF funding, making it the biggest beneficiary after Poland[7]. The greater part of it i.e. €29.2 billion, is invested in its southern LDR, which are stuck in a "low-administrative quality, low-growth trap" (European Commission,

[7]Source: https://cohesiondata.ec.europa.eu [Accessed on 10th January 2017].

2014c:168). Italy also registers among the highest number of OPs (75 national and regional programmes) and accordingly a wide number of bodies involved in their management, certification and audit. This makes the presence of institutional capabilities even more critical for succeeding within the use of this new round of funds.

Within the Italian context, the thesis is particularly concerned with the case of LDR. For these very regions, often characterized by fragmented market economies and affected by institutional thinness, RIS3 represent the opportunity, if not the only way, to improve innovation capabilities and develop new growth trajectories (Foray, 2015). The Italian Mezzogiorno is still the main unresolved issue in the country's development (Viesti, 2010). The area has benefitted from huge amounts of state aid for decades, especially through the so called Special Programme for the Mezzogiorno, which was aimed at the "economic and social advancement of southern Italy" (Art. 1 Law No. 10 August 1950) through measures that were special both in a quantitative sense, because the funds made available came in addition to regular funds, and in a qualitative one, considering that those funds were managed through different procedures and by specific institutions, such as the Cassa per il Mezzogiorno (Fund for the Mezzogiorno). The Program was active until 1992, and was then substitituted by other national measures and, since the early 2000s, by European programs and funds. Nevertheless, southern regions maintain their socio economic gap with the North. Policies aimed at fulfilling this development delay, amongst which measures to enhance entrepreneurship and innovation, have often been fragmented and characterised by an insufficient degree of sectorial and technological specialisation (Caloffi et al., 2014; Viesti, 2011), and the Mezzogiorno issue is still one of the biggest political challenges of the country to be addressed by national and regional policy makers (Bianchi, 2013; Cannari et al., 2009; Cersosimo e Viesti, 2013; Giunta, 2010; Prota e Viesti, 2013; Scalera e Zazzaro, 2010; Trigilia, 1992). The Mezzogiorno remains is interested by strong contradictions. On one side, it is constrained by the weakness of research and innovation assets; the absence of the necessary institutional capabilities; a low private investment rates; and the persistence of massive unemployment rates which, strongly exacerbated by the global crisis, are resulting in high emigration flows, especially for young people. On the other side, the emergence of a promising new activism in some market niches in the agro-industry, tourism, culture and manufacturing sectors, and the presence of pockets of excellence in some fields of scientific research, suggest the presence of innovation potentials, that, if intelligently exploited, can be strategic for the development of both the Mezzogiorno and the whole country (Curzio and Fortis, 2014; SRM – Confindustria, 2015; SVIMEZ, 2016; Trigilia, 2012; Viesti and Luongo, 2014).Effective industrial and innovation strategies are thus more needed than ever in these regions, and the promise of RIS3 is very high. Particularly, the two selected regions of Apulia and Sicily

represent good cases since in these settings the new agenda shows together its complexities and potentials. Both classified as moderate innovators (European Commission, 2016) and ranked at the bottom of the EU in terms of Quality of Government (Charron et al., 2014, 2015), the two regions are emerging in the context of the Mezzogiorno for their valuable efforts in interpreting RIS3 as a tool to qualify policy-making processes and strengthen and innovate engagement in innovation policies (Caramis and Lucianetti, 2016; Bellini et al., 2015). At the same time place-specific challenges are addressed in the two settings. Apulia regards RIS3 as an instrument to give continuity to the restructuring process launched during the last decade, and to consolidate its new reputation based on good governance and socio-economic renewal (Regione Puglia, 2014). Sicily, instead, is making the effort to mark a radical discontinuity with previous experiences in innovation policy, especially as far as the quality of strategy making processes and local governance mechanisms are concerned. In the region, the RIS3 requirements come as a huge novelty, calling for a break from the past by developing credibility and confidence in the public sector (Regione Sicilia, 2016).

4.3.3 Research tools and sources

The case study analysis is based on the combination of two methods, considered realistic and pragmatic to fit within the constraints of this research: a documentary desk analysis and qualitative interviews to regional stakeholders. The desk analysis draws on different sources, mainly consisting of:

- European and national official documents such as: EU policy guidelines and plans, reports, position papers and proposals; the materials produced by the S3 Platform i.e. official guides and manuals, peer review and meeting reports, data bases, scientific articles and expert assessments; moreover, the so called grey literature is considered in order to gain additional information, including reports, evaluations, journal articles and opinion pieces that are not published in academic official forums. These secondary sources are relevant to position the research in the wider scientific and political debate around RIS3, and to develop the conceptual and methodological framework of this thesis.
- Strategic and operational documentation on the RIS3 of Apulia and Sicily made available on the regions institutional websites or obtained through direct contact with the public administrations: these include not only the official RIS3 documents as part of the ex-ante conditionality, but also regional statistics on the economic and innovation performances; reviews of past regional R&D and innovation policies; and ad hoc studies prepared by local research institutes and external

consultants, among others. The systematic review of this documentation enables to gain insights into the on-going RIS3 practice and put it in relation with previous regional experiences.

- Project documentation resulting from similar analysis conducted across the EU, and particularly from the Smart Spec FP7 project.

The second employed research tool is qualitative interviews. Qualitative interviews are effective to describe social and political phenomena, and investigate how and why things change by permitting entry into the processes (Rubin and Rubin, 2005). The fieldwork is aimed at gaining deeper insights into the specificities of the RIS3 practice in each case study region. Interviews investigate each stakeholder's role in driving the strategy formulation and implementation process; the rationales behind their participation in the EDP; and their points of view, perceptions and expectations from the deployment of the new agenda. In order to access different types of experiential knowledge, exponents of different groups of actors are interviewed, namely: public administration officials; firms and business incubators; universities and research institutes; civil society/end users; and EC and national advisors and scholars working on the RIS3 agenda at the national and EU level. This way an evaluative picture of the degrees of success and failure of the new agenda, through the perspectives of those who enact it, is created.

The interview's format is maintained as open and flexible in order to allow respondents to give lengthy answers, and eventually introduce supplementary questions. Variations in the pre-prepared questions are also introduced according to the different types of respondents. The key investigated points can be summarised into the following four:

1) Background and path dependence, regarding past experiences in R&I policy with the aim of highlighting where regions come from and how much RIS3 is building on the past or instead signals a discontinuity by breaking with previous experiences in using ESIF;

2) On-going RIS3 practices, with specific reference to the intra-organisation, intra-system and inter-system policy learning dimensions occurring within it; the aim is to investigate if, what, and how regions are learning through the operationalization of the new agenda;

3) Internal capacities and external support, regarding the availability of the necessary technical and professional capacity and experience to fulfil the required tasks; and the usefulness of the assistance scheme activated by the EC;

4) Positives and negatives, with the attempt to highlight the key features that explain the degrees of success and/or failure of the RIS3 agenda.

Interview have been integrated by the direct participation in scientific conferences, thematic seminars and workshops organised in the two regions as well as at the EU level.

In order to respect the principles of validity and ethics, methodological triangulations have been adopted within this thesis. The relevance and significance of the explanations offered by the fieldwork is crosschecked with evidence from documentary reviews and analysis, and the information gained through the participation in international events and conferences. The different sources inform and shape each other during the various research stages. This allows for the continuous testing of the offered arguments and perspectives, as well as strengthens evidences in support of key claims. Data triangulation also takes place through interviewing stakeholders from different groups and comparing their responses. Moreover, it is pursued through the application of an ad hoc conceptual framework to the data analysis and discussion, as introduced in the next paragraph.

4.4 The theoretical framework: investigating policy learning within RIS3 practices

A conceptual framework has been developed in order to guide the case studies analysis and facilitate the feedback of findings into the frame of the research itself. Defining the theoretical framework is a crucial step of the case study methodology. It is essential to identifying, ex-ante, the appropriate research design and data collection methods, and, during the fieldwork, to concentrate on certain data and issues whilst ignoring others (Yin, 2014). The operationalization of the RIS3 agenda entails multidisciplinary elements and relies on the behaviours of a wide range of actors and organisations with different perspectives and objectives. Hence, for the purpose of this thesis, a multi-dimensional framework able to help the understanding of the RIS3 on-going practices and grasp the transformative dynamics occurring within it through the lens of policy learning is needed. Three RIS3 institutional learning challenges to the regional decision-making are identified, namely the governance, policy mix and political challenge, as discussed in §3.4. These relate to the three realms of the RIS3 policy: the process, the program and the politics dimensions, which are separately investigated within the thesis (figure 7).

Figure 7. The realms of the RIS3 policy and the related challenges

The realms of RIS3	Challenges to the regional decision making
Process	Governance challenge
Program	Policy-mix challenge
Politics	Political challenge

More precisely, the research primarily deals with the RIS3 strong process dimension. Processes are widely recognised as a key element of policies. Processes refer to the ways by which collective choices in the public interest are made. Processes entail the policy design and imply activities such as: identifying problems; examining potential alternatives; consulting (or not), and if so, choosing who, when and how to consult; weighing the opportunities and risks of different solutions; and finally taking decisions (McConnell, 2010). The EDP and the role to be played within it by the involved stakeholders represent the main practical novelty of the new agenda. The thesis investigates what happens in terms of intra-organisation, intra-system and inter-system learning, as defined in §1.2.2, exploring within each mode, which are the factors that can facilitate or constrain it. As far as intra-organisational learning is concerned, the research questions if the implementation of the new agenda is encouraging innovation within the public sector. Improvements in structures, human capital and tools are considered good indicators of the capacity to introduce changes in the role and capacities of the public administrations, and even more importantly, in the public sector culture, thus showing that some form of policy learning is taking/has taken place. Particular attention is placed on the barriers to learning that may arise at each level and how to overcome them. In terms of structures, bottlenecks are expected to be related to factors such as: an insufficient coordination capacity among regional departments; an unclear definition of tasks between managing authorities and intermediate bodies; low power of the involved bodies in taking up their role; weak governance arrangements for holding managers accountable for performance, controlling corruption and avoiding undue political influence over projects selection and staff appointments, amongst others. Inefficiencies related to human resources may instead arise because of a lack of professional skills and competences; low meritocracy; frequent staff turnover rates; and the absence of well-functioning performance-based management and rewards systems. These weaknesses make it difficult to comply with complex EU rules in the field of e.g. public procurement, state aid and environmental legislation, and limit the analytical and programming capacity. Staff reshuffling and delays accumulated in different stages of the policy process tend in fact to undermine the ability of the administration to learn from evaluations being carried out, and reduce the time they can dedicate to the exchange of best practice and other learning mechanisms. Moreover, inefficiencies may be related to the quality, effectiveness and appropriateness of administrative tools. Difficulties in making a real use of manuals of procedures and checklists; insufficient evaluation or follow up of recommendations of independent evaluations; ineffective anti-fraud and anti-corruption measures; problems in the application of public procurement and state aid rules, and so on, are among the constraints that may hamper the effectiveness of RIS3 to be successfully deployed (Charles et al., 2012). The second mode of policy learning i.e. intra-system learning entails the capacity of the

RIS3 agenda to deliver stakeholder learning and enhance the quality of local institutional arrangements. The rationale and mechanisms of the stakeholder involvement process are investigated by focusing on who is involved, how, for what purpose, and when. Through the interviews, insights are gained regarding who engaged in the process and who is missing; the tools used to select and mobilize the different groups of actors; the motivations behind their participation; and the contributions offered during the different phases of the policy cycle. The quantity and quality of institutions that make up the EDP and, even more so, their degree of integration, are expected to be key. The features of the cross-setting dialogue occurring between innovation partners and users, more than their mere presence within the process, is considered a good indicator of the effectiveness of the new agenda to enable policy learning processes at the system level. Particularly, the challenges in setting up polycentric and collaborative governance structures that are simultaneously robust and effective in the delivery of the strategic policies are discussed (Grillitsch, 2015). Thirdly, the inter-system learning mode is explored by looking at the capacity to generate effective extra-regional horizontal and vertical exchanges of knowledge and experiences as part of the RIS3 implementation. As already stressed, transnational and, more specifically, trans-regional learning is a promising tool within RIS3, heavily encouraged by the EC (Mariussen et al., 2014). The research investigates the contents and quality of RIS3 policy transfers mechanisms and the factors enabling or constraining their effectiveness.

In order to embrace a more comprehensive understanding of the analysed RIS3 practices, in addition to its process dimension the program and political realms are also explored. Any public policy consists of various and multiple dimensions that influence each other. Different degrees of success or failure can be achieved in one or more of these. Success is not a univocal concept, and policy success and failure are not mutually exclusive. Success at the process stage is not a guarantee of success at the program level, and something very different from a political success. Making a distinction between the different realms allows us to discuss the mutual relations between the goodness of the process and the feasibility and effectiveness of the resulting programs, and the influence of politics in effectively delivering of the RIS3 agenda. In this way, the thesis aims to adopta mid-ground position between a more scientific and traditional approach that considers the positive and incontestable achievement of identifiable goals i.e. an objective view of success; and a more constructivist approach, according to which success depends on the perception of beholders i.e. a subjective view of success (Marsh and McConnell, 2010). As far as the program dimension is concerned, the research looks at the degree of coherence between the strategic level (the RIS3) and the operational level (the ERDF OP), and discusses the extent to which the process elements are transposed into programs. Programs “give concrete form to the generalized intentions of statements

of a policy" (McConnell 2010, p. 350) by combining the available resources and tools of government. If rightly implemented, the new agenda is expected to result in the design of better strategies and programs, and in the implementation of more effective tools, thus ultimately translating into a higher efficiency and efficacy in spending ESIF resources for innovation. The degree of consistency between the proposed policy-mix and the RIS3 principles; the innovativeness of the proposed lines of action and tools in respect to past policies; the effectiveness of mechanisms and rules for the projects' beneficiary selection, are some of the key considered elements.

Finally, the influence that the political sphere has on the management and implementation of the new agenda in each of the two case study regions is discussed. Politics matters, and policies are hardly successful without politics (Marques, 2015). Processes and programs are political issues having strong consequences in terms of reputation and electoral prospects of politicians (McConnell, 2010; Morgan, 2016c). Conceiving RIS3 as an opportunity to radically innovate the policy-making processes is, first of all, a matter of politics. A strong political commitment able to abstain from favouring short-term objectives that are not in line with the most pressing regional development needs is expected to play a key role in the feasibility of RIS3. Learning and knowledge creation processes are not sufficient in the absence of political power supporting the operationalization of strategies into practical outcomes. A lack of continuity and responsiveness in the political mandate in fact lowers incumbents' incentives to adopt a long-term vision, and affects programming performance, in particular with regard to the extent to which investment priorities are in line with the socioeconomic needs of the territory (Healy, 2016).

In discussing these different dimensions of the RIS3 policy, a distinction is made between the strategy design, the implementation and the assessment phases, which constitute the RIS3 policy-cycle. The design phase entails the definition of the scopes and the adoption of a joint vision; the identification of the key actors; the conduction of studies, consultations, debates; and the creation of scenarios, which result in the selection of priorities and definition of the role of public action. The implementation phase involves the translation of the objectives into more detailed goals; the setting up of pilot projects; the mainstreaming of some of them in existing or new policy lines; the fine-tuning of a policy mix responding to the selected priorities; the identification of stakeholders in charge of the implementation; the decision about budgetary sources and the modes of delivery of public funding, and so on. Whilst the assessment stage, incorporates the production and use of data and feedback during the whole policy cycle. More precisely, this thesis concentrates on the RIS3 design phase, which has been conducted by EU regions in a range of time between 2013 and 2015, and the early implementation phase, which has just been launched by the majority of EU regions

between 2015 and 2016. As far as assessment is concerned, the benefits of the proposed monitoring tools and mechanisms are considered.

The resulting conceptual framework is presented here below (figure 8). The case study analysis is correspondingly structured (chapter 5 and 6). The main evidences from the fieldwork are then discussed in a comparative perspective, underlining how the new agenda is absorbed and operationalized in the two different settings, and providing the concluding remarks and policy recommendations that exceed the specific situations (chapter 7).

Figure 8. The conceptual framework for the case study analysis

<table>
<tr><td colspan="3">Investigating RIS3 practices</td><td>Design phase</td><td>Implementation phase</td><td>Evaluation phase</td></tr>
<tr><td rowspan="4">The process dimension: the governance challenge</td><td colspan="2">Intra-organisation learning: Government learning</td><td colspan="3">Capacities and capabilities in the public sector: changes in structures, tools and human capital</td></tr>
<tr><td colspan="2">Intra-system learning: the policy network learning</td><td colspan="3">Rationales, mechanisms and tools for stakeholder involvement</td></tr>
<tr><td rowspan="2">Inter-system learning</td><td>Horizontal between regions or countries</td><td colspan="3" rowspan="2">Outside connectedness: knowledge and experience exchanges across the EU</td></tr>
<tr><td>Vertical between regions and national and EU level in both directions</td></tr>
<tr><td colspan="3">The program dimension: the policy mix challenge</td><td>Coherence between RIS3 and OPs</td><td>Translation into adequate policy tools</td><td>Effectiveness of evaluation practices</td></tr>
<tr><td colspan="3">The political dimension</td><td colspan="3">The influence of political commitment</td></tr>
</table>

CHAPTER 5. THE COMPLEX EXERCISE OF IMPLEMENTATION: APULIA AND THE CHALLENGE OF 'CONTINUITY IN CHANGE'

This chapter discusses the experience of Apulia in operationalizing the RIS3 agenda. The first part introduces the regional context in terms of socio-economic characteristics, innovation performance, the institutional landscape and past experiences in R&I policies. The second part investigates the on-going RIS3 practice making a distinction between the governance, the policy mix and the political challenges.

The chapter is informed by a documentary desk analysis and by qualitative interviews conducted between May 2015 and January 2017 with the following groups of actors: public officials of the regional administration and its agencies, exponents of the regional innovation system (firms and research institutions), external experts and scholars working on the RIS3 agenda at the national and/or EU level. A total of 12 interviews were conducted, including face-to-face and/or Skype meetings and sometimes involving more than one interview with the same person. Further information was added through direct participation in public events (conferences, seminars, thematic meetings) and via email exchanges as follow-ups to the interviews. In order to maintain confidentiality, the informants will be identified only by the typology of organisations and an approximate indication of the rank (e.g. regional executive, public official, university professor) and will be cited throughout the chapter according to the following codes (Figure 9).

Figure 9. List of interviews conducted between May 2015 and January 2017

Interview	Organisation	No. of interviews
[1]	Regional Administration, Department of Economic Development, Innovation, Education, Training and Labour	2
[2]	Regional Agency InnovaPuglia	2
[3]	Regional Agency for Research and Technology (ARTI)	2
[4]	Regional Agency Puglia Sviluppo	1
[5]	University	1
[6]	Industry	1
[7]	SME	1
[8]	Business incubator	1
[9]	European Commission Expert and Advisor for RIS3	3
[10]	European Commission Expert and Advisor for RIS3	2
[11]	Academic Researcher and Independent Advisor on RIS3	1
[12]	National Expert and Advisor for RIS3	1

5.1. Regional profile

5.1.1 Socio economic characteristics

Apulia is a peripheral NUTS2 region located in the southeast of Italy with a population of about 4million (Eurostat data, 2016). From an economic point of view, the region is characterized by low performance compared to the rest of the country. Its contribution to the national GDP is modest, accounting for about 4.9% of the national GDP. The GDP per capita is among the lowest in Italy and well below the EU-28 average (Eurostat data, 2014). From a European perspective, Apulia was classified as a 'Convergence' region during the 2007-2013 EU programming period, and a 'less developed' region over the current 2014-2020 period, with a GDP/head falling below 75% of the EU27 average. According to the Regional Competitiveness Index (RCI), which captures different dimensions of competitiveness at regional level, including the quality of institutions, infrastructure endowments, education, labour market, innovation system and many others. The region is grouped among the medium-low performing regions and ranks 232 out of 262 EU regions (European Commission, 2013d). The unemployment rate is among the highest at national and European level. In 2015 the region recorded a value of 19.7% compared to 11.9% in Italy and 9.4% in the EU (Eurostat data, 2015). Unemployment affects mainly younger generations and females and has risen sharply during the economic crisis, generating a worrying trend of emigration of the most talented and qualified sections of the population. Comparisons between the pre and post crisis period (2007-2014) show the index rising from 11.1% to 21.5%. The trend is in line with the national tendency, where the unemployment rate passed from 6.1% in 2007 to 12.7% in 2014, though slightly less severe in the rest of the Mezzogiorno (Eurostat data, 2014 and 2015; Curzio and Fortis, 2014). The region is also affected by a low capacity to attract foreign investors and by an insufficient level of public and private investment that, together with emerging social threats such as the rise of poverty and social disparities, represent urgent and complex challenges to the agenda of policy-makers (IPRES, 2016; Regione Puglia, 2014; SRM-Confindustria, 2015).

Figure 10. Apulia: socio-economic indicators

Area square kilometre	19,541	(6.4% of Italy)
Population (2016)	4,077,166	(7% of Italy)
Regional GDP (million €) (2015)	72,135	(4.4% of national GDP)
GDP per inhabitant PPS (2014)	EU-28 average: 100 (27,500) Italy: 96 (26,400) Apulia: 63 (17,200)	
GDP per inhabitant Euro (2014)	EU-28 average: 100 (27,500) Italy: 97 (26,500) Apulia: 63 (17,400)	
Gross Expenditures on R&D per GDP (%) (2013)	0.82	Italy: 1.31
Unemployment rate in % (2015)	19.7	(Italian average: 11.9) (EU-28 average: 9.4)
RCI - Regional Competitiveness Index (2013)	- 0.88	Development stage: 232 out of 262 EU regions

Source: Eurostat http://ec.europa.eu/eurostat/data/database [Accessed on 20th January, 2017].

Despite the discouraging performance in relation to the main socio-economic variables, Apulia is considered one of southern Italy's most dynamic regions (IPRES, 2016). In terms of dynamics, in line with the national composition, in the last 10 years the regional economic structure has registered an increase in the importance of the service sector, in terms of added value, and a decrease in the share of industry and agriculture, though the contribution of the latter to the regional still has very significant added value with regard to Southern Italy or Italy as a whole (ISTAT, 2012). According to the 2011 census conducted by the National Institute for Statistics (ISTAT), the region hosts about 250,000 firms employing more than 700,000 employees. Data on company registrations has revealed an increase in the birth of new businesses since the last survey was conducted in 2001: compared to a growth of 8.4% across Italy as a whole, Apulia recorded 12.1% (ISTAT data, 2011)[8]. The typical firm has less than three employees (less than 4 in the rest of Italy) and the entrepreneurial density is among the lowest in Italy, though higher than in the rest of the Mezzogiorno (ISTAT data, 2013)[9]. Apulia's industrial fabric is characterised by a polarization between a prevalence of micro enterprises mostly operating in traditional sectors, such as textiles, food and furniture, and few medium-large dynamic firms that are mainly held by multinational companies, which in some cases have played a pivotal role in the development of some industrial districts, particularly in the automotive, mechatronics and aerospace fields (ISTAT, 2012). The

[8] Source: http://dati-censimentoindustriaeservizi.istat.it/Index.aspx [Accessed on 10th January, 2017].
[9] Source: http://dati-censimentoindustriaeservizi.istat.it/Index.aspx [Accessed on 10th January, 2017].

larger industrial areas are situated in the major urban areas of Bari, Brindisi and Taranto. Bari hosts firms operating in the chemical and petrochemical fields, alongside the mechanical engineering and textiles sectors. It is characterised by the presence of relatively long supply chains, including aggregations of small firms operating in the design and production of highly specialised components. It is also the seat of the regional Government. The area of Taranto hosts the ILVA steel plant, which has dominated the regional economy since it was constructed in 1961. The plant has recently been hit by a big industrial crisis as it was deemed to be a threat to human health and the environment. The site is currently under an 'extraordinary administration' procedure (Law Decree No. 1 of 5 January 2015). The ILVA restructuring and the consequent fate of 20,000 jobs in a region otherwise struck by high levels of unemployment are currently presenting local policy-makers with enormous socio-economic challenges (European Parliament, 2015b). The province of Brindisi, on the other hand, hosts a wide array of production activities, from highly regarded primary products like wine and olive oil to the airport industry, and is characterised by a burgeoning service economy (IPRES, 2016; Regione Puglia, 2014).

Positive signs also come from the tourism industry, which in recent years has started to emerge as an important source of economic growth at local level (Curzio and Fortis,2014). The sector's weight on the regional GDP passed from 3% in 2006 to 8% in 2011 (ISTAT data, 2011). Areas with fewer tourists are concentrated along the coastlines and in the historic cities of Otranto, Ostuni, Gallipoli and Lecce, forming the so-called area of Salento. Accordingly, the service sector is also increasing in relative significance, most visibly in relation to the airport, which deals with the tourist demand. Likewise, an excessive seasonality still affects the sector, highlighting the inability to fully exploit the cultural and natural assets that characterise the region's internal destinations (IPRES, 2016; Regione Puglia, 2014; SRM-Confindustria, 2015).

The global financial crisis severely hit the regional economy, determining a decrease in the regional added value of 2.4% in 2013, a continuing negative trend in turnover in industry and a huge rise in the unemployment rate which reached 19.8%, furthermore exacerbated by the cost of access to credit, which was particularly severe in Southern regions compared to the rest of Italy (Banca d'Italia, 2016). Nevertheless the regional economy also showed a certain degree of resilience. If large enterprises operating in the construction, steel production and agriculture sectors recorded an overall decrease in output, resorting to huge job cuts and pay cuts, smaller firms located in the less industrialised areas of Salento have conversely proved to be more robust. This is mainly thanks to the inter-sectorial linkages promoted between agricultural production, niche industries and tourism in this area. This has led to mutually reinforcing effects in terms of value added (Banca d'Italia, 2016a; IPRES, 2016). Apulia is also among the southern regions showing a higher propensity of

firms aggregated into formal networks, especially through the legal framework of the so-called 'network contracts' (*Contratti di Rete*) established by the national Law Decree No. 33/2009 (SRM-Confindustria, 2015).Furthermore, though affected by a slowdown during last year, mainly as a consequence of the on-going ILVA plant crisis, it should be noted that Apulia is among the Mezzogiorno regions in which exports have risen the most, reaching a higher level at the end of 2014 than before the crisis of 2007. The region has used exports to partially compensate for the weak domestic demand, and in turn recorded a significant positive trend over theperiod between 2007-2014 (+12.5%) (SRM - Confindustria, 2015). The success of Apulia's exports is largely related to the high-quality production model of its SMEs and the reputation acquired by the 'Made in Puglia' label (Regione Puglia, 2014).

5.1.2 Regional innovation performance

A restructuring process has been implemented into the regional innovation system during the last decade. Under the pressure of international competition, and prompted by the increasing awareness of innovation issues, since the early 2000s Apulia has registered an increase in the propensity to exploit the innovation potentials lying in the region's areas of excellence. Between 2004 and 2012 the percentage of industries introducing product or process innovation overall increased by 7.8 percentage points to 28%, against an average of 25% for the Italian convergence regions (33% for Italy). This is also reflected in the trend of the regional value of exports in dynamic world demand sectors, which was lower than any other Italian macro area in 2007 (25%) and became the best performer in 2013 (41%) (ISTAT, 2012).Nevertheless, a low overall ability to take on innovation and turn it into new economic activities or added value still affects the region (ISTAT, 2012). According to the Regional Innovation Scoreboard 2016, Apulia is one of the least innovative regions in Europe and is grouped with most of the Italian regions as moderate innovators i.e. those regions with a relative performance more than 10% below the national average but less than 50% below that of the EU28 average. This is as measured by the Regional Innovation Index on the basis of a series of indicators including the presence of competences and skills in the regional labour market, the quality of the research assets, SME's propensity to innovative and the level of expenditures in R&D. Yet, compared to 2014, the region's performance has improved strongly (+15%), much more than in the rest of the Mezzogiorno. Only one other Southern region, Basilicata, shows the same positive trends, though less robust, recorded in the same period (2014-2016) an increase of 5% in the indicator value. The areas of relative strength, in which Apulia shows better placement compared to the EU28, relate to non-R&D innovation expenditures and the ability of SMEs to introduce marketing and organisational innovations. The incidence of innovative

firms and the level of employment in high tech industries and knowledge-intensive services, however, are low. As happens in many Italian regions, the ability of firms to market new products is not usually the result of an investment in formal R&D activities.

Figure 11. Apulia: regional innovation system normalised data (0-1 scale, 1 for best performing regions and 0 for worst performing regions)

Indicator	Value
Population with tertiary education	0.261
R&D expenditure in the public sector	0.233
R&D expenditure in the business sector	0.178
Non-R&D innovation expenditures	0.402
SMEs innovating in-house	0.508
Innovative SMEs collaborating with others	0.107
EPO patent applications	0.179
SMEs introducing products or process innovations	0.493
SMEs introducing marketing or organisational innovation	0.417
Employment in knowledge intensive activities	0.372
Exports in medium-high/high tech manufacturing	0.351
Sales new to market and new to firm innovations	0.316

Source: Regional Innovation Scoreboard 2016.

The region exhibits the lowest performance precisely in relation to this indicator (R&D expenditure in the business sector), as well as in the EPO patent applications filed by local firms. The percentage of the population with a university degree is also low, though it is not among the lowest in the South of Italy (European Commission, 2016). The poor skill intensity of the regional workforce is seriously hampered by a harsh brain drain, as shown by the negative net migration of university students (-6,72% in 2012), which is among the most significant among Italian regions (ISTAT data, 2012)[10]

5.1.3 Policy-context

5.1.3.1 Policy capabilities and quality of government

A process of decentralization of competences and responsibilities has characterized the Italian polity system during the last 15 years. Following the 2001 reform of Title V - Article 117 of the

[10] Source: http://www.istat.it/it/archivio/16777 [Accessed on 20th December, 2016]. The net migration is defined as the difference between the registered members in regional universities and the number of residents enrolled in the university system in the region.

Italian Constitution (Constitutional Law n. 3, 18thOctober 2001), the vertical multi-level distribution of power in the field of public policy decision and planning has been radically reviewed. The Constitutional reform marked a turning point, establishing concurrent legislative powers at the national and regional levels. Italian NUTS2 regions became responsible for policy-making in a wide range of policy fields, including those for scientific and technological research and support for innovation. Except for some areas of national relevance, which remain under the responsibility of the central Government (as happens, for instance, in the case of large-scale R&D programs or in the field of scientific research), R&I policies start to be designed and developed at the regional level, and basically implemented by making use of European Funds. As far as the ESIF management is concerned, vertical co-ordination between regional, national and EU authorities is ensured by the Partnership Agreement as established by the rules and legislation governing the 2014-2020 programming period (European Commission, 2013e). The Partnership Agreement is a strategic plan negotiated between the EC and national authorities on the basis of a consultation with local and regional representatives and stakeholders, which sets out the list of national principles and investment priorities. Horizontal coordination among regions is, instead, guaranteed through the Conference of Regions and Autonomous Provinces. The process of devolution of competences and powers, which essentially coincided with the start of the 2000-2006 EU programming period, has prompted, though to varying degrees of implementation, Italian regions to start issuing their own laws and reorganize their institutions in order to carry out the new tasks. In Apulia the regionalisation trend inspired a rationalization of the regional institutional system through the setup of a system of regional agencies, with specific tasks and responsibilities in the field of regional growth and innovation policy. The first step was the establishment, in 2004, of the Regional Agency for Technology and Development (ARTI), an independent agency supporting the administration in policy designing and facilitating networking for all the regional research and innovation actors. This is followed by the creation of two other bodies managed by the Region's Department for Economic Development: InnovaPuglia Spa, established by the Region in 2008 from the merger between the science and technology park Tecnopolis S.c.r.l. and the financial agency FinPuglia Spa; and Puglia Sviluppo Spa, originating from the regional branch of Sviluppo Italia, the National Agency for the Promotion of Investments and Enterprise Development (now Invitalia). In 2008, the Region acquired the majority of shares of both InnovaPuglia and PugliaSviluppo and gave them a more strategic role as intermediary bodies for regional innovation policies. Particularly, InnovaPuglia is in charge of the implementation of e-government policies and ICT infrastructure investments; PugliaSviluppo instead focuses on the promotion of business competitiveness,

delivering ESIF grants and engineering financial instruments to support entrepreneurship, innovation and internationalisation (Grigolini et al., 2015).

The Apulian regional administration and its system of agencies showed their strengths over the last two programming periods for their ability to coordinate development policies through an effective use of ESIF compared with the other Mezzogiorno regions (SRM-Confindustria, 2015; SVIMEZ, 2016). Apulia is among the five Italian regions (together with Emilia-Romagna, Friuli Venezia Giulia, Tuscany and Campania) that met the requirements for the use of ESIF during the last programming period, exceeding the ERDF and ESF targets by 5% and by 0.7%respectively at the end of 2015 (Il Sole 24 Ore, 2016)[11]. The overall impact of the ERDF 2007-2013 on the regional GDP is also evaluated as positive and increasing, recording a value of 0,6% in 2014 (Mastrorocco and Calò, 2016). It should be noted that such achievements are even more valuable when considering the specific context of the Mezzogiorno. For the historically state-dependent regions of the South of Italy in fact the acquisition of competences in the autonomous development of policies has occurred slower that in their counterparts of the Centre-North. National authorities initially supported the planning process for Objective 1 regions during the 2000-2006 programming period and, to some extent, in the 2007-2013 one, resulting in a slowing down of policy learning related to the devolution process. Within this frame, Apulia distinguishes itself for its capacity to establish effective inter-governmental relationships between regional and national authorities, and integrate the local business and community sectors into coherent development programmes. Since the early 2000's the region has started to invest in building a new reputation based on good governance, efficient public administration and socio-economic renewal, beginning to pull away from its peers. Nevertheless, efforts are still not reflected in the data on the quality of institutions, which remain discouraging, without showing any evident sign of an inversion of tendency. In the transition from the 2007-2013 to the 2014-2020 programming periods Apulia remains classified as LDR (Mastrorocco and Calò, 2016), and the Quality of Government index (EQI) remains well below the national average, and one of the lowest in Europe. Following Charron et al. (2015), Apulia is in fact ranked 216th out of a total of 236 European observed regions, positioning itself mid-table when comparedwith the other Mezzogiorno regions, after Basilicata and Sicily (Charron et al., 2015).

[11] Source: https://www.pressreader.com/italy/il-sole-24-ore/20160418/281522225259372.

Figure 12. Apulia:. European Quality of Government Index (EQI)

NUTS code	Name	EQI 2010	EQI 2013	EQI100 (2013)	Rank (2013)	EQI Italy (2013)
ITF4	Apulia	-1.669	-1.604	19.379	216	-0.93

Source: Charron et.al. (2014, 2015)

5.1.3.2 Path dependence: the history of regional innovation policy

The process of introduction and deployment of the RIS3 agenda in Apulia is built on past experiences in using ESIF to promote growth through innovation. Facilitated by a favourable political context based on the strong leadership assumed by the regional government taking office in April 2005 (2005-2015), the regional administration has sought to upgrade its support repertoire under the new banner of innovation. A first reflection on the significance of R&I policies within the region is stimulated by the results of the ex-post evaluation of the 2000-2006 funding period. In line with the EU 2020, the regional approach starts to evolve towards the idea of innovation as a more open, responsible and internationalized process, based not just on technologies but also on the wider idea of creativity. In the frame of the Italian Mezzogiorno, Apulia has started to invest in building a new vocation for itself on the basis of three strategic assets: the valorisation of its natural and cultural heritage; a huge investment in social and technological innovation and applied research; and the commitment to and mobilisation of human capital, especially the younger generations (Regione Puglia, 2014). The launch of system-based policies including policies targeting clusters, districts, poles, local value chains (e.g. the creation of productive and technological districts) and measures prompting collaborations between industry and research institutes (e.g. the establishment of a network of so-called Industrial Liaison Offices – ILOs – linked to existing Universities and aimed at promoting technological transfer and the generation of spin-offs), together with more targeted initiatives addressing firms' specific innovation needs in the traditional agriculture and handicraft sector (e.g.: R&D incentives for individual enterprises) or supporting social and physical investments in marginalised rural areas as well as the digitalisation of the public administration, the reduction of the digital divide and the development of smart cities projects, are some of the strategic measures that have been implemented by the regional Government as part of the 2007-2013 programming period in order to address both local economic development and cultural renaissance goals in a new and innovative integrated fashion (Grigolini et al., 2015). Amongst these, policies supporting nascent production and technological districts in traditional and advanced clusters represented an important stimulus for the creation of local business networks based on productivity similarities within specific value chains or sectors. These policies allowed the weaknesses affecting the regional productive system to be addressed by stimulating the formation of new collaborations,

and favouring its strategic re-positioning and enhancing regional competitiveness in global markets (Florio et al, 2015). More precisely, the Apulian productive districts are defined as significant associations of firms, especially SMEs that in partnership with other relevant institutional actors from the business and research world operate in an integrated way within a relevant productive system. This might assume the form of formalised networks based on horizontal specialisations around specific sectors, or on vertical links within value chains. In contrast to the conventional Marshallian agglomeration, which is a spatially clustered phenomenon, the clusterisation policy in Puglia was not informed by territorial proximity but by productive similarity. With the exception of logistics and aerospace (which are obliged to locate close to the harbour and the airport), there is no geographical agglomerative pattern associated with the emergence of productive districts in the region, which in fact can involve firms operating in the same and/or different geographical areas located within or outside the region (Regional Law No. 23/2007, article 2). Since their launch in 2007, the number and size of productive districts has grown considerably: according to the latest survey conducted by the Regional Agency for Technology and Innovation (ARTI), the Apulian productive districts currently involve over 4,000 actors comprising businesses and trade unions, local authorities (public associations, chambers of commerce), private associations, foundations, consortia, universities and public and private research institutes and laboratories (Regione Puglia, 2014). Technological districts, however, are the result of a more recent policy launched and implemented since the beginning of the 2000s in collaboration with the national level. The National Research Program 2005-2007 (*Programma Nazionale per la Ricerca 2005-2007*) identified technological districts as the key instruments in supporting the development of strategic collaborations between the national and regional level in order to enhance the territorial technological and competitiveness development level through a pervasive use of KETs. Technological districts are defined as consortia involving regional authorities (with financing, promotion and coordination roles), enterprises (large enterprises and SMEs), business representative associations and universities committed to cooperating to produce technological innovation, with a view of becoming excellence centres at national and international level. Compared to productive districts, technological clusters are characterised by a stronger presence of actors operating in the R&D and technology transfer field (ARTI, 2011).

In addition, it has to be underlined that a particular political commitment has interested the regional energy sector over the last decade. Besides exploiting a new technological opportunity, the photovoltaic history of Apulia illustrates a radical novelty on the policy front, becoming the icon of an ecologically conscious administration capable of making a Mediterranean LDR assume a leadership role in the renewable energy stakes. The regional Government has displayed a great deal

of political virtuosity in exploiting the national incentives, showing itself to be even more agile than many other regions in Italy. The public sector assumed a pro-active role in simplifying and accelerating the bureaucratic procedures of license concessions, and the region reached an impressive position in the regional league table of installed power in Italy in 2012, accounting for 17% of national production (GSE, 2012; IPRES, 2016).

The current situation of Apulia thus is that of a region in the middle of its renewal journey. Even if the region is still lagging behind in terms of technological and economic development when compared to most of the Italian and European regions, the instruments developed thus far indicate a genuine effort to align policy practice with political rhetoric and develop effective R&I strategies and measures. Many steps are to be completed. Moreover, the impacts of the financial crisis have partly determined an underutilisation of the instruments initially proposed and the adherence to more traditional schemes of support for individual firms, despite the original intention of adopting a system based approach and enhancing collaborations among firms and between firms and research institutions, as shown by data on targeted beneficiaries (European Commission, 2015b; Grigolini et al., 2015). Nevertheless a cultural transformation is underway and a different self-perception and an increasing awareness of the existing environmental, cultural and social potentialities emerged within the region and its citizens (Regione Puglia, 2014). Moreover, during the 2007-2013 ESIF programming period the region also gained significant experience in developing high-quality and participative strategy-making processes. The Strategy for Research and Innovation adopted by the region in 2009 represents a key document in this respect, being conceived in the same spirit as the new approach characterizing the EU Cohesion Policy 2014-2020. The Strategy identified innovation as the fundamental leverage for economic development and quality of life in the region, and put it as a crosscutting objective for regional actions It also identified a list of priority sectors (i.e. biotech and life sciences; agro-food, technologies for energy and the environment; aerospace, mechanics and mechatronics; new materials and nanotechnologies; ICT; logistics and production system technologies) to be promoted in a systematic effort by a wide range of stakeholders and through the development of networks of competences for scientific and technological applications (Grigolini et al., 2015). Moreover, during the past ESIF programming period, Apulia launched the experimentation of three so-called ‘bridge initiatives’, which were specifically aimed at connecting the 2007-2013 and 2014-2020 funding phases and thus considered the first step of the Apulian RIS3 process (Interview 1, June 2015). The first initiative - Alliances for Innovation – was launched in June 2011 and was aimed at encouraging the creation of strategic partnerships between the already existing ILOs, including Universities and research institutes, and the Apulia clusters. The main goal was to strengthen the business-academia link and finance industrial research and technological

transfer. The second pilot initiative, the ICT Living Labs, was implemented in 2012 to support stakeholder mobilisation around the innovation theme and engage in direct discussion with the demand side. Living Labs are defined as public private partnerships in which businesses, researchers, authorities and citizens work together for the creation, and validation of new services, business ideas, markets and technologies in real life contexts (Bergvall – Kareborn et al., 2009). Conceived as an open ecosystem whereby the users can actively take part in researching and testing innovative solutions through the use of ICT, the Labs encouraged the incorporation of social issues in the discourse on innovation. The third topic addressed was public procurement. In September 2012 the regional administration decided to test for the first time the pre-commercial public procurement tool to enhance public demand for innovation and stimulate, through the public sector's power of purchase, private initiatives for developing solutions to citizen's concrete needs. The experimentation was first launched in the domain of independent living and home automation, and then extended to other sectors (Regione Puglia, 2014; Grigolini et al., 2015).

Concluding, as a result of past policies and experimentations, there is the feeling, highlighted by interviews with regional administration officials and external experts (interviews 1 and 2; interviews 11 and 12), that at the time of the emergence of the RIS3 paradigm the region can rely on pre-existing competences, tools and content for the definition and implementation of its RIS3. Thanks to these preconditions, which are further reinforced by the stable and consolidated political leadership characterising the region over the previous decade, Apulia enters the on-going ESIF programming phase in an advanced position compared with its Mezzogiorno peers, making the need to guarantee 'continuity in change' the key challenge related to the introduction of the new EU regional innovation policy agenda (Regione Puglia, 2014).

5.1.4 Institutional landscape: RIS3 organizations and actors

The most relevant actors and organisations making up the Apulian regional innovation system are listed below.

Public sector pillar

The regional institutional structure of Apulia consists of the Regional Government (*Giunta Regionale*), which is composed of the President of the region (*Presidente della Regione*) and the Ministers (*Assessori*), and the Regional Council of Apulia (*Consiglio Regionale della Puglia*). The Regional Government exercises the executive power. Legislative power instead is vested in both the Government and the Regional Council.

As already highlighted, the region can count on the presence of a system of public agencies and technical structures supporting the administration, namely:

- The Regional Agency for Technology and Innovation (ARTI), which was established by the regional administration in 2004 in order to govern R&D and technology transfer more efficiently. Its mission is to consolidate the innovation system and support the implementation of strategies for innovation and competitiveness. The measures taken by the Agency to facilitate networking among the regional research and innovation actors included, for example, the creation of the network of ILOs and Technological Districts. ARTI also has responsibility for monitoring activities: the agency collects statistical data and carries out policy evaluations to furnish the regional government with evidence-based information. ARTI also stimulates and supports the private demand for innovation and the qualification of human capital. In July 2015 the regional administration approved a new organisational model called MAIA (*Modello Ambidestro per l'Innovazione della macchina Amministrativa*) for innovation in the administrative structure, which further strengthened ARTI's competences and identifies it as the key strategic agency supporting the Governor in the definition of regional R&I policies;
- InnovaPuglia Spa, the intermediary body created in 2008 which provides technical support for the implementation of technological investment programmes, is the public agency for ICT and is responsible for the implementation of the Digital Agenda;
- Puglia Sviluppo Spa, another intermediary body which provides assistance in the definition and implementation of initiatives enhancing the internalization and innovation capacity of the local productive systems. The agency provides support to enterprises through a diversified portfolio of instruments from the development of project ideas, through the procedures to get administrative permits, to project final approvals. Amongst its functions, Puglia Sviluppo is responsible for the development and management of the regional business incubators.

Higher education and public research pillar

As for the research system, the main actors operating in the region are:

- 5 Universities, namely: University of Bari; Polytechnic of Bari; University of Foggia; University of Salento, and the private institute LUM Jean Monnet of Bari;
- Public and private research laboratories, operating in the following fields: innovative technologies and materials for the transport industry (TEXTRA); bioinformatics for molecular diversity (MLAB); ambient assisted living (INNOVAAL); environmental monitoring (REAM); advanced materials (RITMA);

- More than 25 research centres, of which more than 20 institutes belonging to the National ResearchCouncil (CNR), including the National Laboratory for Nanotechnology, the Institute for Microelectronics and Microsystems, the Institute forIndustrial and Automation Technologies and the Laser Innovation Technology Transfer and Training centre;
- 6 technological districts operating in the following fields: advanced materials and nanotechnologies (DHITECH); energy (DiTNE); aerospace (DTA); mechatronics (MEDIS); agro-food (DARe); biotechnologies (HBIO);
- 6 interregional Centres of Technological Competence, which are defined as structures dedicated to the promotion of the scientific and technological development of firms (especially SMEs) in the 5 Italian Objective 1 regions of the South. The Centres of Technological Competence were promoted in 2006 as part of the National Operational Research Programme 2000-2006 (*PON Ricerca 2000-2006*) and operate in the following fields: agro-industry technologies; ICT for productive activities; advanced biology, analysis and prevention of the environmental risk and transport, through the diffusion of scientific-technological information and technology transfer activities[12].

Firms Pillar

The regional productive system is characterised by the presence of the following main typologies of actors:
- Large firms, mainly held by multinationals, located in the industrial poles of Bari, Brindisi and Taranto operating in the mechanics, automotive, building, chemistry and pharmaceutics, energy, logistics sectors, amongst others;
- 18 production districts operating in both traditional and highly innovative sectors, namely: tourism; agro-food; fishing and aquaculture; horticulture; stone quarrying; sustainable building; new energies; environment and recycling; logistics; nautical; aerospace; mechanics; ICT; communication, publishing and graphic industries; fashion; wood and furniture; creative industry.
- 2 enterprise incubators locate[d] in Modugno (Bari) and in Casarano (Lecce), which support the creation and development of innovative start-up by offering targeted logistic and consulting services[13].

[12] Source: http://www.arti.puglia.it/ [Accessed on 15th January, 2017].
[13]Source:http://www.pugliasviluppo.eu/it/incubatori-di-impresa[Accessed on 20th January, 2017].

5.2 Analysis of the RIS3 practice

Apulia has started in duly time to outline its Smart Puglia 2020 RIS3, and has been among the first Italian regions to develop and approve the strategy. In September 2012 Apulia hosted the European Seminar on Smart Specialisation Strategy, which was organised by the DG Regional and Urban Policy of the European Commission and involved representatives of the European Commission and the Italian Ministry of Economic Development (MISE) as well as the managing authorities of all the Italian regions[14], thus representing the first step of dissemination of the new agenda, marked by a strong international spirit (Regione Puglia, 2014).

Figure 13. The process towards 'Smart Puglia 2020'

1st step: Launch of the process	European Seminar on Smart Specialisation Strategy, Bari (25-26 September 2012) Smart regional innovation meeting between the regional body and its agencies (6 December, 2012)
2nd step: Stakeholder inclusion	The evaluation of R&I policies (19 February, 2013)
	Digital active citizenship (9 and 10 April, 2013)
	Which specialisations for Apulia 2020? The proposal of technological districts (23 May, 2013)
	Which KETs for Apulia 2020? (23 July, 2013)
3rd step: Citizens inclusion	Health Living Lab (21 September, 2013)
	Smart Cities Living Lab (15 November, 2013)
	Green Living Lab (3 December, 2013)
	Creativity and Territory (6 December, 2013)
	Social Responsibility in the new programming phase (7 April, 2014)
4th step: Public consultation	Public consultation on Smart Puglia 2020 (14 March – 14 April 2014)

Source: RIS3 Smart Puglia 2020 (Regione Puglia, 2014)

The region formally launched the process towards RSI3 on July 17, 2012 (DGR no. 1468/2012). As highlighted in Figure 13, discussion starts within the public administration and its agencies, and is then extended to the innovation community by including first the research and business world, and, in later, civil society i.e. the innovation users. A first draft of the strategy is developed in March 2014, and followed by the launch of a public consultation. The RIS3 is approved by the regional Government in August 2014, together with the Digital Agenda (DGR no. 1732/2014). In order to fulfil the ex-ante conditionality the region has been required by the EC to fulfil an Action Plan by the end of 2015. The Plan is agreed at the Region and the European level and sets out integrations

[14] Source: http://www.europuglia.it/archivio-news/100-area-istituzionale-90347/5843-innovazione-sostenibilita-inclusione-lintervento-di-vendola-al-seminario-europeo [Accessed on 15th July, 2015].

related to the following weaknesses affecting the first draft of the RIS3 document: degree of specificity of the selected areas of innovation; governance system; financial plan and resource allocation; indicators and monitoring mechanisms. These elements have also been addressed through the annual reviews conducted in 2015 and 2016. An updated RIS3 version was approved by the EC in November 2016 (although not yet made public), which is waiting for formal adoption by the Regional Government during the first semester 2017 (Interview 1, January 2017).

5.2.1 The governance challenge

The RIS3 team is coordinated by the regional Department of Economic Development, Innovation, Education, Training and Labour and more precisely by the Research, Innovation and Institutional Capacities unit, together with the ESIF Managing Authorities and with the support of ARTI, InnovaPuglia and Puglia Sviluppo. The agencies provide technical assistance in the following areas: Puglia Sviluppo focuses on the links between R&I initiatives and other transversal actions such as competitiveness and internationalization of SMEs, professional training and access to credit; InnovaPuglia focuses on R&I initiatives for SME's and on public procurement; the agency is also the technological partner for the implementation of the Apulian Excellence Platform informative system; ARTI instead focuses on RIS3 monitoring and evaluation activities working in collaboration with the regional evaluation unit (*Nucleo di valutazione e verifica degli investimenti pubblici* - NUVAL) and the national evaluation unit (*Unità di valutazione degli investimenti pubblici* - UVAL). Territorial actors such as the regional production and technological districts also played a key role, particularly as far as their contributions to specific fields are concerned (Interview 4).

Following the regional political elections held on 31st May 2015 and the associated organisational changes introduced as part of the adoption of the MAIA organisational model, the composition of the RIS3 team and its responsibilities were confirmed. This, according to the regional officials interviewed, permitted the needed continuity to be guaranteed in the creation and consolidation of competencies related to the introduction of the new agenda both inside and outside the administration (Interview 2). Yet, to date the governance structure has not been institutionalised to become a stable area of activity within the administrative structure. Nevertheless, the region has recently activated an ad hoc unit dedicated to the RIS3 within ARTI, and is currently working on the creation of operational teams responsible for the definition and implementation of action plans in each RIS3 innovation domain.

5.2.1.1 Intra-organisation learning: capacity and capabilities in the public sector

A policy learning process around the innovation investment priority started to take place within the Apulian public administration between the end of the 2000-2006 ESIF programming period and the beginning of the 2007-2013 phase. In 2010 the publication of the Europe 2020 and the Innovation Union flagship initiative inspired the first self-assessment exercise on regional policies based on the Innovation Union tool and was carried out by ARTI. The study evaluated the regional R&I performance and encouraged a first reflections on technological trends and desirable areas of innovation. This was followed by the introduction of the concept of bridge initiatives, which identified actions that have been implemented as part of the 2007-2013 ESIF programming period but anticipated themes and objectives of the RIS3. From the very beginning, the financed projects suggested a new strategic role for the public sector inspired by the Quadruple Helix model. Particularly, Apulia put much attention on the qualification of the public demand for innovation. A smart public demand is considered key by the administration and its agencies to increase awareness of the state of the art of technologies. The launch of the pre-commercial public procurement pilot test in 2012 is recognised by interviewed actors as strategic to understanding the benefices of a robust public role in stimulating private initiatives and promoting integration and cooperation between regional policies (interviews 1, 2 and 3). In 2013 a mapping of the territorial innovation needs was launched. Over 550 requests were collected which led to the identification of 470 needs expressed by more than 250 regional stakeholders as part of local, municipal and regional authorities; hospitals and university clinics; production and technological districts; research bodies and universities; business consortia, foundations, schools, museums, consumer associations, and local action groups, among others. This exercise, which was concluded on December 31st 2013, was indispensable in identifying five key regional societal challenges, i.e. sustainable cities and territories; health, wellbeing and socio-cultural dynamics; sustainable energy; creative industry and cultural development; food security and sustainable agriculture, and related priorities for action. Moreover, through the public procurement experimentation the public administration has, for the first time, sought to use its own procurement to position itself as a market leader at a regional level, acting according to an entrepreneurial mind-set. Support is not only for the creation of scientific and/or technological knowledge, but its wide diffusion and use within society to innovate specific services and products through effective applications (Regione Puglia, 2014).

Interviews with regional public officials highlighted that the advent of the RIS3 agenda is understood to be a useful tool to consolidate this new engagement in innovation policy. In their opinion, its on-going operationalization is helping to strengthen the public sector's role as connector

and curator of the innovation processes. The commitment required by the new European programming period, although implying a long and sometimes complex process to be managed, is seen as crucially important, because it has pushed and will continue to push policy-makers to act strategically (Interviews 1 and 2).In drafting the RIS3 document a participatory methodology has been applied both internally, within the regional administration's departments and its regional agencies, and externally. In the region's view, as confirmed at the beginning of the fieldwork, *"the public sector produces innovation also through its behaviour. It is not just about producing social capital but also civil capital. Making R&I not just about developing and publishing calls; it means conceiving, together, our own role and commitment towards a common goal* (interview 1 - Regional Administration*)"*[15]. From the very beginning public officials interpreted RIS3 as a concrete approach to increasing the contamination among the rich and sometimes complex network of regional agencies and structures, making dialogue more efficient and effective and promoting a better understanding of the territory and collaboration with stakeholders. "*RIS3 is a concrete arena where dialogue between the regional agencies and the central administration can be enhanced* (interview 3 - ARTI)*"*[16]. Moreover, the RIS3 is seen as helpful in renovating the political commitment towards innovation policy, and offers a stimulus to reform specific tools in areas such as public procurement (interview 1).

In terms of administrative capabilities, public officials interviewed highlight the presence of available skills and capacities to fulfil the EC's requirements, especially given the technical support received by the regional agencies. Though, the external assistance received by national and EU advisors was evaluated as important, as better described in paragraph at 5.2.2.3 (interviews 1 and 2).

Together with the positives, the interviewed officials also highlight two critical issues for an effective deployment of the RIS3 agenda: time constraints and political commitment. Public administrators show a certain degree of awareness that the new agenda requires a significant amount of innovativeness in the political, administrative and cognitive processes. *"There is no innovation without a cultural change. Innovation cannot be pursued but has to be generated through reaching an equilibrium* (interview 1 - Regional Administration)*"*[17]. Moreover it is

[15] Interview with public official of the Industrial Research and Innovation unit - Economic Development, Innovation, Education, Training and Labour department of the Regione Puglia, Bari, 23rd June 2015.
[16]Interview with project manager, ARTI, Bari, 23rd June 2015.
[17] Interview with public official of the Industrial Research and Innovation unit - Economic Development, Innovation, Education, Training and Labour department of the Regione Puglia, Bari, 23rd June 2015.

stressed that: "*the regional administration is usually less incline than the private sector to manage complexity. The public sector has a bipolar approach: it looks at citizens as users and as patients that need to be assisted. But in the real world, where knowledge represents the principal resource, citizens produce simultaneously problems, competences and solutions. They are active actors, and key nodes of information. The practice of listening to citizens' needs and answers is a necessary practical dimension that needs to be enhanced* (interview 2 - InnovaPuglia)[18]. Yet, a cultural transformation needs time, and "*the costs of experimentations are perceived as very high, especially at the political level* (interview 1 - Regional Administration)"[19]. Besides, if R&I policies were initially conceived with the intention of being offensive and were placed at the service of the broader objectives of development, competitiveness, quality of life, wellbeing and employment for young people, due to the impacts of the economic crisis, new and differing challenges were faced. In 2009, due to the economic downturn, a reprogramming of the OP 2007-2013 was necessary in order to give more space to social inclusion and safeguarding of employment, especially as part of those actions aimed at promoting growth in firms. This led to a deviation from the original strategy for what concerns SME innovation. The regional administration was forced to move back to a more defensive approach, which is still generating negative consequences in terms of the public sector's reputation, especially from the part of the regional business world, as highlighted by interview to Puglia Sviluppo (Interview 4). Within this context, regional administrators highlight that the current RIS3 requirements are sometimes perceived as too strict and standardised, putting the original context-specific spirit of the new agenda at risk. Referring to more theoretical aspects, it is underlined, for example, that *"the request of choosing the RIS3 areas of specialisation in advance is not fully compatible and coherent with the idea of entrepreneurial discovery advocated under the new agenda, which instead entails the maintenance of a high degree of flexibility and openness towards new discoveries throughout the whole process* (interview 1 - Regional Administration)*"*[20]. Once more, the interviewed officials stress that in order to guarantee the required balance between inclusiveness, effectiveness and openness of the strategy-making process a long period is needed. In their perception, "*the strict deadlines and requirements could partly undermine the possibility to use this important opportunity even in the case of a region like Apulia that seems to have all the*

[18]Interview with project manager, InnovaPuglia, Bari, 23rd June 2015.
[19] Interview with public official of the Industrial Research and Innovation unit - Economic Development, Innovation, Education, Training and Labour department of the Regione Puglia, Skype call, 29th Match 2016.
[20] Interview with public official of the Industrial Research and Innovation unit - Economic Development, Innovation, Education, Training and Labour department of the Regione Puglia, Bari, 23rd June 2015

pre-conditions to successfully follow its innovation trajectory under the umbrella of smart specialisation (interview 1 - Regional Administration)"[21].

5.2.1.2 Intra-system learning: rationales, mechanisms and tools for the involvement of stakeholders

The Apulian RIS3 is conceived as a new vision for a new responsible development model based on the progressive enhancement of the interconnections and dialogue within the innovation community, and on an intelligent, inclusive and sustainable use of technologies" (Regione Puglia, 2014). Grounded on established practices of social dialogue in elaborating development and innovation plans, the RIS3 process launched by the region was, from the very beginning, inspired by a collaborative leadership and client-oriented approach. Since the early 2000's the regional administration's attitude has gradually moved from a 'consultation for listening' to a 'consultation for co-designing' approach, which allowed better fine-tuning and tailoring of the call specifications to the specific needs highlighted by potential beneficiaries (Grigolini et al., 2015). Pilot initiatives such as the Alliances for Innovation and the Apulian ICT Living Labs, which were financed under the previous programming period, are documented as successful and internationally classified as best practices due to the ability to mobilise the innovation community and engage in direct discussion with the relevant stakeholders (Interview 10). Through the Alliances for Innovation tool, for example, over 200 regional SMEs, 13 research bodies and more than 380 young researchers had the opportunity to work together on the discovery of the most promising innovation areas, focusing in particular on the identification of the main barriers constraining their emergence and development (Regione Puglia, 2014). "*Innovation processes are the synthesis of three forces: the capacity to deal with uncertainty; the courage to accept failures and the capacity to manage change. Thus, in order to make innovation really happen, the active participation of the exponents of a variety of stakeholders, who share these common responsibilities and risks is essential* (interview 6 - University)"[22]. With the launch of the Living Labs initiative, the EDP is further enriched involving the civil society, in line with the Quadruple Helix model. The Labs provided a fresh analysis of the regional demand-driven innovation potentials and "*looked inside the black box*

[21] Interview with public official of the Industrial Research and Innovation unit - Economic Development, Innovation, Education, Training and Labour department of the Regione Puglia, Bari, 23rd June 2015.
[22] Interview with University professor, Bari, 24th June 2015.

of human capital for RIS3 (interview 3 - ARTI)"[23]. Over 130 innovation users participated in the development of products and services in a number of different domains that are particularly sensitive to innovation and with respect to which regionally managed public procurement is likely to play a role, such as healthcare, welfare, ageing society and transportation. A mapping of social needs based on more than 400 contributions expressed by the local innovation community was also developed (Regione Puglia, 2014). Apulia currently counts 84 Living Labs working on the following topics: environment, security and territorial protection; cultural heritage and tourism; e-governance; health, wellness and socio-cultural dynamics; competitive and renewable energy; training and education; transport and sustainable mobility; digital creative industry[24]. The number of actors involved in the Labs experimentation has increased and improved since the RIS3 process was launched, evidencing that the new agenda has been able to prompt their consolidation. This is confirmed from both the interviews conducted, and by official data (IPRES, 2016).

Interviews conducted with actors from the research and business world confirm that the innovation community is recognising the positives of setting up a wide process of direct stakeholder involvement, though sometimes long and challenging to managed, as underlined by regional administrators (interview 1, March 2016). As an example, the introduction of tools such as the Living Labs is recognised as being an original and constructive approach that allowed better dialogue between the administration and its citizens through the reduction of linguistic divergences. Moreover, it is stressed that the Labs have been of great use in identifying the more diffuse territorial innovation needs and gave visibility to social innovators by allowing *"collection of knowledge and information from the ground through the semantic research of shared and convergent factors. A wider participation of the digital community is essential because it permits data to be constructed (about life) as evaluation factors* (interview 6 - University)"[25]. Their further development and consolidation is thus seen as desirable by the business world, especially SMEs (interviews 7 and 8).

Among the results obtained through the introduction of the RIS3 agenda, the followings are particularly underlined by the field work: improvement of contaminations within the dense network of regional organisations and actors which is confirmed by both the business world (interviews 6 and 7) and by the research world (interview5). University actors particularly appreciated the

[23]Interview with project manager, ARTI, Skype call, 18th January 2017.
[24] Source: http://livinglabs.regione.Apulia.it [Accessed on 15th December, 2016].
[25] Interview with University professor; Bari, 24th June 2015.

increase in conversation and the rise of "*a new narrative around the innovation discourse: giving voice to the community and to co-produce the innovation content is an enrichment and not a replacement of the political mandate, and gives the opportunity to continuously control on-going work by maintaining a stimulating and cooperative approach. That's why it's worth working on the reputation and sharing of responsibilities. The result is the process* (interview 5 - University)"[26]. Another positive element is the introduction of new mechanisms for the involvement of social actors such as the web-based open space for the collection of contributions and the open data system to increase the transparency of the process and offer access to all the related documents, particularly appreciated by firms (interviews 7). A general increase in the demand side focus is also recorded and the positives of involving new actors such as credit institutions are highlighted (interview 8). Moreover regional officials highlight that the RIS3 process allowed for a strengthening in the inter-sectorial connections between innovation and other regional policies, such as internationalisation, youth policies and smart city initiatives (interviews 2 and 4). "I*n this respect, an important role was carried out by the technology and productive district. The latter, which includes both research institutes and firms, has been key in facilitating cross-fertilizations between different but complementary knowledge and skills, as proposed by the RIS3 approach* (interview 4 -PugliaSviluppo)"[27].

Among the critical elements, external evaluators and experts interviewed highlight that no direct leading role has yet been assumed by universities, except in a few cases, nor by the regional business world, which is mainly represented by its associated expressions (regional districts, trade unions) and not by single entrepreneurs: this is related to "*the fact that knowledge pieces of firms cannot always be shared collectively because firms don't want to; thus an additional increase in the socialisation of innovation processes in order to be really effective in the deployment of the new agenda is required* (interview 12- National Expert and Advisor for RIS3)"[28]. Furthermore, it is underlined that "*the composition of the working groups remains not inclusive enough of emerging and highly dynamic social groups such as the younger population, women and skilled immigrants, as suggested by the Quadruple Helix model*" (interview 9 - EC Expert and Advisor for RIS3)[29]. As far as the methodology adopted to manage the EDP is concerned, except for the Living Labs, consultation meetings and events with stakeholders were mainly built on quantitative analysis and

[26] Interview with University professor; Bari, 24th June 2015.
[27]Interview with project manager Puglia Sviluppo, Bari 23rd June 2015.
[28] Interview with national expert and advisor for RIS3; Milan, 17th May 2016.
[29]Interview with European Commission External Advisor for RIS3; Skype call, 10th February 2016.

made large use of statistical data (Regione Puglia, 2014), rather than capturing more qualitative kinds of information, able to integrate and update the scenario by demonstrating emerging trends and weak signals that normally escape standard analysis, as highlighted by international experts (interview 10). Furthermore, if during the design phase (years 2013 and 2014) a rich calendar of events has nurtured the process, in the successive stage the external advisors signal that the degree of stakeholders' involvement has slowed (interview 9). According to regional officials, this was a conscious choice related to the need to internally consolidate and elaborate the first results obtained and not disregard the expectations generated within the community of actors: "*The RIS3 process continued internally. The definition phase was concluded on time (2014) and the choice, following the process of feedback and administration, to not reactivate discussions was to wait for results* (interview 1 - Regional Administration)"[30]. Moreover, "*there was the requirement to concentrate on the RIS3 reviewing process, which implied technical work that had been conducted internally by the regional administration in close synergy with the external experts and the EC* (interview 3 - ARTI)"[31]. The innovation community, especially businesses tended instead to perceive a sort of interruption of the process, which risks putting the effective and timely deployment of the strategy at risk (interview 8).

Lastly, a final aspect confirmed by the national expert interviewed relates the activation and use of ad hoc communication and diffusion tools (interview 12). A dedicated website, as well as specific sections within existing websites, has been created to share information and cultivate the dialogue around smart specialisation at the territorial level. But these tools partially overlap, and none of these results complete the information offered[32]. Moreover, three years after its introduction, the use of social networks such as Facebook, LinkedIn and Twitter, which would be of great use to take into account the user's perspectives and target specific social groups such as younger generations, is still under-adopted (interview 1).

5.2.1.3 Inter-system learning: horizontal and vertical connectedness

Apulia was the first Italian region to join the S3 Platform in December 2011. The region participated in a peer review exercise in May 2012 and in a series of successive thematic meetings, also assuming the role of co-organizer, such as in the case of a recent event on sustainable

[30] Interview with public official of the Industrial Research and Innovation unit - Economic Development, Innovation, Education, Training and Labour department of the Regione Puglia, Skype call, 17the January 2017.
[31] Interview with project manager, ARTI, Skype call, 18th January 2017.
[32] Source: http://innovazione.regione.puglia.it/ [Accessed on 20th February, 2017].

manufacturing and health held in Bari in July 2016. In 2016 the region also joined the S3 thematic platforms on Industrial Modernisation and Energy. Particularly, in the field of Energy, the region is actively working on challenges and opportunities related to the development of a smart grid, and participated in two thematic events in Brussels (Puglia and Energy; June 16, 2016) and Bari (Smart Mediterranean Conference on Smart Grid; June 23 and 24, 2016) (Interview 1). Moreover, through ARTI, Apulia is part of the Lagging Regions working group on RIS3 monitoring, and the working group on the role of universities (Interview 3). Though it sometimes adds complexity, especially due to the frequent requests for compilation of questionnaires and interviews for the purpose of data collection, the participation in the Platform's activities is perceived as an overall positive experience by the public officials interviewed. The Platform is considered useful for learning from each other through the exchange of know-how and best practice, and is recognised as an effective forum to refer to in case of specific needs (interview 2). Of particular relevance, especially for the on-going implementation phase, is its role in facilitating the development of joint investment projects on specific RIS3 thematic areas (interview 1).

Even if not yet fully reflected within the RIS3 according to external evaluations, given that in its first versions the document mainly refers to traditional international rankings (interview 9), the region is currently making the effort to increase its horizontal connectedness in respect to specific RIS3 domains through benchmarking exercises: an important contribution in this respect is offered by the active presence of Apulia in EU territorial cooperation programs such as Interreg Europe IVC, MED, IPA-Adriatic, and networks such as the NEREUS network on space policies; the ERRIN network on R&D&I; the European innovation partnerships on Sustainable Agriculture and Active and Healthy Ageing; the CORAL network on independent living; the European innovation partnership on smart cities & communities; the RICC Network on culture and creativity, among others (interview 1).

In terms of vertical connections, however, the region benefitted from the assistance schemes activated at both the national and the EU level. In May 2013 (May 2013 – December 2014) the Department for Development and Economic Cohesion (DPS) of the Italian Ministry of Economic Development (MISE) launched a measure to support Italian regions in the design of their RIS3 (*Supporto alla definizione e attuazione delle politiche regionali di ricerca e innovazione (Smart Specialisation Strategy*). A common forum to share on-going experiences was provided, and a mapping of the regional sectorial and technological specialisations was produced, taken as the

starting point for the development of the national RIS3. The projects have been managed by the National Agency for Inward Investment and Enterprise Development (Invitalia) and allowed for the activation of standard tools such as thematic seminars, auditing and consultancy services[33]. Apulia also took the opportunity of a free advisory service as part of the nationally funded project Capacity Sud (February 2012 – May 2015). The project was aimed at fostering administrative capacities and skills and enhancing inter-institutional collaborations in the planning and implementation of ESIF. It facilitated the sharing of experiences and praxis through participation at laboratories and focus groups[34]. Moreover, the region was entrusted with the recommendations of an external international expert made available by the EC during the period 2013 - 2016. Compared with more traditional forms of support, this service took the form of personalized assistance, and focused on the quality of the process rather than on the strategy content. Informed by a continuous exchange of information and dialogue with the regional administrators from a policy learning perspective, the European Commission's expert followed the implementation of the RIS3 steps by providing both technical knowledge and qualitative support in the implementation of the EDP, and encouraging the introduction of correctives and discontinuities where necessary (interview 9). In the perception of the regional officials interviewed (interviews 1 and 2) the assistance received, especially through the Capacity Sud project and the work done with the expert, was extremely informative and allowed better focus on the definition of their RIS3: "*the acquisition of competences, methodologies and contents was facilitated, and the acquisition of a common language within the regional administration and the innovation community was stimulated* (interview 1 - Regional Administration)"[35]. On the other hand, these very experts stress that RIS3 is "*a continuous adventure full of obstacles that will emerge and will need new competences to develop new solutions, making continuous learning within the administration the key challenge for its successful deployment and to avoid emulations not just in the contents but also in the adopted methodologies and tools* (interview 12 - National Expert and Advisor for RIS3)"[36].

As far as other levels of government, especially the local/urban one, are concerned, these are not directly involved in the definition of the RIS3 (interview 2). Nevertheless, the RIS3 document includes a reflection on the roles and responsibilities of cities as poles of attraction for innovation as

[33]Source: http://www.invitalia.it/site/new/home/cosa-facciamo/sviluppiamo-i territori/innovazione/smart-specialisation-strategy.html [Accessed on 20th January, 2017].
[34] Source: http://capacitaistituzionale.formez.it/content/capacity-sud [Accessed on 25th January, 2017].
[35] Interview with public official of the Industrial Research and Innovation unit - Economic Development, Innovation, Education, Training and Labour department of the Regione Puglia; Skype call, 29th March 2016.
[36] Interview with national expert and advisor for RIS3; Milan, 17th May 2016.

part of the City Agreements initiative. Launched in 2014 as a pilot action under the ERDF 2007-2013, the City Agreements were aimed at developing functional networks able to de-codify the data made available by new technologies to interpret, in a shared and participative way, territorial vocations and propose new life styles that are more sustainable and able to generate bottom up development processes (Regione Puglia, 2014). This initiative was connected with the Living Labs activity, and is cited by external experts as a "*virtuous example of the capacity to find a territorial declination to the smart cities and communities issue in close connection with the smart specialisation paradigm, potentially able to facilitate the sharing of principles and practices between the regional and the local level* (interview 11 - Academic Researcher and Independent Consultant on RIS3)"[37].

5.2.2 The policy-mix challenge

According to the expert, the final version of the RIS3 document evidences an established awareness of the challenges linked to innovation policies and an equally mature sensitivity of the need to effectively combine technological trajectories with the main social and environmental issues (interview 9). The strategy includes a rich and focused context analysis. The innovation ecosystem is investigated through a series of studies assessing the performance of the productive sectors, and their import and export markets; existing technological competences and KETs in which critical mass is achievable; the research system performance was measured through data on university publications and citations (Regione Puglia, 2014). More precisely, the RIS3 makes the effort to focus on regional vocations by proposing an assessment of the competitive assets of the region through a SWOT analysis based on the concrete examination of the aggregates of capacities and territorial assets that might create favourable contexts for innovation (interview 3). This work, together with the Living Labs' evidence, has led to the identification of three strategic RIS3 innovation areas, further articulated in 12 sub-areas, as highlighted in figure 14.

[37]Interview with university researcher and independent advisor on RIS3; Brussels, 12th May 2016.

Figure 14.Apulia RIS3 specialisations

Innovation areas	Sub areas	Critical mass
Sustainable manufacturing	Smart factory	Technological districts and public-private aggregations (DTA, MEDIS, RISMA, TEXTRA); productive districts (Aerospace, Mechanics, Logistics, Nautical, Furniture,..); private and public research infrastructures (ENEA, CNR, CETMA, RIVOVA, INFN). Focus: developing supporting schemes for large firms (Program Agreements and Technological Cluster)
	Aerospace	
	Mechatronics	
Human health and environment	Human health	Technological districts and public-private aggregations, (INNOVAAL); productive districts (DES, DIPAR, Agro-food, New energy,..); private and public research infrastructures (ENEA, CNR, CMCC, Life Watch). Focus: developing tools for the enhancement of the public demand for innovation and integrated aids for SMEs
	Green and blue economy	
	Agro-food	
	Tourism	
Digital, creative and inclusive communities	Cultural and creative industries	Technological districts and public-private aggregations (DHITECH, INNOVAAL, DITNE, MLAB); productive districts (Communications, Creative Puglia, Informatics,..); private and public research infrastructures (ENEA, CNR,..). Focus: promoting inter-connections with: Digital Agenda (digital services and contents); new forms of production (makers); emerging firms operating in the field of social innovation.
	Services	
	Social innovation	
	Design	
	Non R&D innovation	

Source: RIS3 Smart Puglia 2020 (Regione Puglia, 2014) and Italian District Observatory (http://www.osservatoriodistretti.org/category/regione/puglia)

As far as the nature of the selected specialisations is concerned, the region embraces a wide view of innovation. The selected areas include both S&T domains and non-technological ones. Some areas are sector-based (e.g. aerospace, tourism, agro-food, services), some are technology-based (e.g. mechatronic), while others are a combination of both (e.g. green and blue economy, smart factories). Particularly, the concept of specialisation is interpreted by the regional administration as "*areas of aggregation of existing priorities rather than leading to the identification of new strategic domains* (interview 1 - Regional Administration)"[38]. This interpretation reflects, on one side, the region's ambition to enhance inter-sectorial connections between transversal policies for research, innovation, competitiveness, internationalisation, and more vertical ones related to environment,

[38] Interview with public official of the Industrial Research and Innovation unit - Economic Development, Innovation, Education, Training and Labour department of the Regione Puglia; Bari, 23rd June 2015.

transport, health and welfare issues (interview 1). On the other, it results in the identification of priorities that, at least in their first formulation, were evaluated as not focused enough, especially in the case of Area 3 – Digital, creative and inclusive community (interview 9).

A criticism underlined by the external experts is that the logic behind the priority setting does not fully emerge from the RIS3 document. As explained within the document, the three innovation areas identified result from the assessment of past policies, and are based on studies carried out by the regional administration and its agencies as part of the context analysis (Regione Puglia, 2014). But it is not explained by which mechanisms the selection process is informed by the EDP. Notwithstanding the advancements made in the latest versions (RIS3 December 2015 and RIS3 March 2016), the evidence and data collected are not systematised in a coherent methodology to select and refine the specialisation areas by identifying, within each, opportunities for potential or existing competitive advantages and the related needs in terms of digital growth, KETs and infrastructures (interviews 9 and 12). In addition there is a tendency, emerging in many other European regions, to confuse the identification of specialisations, i.e. those areas in which there is a potential competitive advantage that, to be exploited, requires the overcoming of a market failure, with the concept of excellence, i.e. sectors in which the region already has a competitive position and does not necessarily need public support (interview 9). Therefore, as a consequence of a process that, though evaluated by regional administrators as "*very rich and dynamic*(interview 1 - Regional Administration)"[39], remains, according to experts, "*not completely developed and strong in the adopted techniques* (interview 9 - EC Expert and Advisor for RIS3)"[40] within the Apulian RIS3 real choices do not emerge. Efforts in reaching a higher degree of granularity are made within the articulation of the specialisation sub-areas. For each, the document presents the specific vision, challenges and critical mass, including practical examples (Regione Puglia, 2014). Nevertheless, discussion stops at the identification of the potential development trajectories more than delineating real specialisation domains (interview 9).

5.2.2.1 From strategic orientations to Operational Programs

Apulia has adopted a multi-fund OP for the ERDF and the ESF. This choice is related to the ambition to favour a more systemic approach towards regional growth through the integration of

[39] Interview with public official of the Industrial Research and Innovation unit - Economic Development, Innovation, Education, Training and Labour department of the Regione Puglia; Bari, 23rd June 2015.
[40] Interview with European Commission External Advisor for RIS3; Skype call 20th June 2016.

resources dedicated to regional development with those targeted at social and human capital needs (interview 1). The OP was adopted by the European Commission with Decision (CE) n. C(2015)5854 of 13th August, 2015. The total budget is €7,120 million, of which €3,560 million of EU contribution. The ERDF budget amounts to €5.576 million, and 12.06% of which is allocated on TO1-R&I (€336 million) (Regione Puglia, 2015).

For Apulia, as for many other Italian and European regions, the identification of an effective policy mix represented the most difficult step in operationalizing the new agenda. The degree of coherence between the strategic and the operational level has been a weakness of the past programming period, which according to external evaluations is partly confirmed in the current one (Interview 9). In the perception of interviewed regional administrators, developing an OP that reflects and effectively implements the RIS3 strategic choices by synthetizing the emerging ideas and evidence of the EDP discussion into concrete policy propositions is a very difficult task (interview 1). The RIS3 envisages the definition of a new policy mix for each of the three selected innovation areas, proposing a list of priority actions, namely: the development of measures supporting research, innovation and competitiveness for large firms and their interconnection with SMEs in the area of sustainable manufacturing; the activation of the public demand in order to integrate competences and support SMEs in complex experimentations in the field of human health and environment; and the integration of tools supporting digital growth, new forms of production and new firms operating in the area of digital, inclusive and creative communities (Regione Puglia, 2014). But these considerations stop at the methodological level without going into depth on the reasoning behind the differentiation of tools and modes of delivery among areas and sub-areas (interview 9).

Looking at the OP, priority investments dedicated to the RIS3 deployment are found within Axis 1 - R&I, as required by the ex-ante conditionality, whilst within the other Axes, references to smart specialisation are less common. The OP includes a table linking the RIS3 innovation areas and goals with the addressed TOs. Yet when moving to the single Axis description, references to the RIS3 are weak (Regione Puglia, 2015). The weak coherence is considered particularly worrying by external advisors with reference to Axis 3 - SMEs competitiveness, where it is stated that the RIS3 innovation areas will be taken into account in the project selection as part of action 3.1.1 - Boosting the investment propensity of the productive system. Also, within Axis 11 – Enhancing institutional capacity, notwithstanding the need declared within the strategy to enhance administrative competences, no reference is made to the RIS3. Partial references are present within Axis 10 - Education and training; Axis 6 - Environment, cultural and natural resources; Axis 8 - Employment and labour market; and Axis O9 - Social inclusion, but without developing concrete policy propositions (interview 9). The evidence that the RIS3 strategic reflections do not appear

sufficiently operationalized into concrete intervention models nor transversally addressed through the whole OP, as the initial ambitious vision would instead have required, has been explained by the stakeholders interviewed, referring to both internal and external factors. The regional administration officials underlined that the region made the choice of maintaining a high degree of flexibility in the priority setting, and that such an approach has the merit of making the RIS3 a central element of the whole regional programming and potentially able to influence all the Axes of the OP (interview 1). Likewise, external advisors stress that when moving to the identification of actions necessary to acquire competitive advantage within each area, a higher degree of distinctiveness is necessary to better focus investments. Otherwise, the financial plan also risks not being clearly established, along with mechanisms for re-directing resources to new goals where necessary (interview 12). Furthermore, during the last year (2016) Apulia, like most Italian regions, has accumulated delays in launching the implementation phase and publishing the first calls which resulted in a significant shortening of the available programming period (interview 10). This has generated a sort of "*expectation, whose distortive effects on entrepreneurial behaviours and relationships with local stakeholders are starting to become visible, undermining the experimental character of the RIS3, as the first calls in favour of enterprises showed* (interview 9 - EC Expert and Advisor for RIS3)"[41].

5.2.2.2 Towards policy action: the translation into policy tools

In the regional administration's intention, RIS3 policy tools should be conceived in continuity with previous experimentations that the region intends to valorise and consolidate: "*the new agenda is mainly about revisiting, completing and renovating the existing innovation support repertoire* (interview 1 - Regional Administration)"[42]. Pre-existing policy tools such as pre-commercial public procurement; the ILO initiative to enhance the university-business liaisons, Program Agreements to strengthen private investment in existing enterprises, as well internationalisation and financial engineering instruments, were confirmed for the 2014-2020 period (interview 2).

As of January 31st 2017, two calls have been published to specifically support the development of innovation partnership mechanisms, i.e. Innonetwork and Manunet III, both funded under Axis 1, priority investment 1.6 - Strengthening the regional innovation system and collaborations among firms and research structures. The two measures support the creation of public-private technological

[41] Interview with European Commission External Advisor for RIS3; Skype call 20th January 2017.
[42] Interview with public official of the Industrial Research and Innovation unit - Economic Development, Innovation, Education, Training and Labour department of the Regione Puglia; Skype call, 17th January 2017.

partnerships by facilitating, in one case, the aggregation of existing firms and technological start up, and in the other the development of international projects. Another tool to be published in the first semester 2017 is InnoLabs (Axis 1, priority investment 1.4 - Interventions for the promotion of new innovation markets), which will be supporting the experimentation of innovative solutions and pilot actions in three strategic areas: Smart Communities, Knowledge Communities and Business Communities, through the adoption of the Living Lab approach (involving final users and research laboratories)[43]. Among the access criteria, the calls indicate that potential beneficiaries are required to: operate in one the RIS3 selected areas of innovation; and/or make use of the relevant KETs; and/or have an impact on one of the key societal challenges identified by the RIS3; and/or offer interesting internationalisation opportunities in the RIS3 areas[44]. But, as highlighted by external evaluations, the access rules don't allow their identification in an exclusive way (interview 9). Mechanisms to evaluate projects on the basis of the quality and innovativeness of the proposals, instead of referring to the sectorial specialisation of the beneficiaries are also not clearly established (interview 12). Additionally, the published measures address all the RIS3 specialisations together, rather than targeting one or few single domains; as a result, *"the degree of consistency between the so far implemented tools and the RIS3 principles is evaluated as partial* (interview 9 - EC Expert and Advisor for RIS3)"[45].

According to the public officials interviewed, positive advancements have been made in the integration with other funds, also thanks to the interesting declination assumed by the internationalisation theme within the region during recent years. The Regional Internationalization Plan 2013-2014 was designed in close synergy with the RIS3. The Plan underlined the need to better synchronize innovation and internationalisation policies by pursuing a convergence of goals. A key role is assumed in this respect by the regional productive districts during the RIS3 consultation phase (interview 4). Accordingly, the on-going implementation phase is characterised by the intensification of relations with other territories, looking for concrete spaces of cooperation and financial synergies around the RIS3 innovation area (interview 1). The region has been recently recognised as a reference site for the pilot initiative 'European Innovation Partnership in Active and Healthy Ageing' (EIP on AHA), launched by the EC. Apulia is one of the 74 EU inspirational

[43] Source: http://por.regione.puglia.it/bandi-aperti [Accessed on 31st January, 2017].
[44] Source: http://por.regione.puglia.it/bandi-aperti [Accessed on 31st January, 2017].
[45] Interview with European Commission External Advisor for RIS3; Skype call 20th January 2017.

ecosystems working on the integration of ageing policies with the Digital Agenda[46]. This is seen by the regional administration as a great occasion to make scaling up in the RIS3 area 'Human Health and Environment' (interview 1). The region is also lead partner of the Interreg-MED 2014-2020 horizontal project TALIA - Territorial Appropriation of Leading-edge Innovation Actions. The project started in October 2016 and is aimed at developing the cultural and creative industry focusing on open data and social innovation[47]. In the field of sustainable manufacturing, on the other hand, the region participates in the on-going Horizon 2020 project MANUNET III, a Joint Research Programme involving 26 EU Regions and Member States working on advanced manufacturing with a special focus on new production processes, adaptive systems and technologies for the factory of the future[48]. Moreover, the region is involved in the Citadel Horizon 2020 project on efficient project planning and services of public policies. The project aims to undertake cutting edge research into how emerging technologies can be used to empower citizens to transform public services and the public administration in their country[49].

5.2.3 Evaluation practices

The region can count on pre-existing competences in R&I monitoring. Initiatives such as the auto-evaluation exercise launched in 2010, the participation to the Interreg IV C project Scinnopoli around the issue of impact evaluation, and the pilot test on indicators as part of the national project held by the DPS Minister permitted to improve regional evaluation practices (Interview 3). Moreover, Apulia was involved in the project "New Tools for Innovation Monitoring" (NETIM) financed by the Horizon 2020 EU Programme and specifically aimed at developing effective and easy to implement practices for monitoring the delivery of public policies supporting innovation in SMEs (February 2016 – March 2017) [50]. The project was coordinated by ARTI Puglia, and implemented together with IFKA, the Public Benefit Non-Profit Ltd. for the Development of Industry (Hungary), and FUNDECYT-PCTEX, the Foundation FUNDECYT Science and Technological Park of Extremadura (Spain). This project permitted a step-forward to be made in the identification of ad hoc indicators for each RIS3 specialisation area. The latest version of the RIS3

[46] Source: https://ec.europa.eu/eip/ageing/home_en [Accessed on 31st January 2017].
[47]Source: http://www.sistema.puglia.it/portal/page/portal/SistemaPuglia/talia [Accessed on 20th January 2017].
[48]Source: https://ec.europa.eu/eip/ageing/home_en [Accessed on 31st January 2017].
[48]Source: http://www.sistema.puglia.it/SistemaPuglia/manunetIII2017 [Accessed on 20th January 2017].
[49] Source: http://www.citadel-h2020.eu/ [Accessed on 20th January 2017].
[50] Source: http://www.arti.puglia.it/wp-content/uploads/NETIM-leaflet_ITA1.pdf [Accessed on 1st March 2017].

(2016) proposes that, together with contest and program indicators, two macro categories of RIS3 indicators, and namely: impact indicators related to general sustainable development goals as defined by the strategy, which assess the evolution of the territory in its economic (regional GDP, employment, competitiveness), social (sustainable wellness), innovation (fast growing firms) and modernisation (digital alphabetisation) dimensions; and transition indicators related to the RIS3 drivers and expected changes declined for each selected priority area (interview 3). Transition indicators are innovation value chain specific and thus should allow for a better understanding of results produced by the policy within specific innovation areas relevant for the regional territory (NETIM, 2017). A system that rewards actors and projects able to achieve higher impacts and returns is also proposed. Furthermore, through ARTI the region is working on the creation of a new regional information system. The tool aims at re-designing the structure of regional portals through a unitary approach for the collection and management of data, in this way aiming at transforming the wide wealth of information into knowledge patrimony, and facilitating its evaluation (Interview 1). Nevertheless, evaluators underline that a better definition of road maps and measurable objectives is required in order to arrive to an effective identification of achievable output and result indicators for each RIS3 innovation area (interview 9).

5.2.4 The role of political commitment

Apulia is one of the few Italian regions, if not the only, in which the RIS3 process was characterized by a strong political commitment from the very beginning. The introduction of the agenda in 2012 overlapped with a period of deep economic crisis, which is reflected in an increasing demand for public intervention that presses the administrative system. But at the same time the strategy design phase benefitted from a very fertile and positive political moment, with the regional Government at the height of its power. The region simultaneously launched two processes: a political one, characterised by a strong political emphasis; and a participatory one, inspired by a bottom up and inclusive approach (interview 1). The region achieved an ambitious vision, built through a participatory methodology and nurtured by a high number of contributions and stimulus received by its innovation community, as already highlighted in §5.2. Apulia aims at building a region that is “attractive for foreign enterprises and young talent; competitive, thanks to the integration between different forms of technological, social and territorial innovation; inclusive towards disadvantaged actors; responsible in terms of the environment and its culture and traditions; connected to the national and international context, especially in the Mediterranean area; and integrated, in developing policies to achieve convergence and cohesion” (Regione Puglia 2014, p.13). The leadership assumed by the President of the Region in guiding the launch of the new

agenda is widely recognised as a positive element by the regional officials interviewed: "*the presence of a charismatic political leader with a clear vision has been essential to interiorise and diffuse the RIS3 principles, mobilising and attracting the relevant stakeholders even before entering the new programming phase* (interview 1 - Regional Administration)"[51].

Yet this initial enthusiasm is not fully transposed in the on-going implementation phase (interview 9). Its launch coincided with the political transition and the introduction of internal organisational changes following the regional political elections held on 31st May 2015. The ruling party has remained the same, and the composition and functions of the RIS3 team are confirmed. Nevertheless, a worrying slow-down in the strategy review and deployment processes is recorded by the external experts interviewed: "*The big challenge became maintaining what had been started* (interview 10 - EC Expert and Advisor for RIS3)"[52]. Guaranteeing continuity in the regional renewal process and consolidating a virtuous path towards a development model based on innovation, culture and ecological consciousness that still needs to fully show its concrete results has confirmed the key on-going challenge (interview 11). Moreover, it is stressed by advisors that a better declination of specialities as a result of the EDP and a more precise definition of implementation and evaluation tools would have been required in order to finalise the work so far done by the region. The main current risk is that in the absence of clear operative mechanisms, the RIS3 might not be able to orient the programming and act as a trigger to boost the whole productive system (interview 12, May 2016). "*Initial intuitions, such as the choice in interpreting the RIS3 concept of specialisation as areas of aggregation in order to facilitate cross-sectorial synergies, if not finalized through concrete policy prescriptions could turn into threatening elements. In June 2016 the ex-ante conditionality was still not completely fulfilled, and weaknesses persisted with regard to the identification of indicators, the quantification of resources, and the very definition of the areas of specialization* (interview 9 - EC Expert and Advisor for RIS3)"[53]. As a result, doubts are raised by international experts about the region's capacity to effectively deploy the strategy concern less impressive but more realistic approaches adopted by other regions (interview 10).

In the view of the public officials interviewed, the ability to put the RIS3 at the centre of the regional planning process, making it part of the daily life of the institution, will primarily depend on the degree of political awareness and, more precisely, on the ability to combine stable political

[51] Interview with public official of the Industrial Research and Innovation unit - Economic Development, Innovation, Education, Training and Labour department of the Regione Puglia; Bari, 23rd June 2015.
[52] Interview with European Commission External Advisor for RIS3; Brussels,12th May 2016.
[53] Interview with European Commission External Advisor for RIS3; Skype call 20th June 2016,

support with the capacity to insert positive discontinuities when necessary (interview 1). Delays were accumulated in publishing the first calls, which generated political pressure and a tendency to enlarge the audience of eligible projects and beneficiaries, with the risk of missing out on more innovative decisions (interview 9). "*Smart specialisation is a risky activity, which adds a lot of complexity when it comes to its implementation. But adopting conservative choices may lead to the loss of opportunities and an unrealistic evaluation of actual positioning and development potentials* (interview 11 –Academic Researcher and independent advisor on RIS3)"[54]. From the case of Apulia it clearly emerges that, as happened during the RIS3 design phase, the political attitude is the factor that will make the difference. The acknowledgment that smart specialisation is a concrete approach in optimizing the impact of the new round of ESIF, targeting measures towards better opportunities and maximizing synergies among EU resources, is in fact a political issue. The capacity of the region to spreading this message and guarantee active support will be fundamental to contributing to the credibility and effectiveness of the actions that are and will be proposed for its deployment (interview 12).

[54] Interview with university research associate and independent advisor on RIS3; Brussels, 12th May 2016.

CHAPTER 6. THE COMPLEX EXERCISE OF IMPLEMENTATION: SICILY AND THE CHALLENGE OF 'BREAKING WITH THE PAST'

The chapter presents the experience of Sicily in operationalizing the RIS3 agenda. The first part introduces the regional context in terms of socio-economic characteristics, innovation performance, the institutional landscape and past experiences in R&I policies. The second part discusses the on-going RIS3 practice making a distinction between the governance, the policy mix and the political challenges.

The chapter is informed by a documentary desk analysis and by qualitative interviews conducted between June 2015 and January 2017 to the following groups of actors: public officials of the regional administration and its agencies; exponents of the regional innovation system (firms and research institutions); external experts and scholars working on the RIS3 agenda at the national and EU level. A total number of 13 face-to-face and Skype interviews were conducted, involving more than one interview with the same person. Additional information is acquired through the direct participation of the author to public events (conferences, seminars, thematic meetings) and via email exchanges as follow-up to the interviews. In order to maintain confidentiality, the informants will be identified only by the typology of organisations and an approximate indication of the rank (e.g. regional executive, public official, university professor) and will be cited throughout the chapter according to the following codes (Figure 15).

Figure 15. Sicily: list of interviews

Interview	Organisation	No. of interviews
1	Regional Administration, Programming Department	2
2	Regional Administration, Evaluation Unit	2
3	Regional Administration, Productive Activity Department	1
4	University	1
5	Industry	1
6	Industry	1
7	Technological District	1
8	Business Incubator	1
9	Consulting Partnership	1
10	European Commission Expert and Advisor for RIS3	3
11	European Commission Expert and Advisor for RIS3	2
12	External Consultant and Researcher on RIS3	1
13	National Expert and Advisor for RIS3	1

6.1. Regional profile

6.1.1 Socio economic characteristics

Sicily is the largest Italian NUTS2 region, covering 8,5% of the whole national territory, and the fourth most populated, with almost 5 million residents (Eurostat data, 2016). Socio-economic indicators place the region in the group of European less performing regions (LDR), with a GDP/head falling below 75% EU27 average. The regional GDP is modest (87.1 billion), contributing to 5.4% of the national GDP, and the GDP per capita is among the lowest in Italy and well below the EU-28 average (Eurostat data, 2014). The region registers the second highest unemployment rate in Italy and among the highest in Europe i.e. 21.4% in 2015 (Eurostat data, 2015). As for Italy as a whole, between 2007 and 2011 the global crisis' heavy consequences on the labour market, especially for young people (age 15-24), for which unemployment reached 55.9% in 2015, compared to a rate of 37.2% in 2007. Sicily also shows amongst the lowest employed/inhabitants indexes in Europe (Eurostat data, 2016). The overall Regional Competitiveness Index is also very low (-0.96 in 2013). Sicily registers the worst result in Italy and is positioned at the very bottom of the EU being ranked 235 out of 262 EU regions (European Commission, 2013d).

Figure 16. Sicily: socio-economic indicators

Area square kilometre	25,833	(8.5% of Italy)
Population (2016)	5,074,261	(8.3% of Italy)
Regional GDP (million €) (2015)	87,383	(5.3% of national GDP)
GDP per inhabitant PPS (2014)	EU-28 average: 100 (27,500) Italy: 96 (26,400) Sicilia: 62 (17,000)	
GDP per inhabitant Euro (2014)	EU-28 average: 100 (27,500) Italy: 97 (26,500) Sicilia: 62 (17,100)	
Gross Expenditures on R&D per GDP (%) (2013)	0.89	Italy: 1.31
Unemployment rate in % (2015)	21.4	(Italian average: 11.9) (EU-28 average: 9.4)
RCI - Regional Competitiveness Index (2013)	-0.96	Development stage: 235 out of 262 EU regions

Source: Eurostat (http://ec.europa.eu/eurostat/data/database) [Accessed on 10th January, 2017].

The economic crisis of 2008 has locked Sicily into a recession even more severe than the national average. Impact in terms of job losses, decline of the internal demand and of the industry performances is exacerbated by the already fragile local production structure and by historical structural and cultural barriers related to the incidence of illegal activities of organised crime that

limit the growth potential of the region. Sicily is one of the regions in which the GDP has declined the most i.e. -13.1% in the period 2008-2014, compared to the national average of -9% (SVIMEZ, 2016). A slight sign of recovery was recorded in 2015 when, after eight years of recession, the regional GDP registered an increase of +1.5, the second best performance of the Mezzogiorno after Basilicata (ISTAT data, 2016)[55]. Nevertheless, Sicily exited the crisis with an economic structure whose obstacles to development seem even more consolidated than before in terms of low density of enterprises; deep crisis of the manufacturing sector; strong presence of the primary sector within the economy; and low incidence of high value added activities (SRM-Confindustria, 2015). According to the 2011 census conducted by the National Institute for Statistics (ISTAT), the region hosts about 271,000 firms employing 720,000 employees. The entrepreneurial density is the lowest in Italy (ISTAT data, 2011)[56]. Local enterprises are small, with an average of 2.7 employees per firm, and are chronically not inclined to network cooperation (ISTAT data, 2013)[57].

In terms of contribution to the regional GDP, the economic system is essentially based on services provided by public administration (29%), followed by financial intermediation, real estate and business (21%), and commerce (18%). Industry (9.3%), construction (5.5%) and agriculture (3.5%) instead make very slight contributions, especially if we consider that at the national level the industrial GDP weighs in at 18.3% while in Sicily it accounts for less than 10%, (ISTAT, 2012). Medium-large companies largely held by foreign capital and belonging to highly dynamic sectors (chemistry, ICT, pharmaceuticals, biotechnology, electronics) are also present in the region. These are concentrated in the most industrialised provinces of Catania, Palermo and Messina, which absorb 58.8% of the total work force of the island (European Parliament, 2015). Catania also hosts the region's scientific park, which includes companies specialized in ICT, biotechnology, pharmaceuticals, advanced materials and chemicals. Other important industrial areas are located around Messina, Syracuse and Gela (petrochemical industry), Mazara del Vallo in the province of Trapani (an important fishing port in Italy) and in the area of Trapani and Marsala (salt, tuna-fishing and wine production) (Regione Sicilia, 2016). But despite the presence of endogenous clustering, the regional entrepreneurial fabric is highly fragmented and affected by a low ability to orient towards high value-added sectors (SVIMEZ, 2016). The impacts of the crisis are also reflected in the rise of poverty and social disparities. Sicily is one of the poorest regions in Italy, with

[55] Source: http://www.istat.it/it/archivio/16777[Accessed on 14th November, 2016].
[56] Source: http://dati-censimentoindustriaeservizi.istat.it/Index.aspx [Accessed on 14th November, 2016].
[57] Source: http://www.istat.it/it/archivio/16777[Accessed on 14th November, 2016].

increasingly large sections of the population falling below the threshold of relative poverty (SRM – Confindustria, 2015). In 2011 more than 547,000 people registered an income below euro 1.011,03 (ISTAT data, 2012)[58]. This is made even more critical by the rising emigration trend of young and skilled people, and in the growth of the population-ageing rate. Demographic forecasts in 2030 indicate that the population will suffer a strong decrease and will be mostly composed of elderly people, placing the region at the top of the list of Italian regions affected by this challenge (Regione Sicilia, 2016; SVIMEZ, 2016).

Positive signals have been recorded in the tourism industry during the last 5 years. After showing a reduction in 2010, due to the strong contraction of domestic demand, since 2011 Sicily has started to improve its global positioning as a tourist destination, benefitting also from the reduced competition by some Mediterranean countries, such as Egypt and Tunisia. Flows, especially of foreigners, are rising, and in 2014 the number of arrivals in accommodation establishments amounted to over 4.4 million. Nevertheless, the tourism sector accounted for only 4% of the regional GDP and for 10,3 % of the total Italian GDP (Regione Sicilia, 2015a). This is mainly related to the underdeveloped infrastructural network (Istituto Tagliacarne - CNEL, 2014), and to the fact that tourism is concentrated in the summer seasons (European Parliament, 2015a). Export flows also showed a positive dynamic during recent years. The ability to export is the feature which discriminates regional companies which have survived the crisis, despite falling profits, from others at the risk of permanent closure. In 2012, 3.3% of Italian exports originated from Sicily, mainly from petrochemicals, chemicals, agribusiness and electronics (European Parliament 2015a). Particularly, the regional economy is characterised by some significant relationships in the US market in the field of chemicals, pharmaceuticals and mechatronics; with the French market for ICT; and with the Middle East (mainly Japan) for the electronics sector (Regione Sicilia, 2016).

6.1.2 Regional innovation performance

According to the Regional Innovation Scoreboard 2016, Sicily is one of the least innovative regions in Europe, placed in the group of moderate innovators i.e. those regions with a relative performance, as measured by the Regional Innovation Index on the basis of a series of indicators including the presence of competences and skills in the regional labour market, the quality of the research assets, SME's propensity to innovative and the level of expenditures in R&D, which is

[58] Source: http://www.istat.it/it/archivio/16777[Accessed on 14th November, 2016].

more than 10% below but less than 50% below that of the EU28 average. Since 2008, when it moved from the category of modest to moderate innovator, the innovation performance shows no signs of positive growth, having instead strongly decreased compared to 2014 (-14%), a trend that is in line with the rest of the Mezzogiorno, except for Apulia and Basilicata. The areas of relative strength, in which the region shows a relatively better placement compared to the EU28, relate to non-R&D innovation expenditures (highest value in the Mezzogiorno); SMEs with marketing or organizational innovations; and SMEs innovating in-house. The worst performances instead are found in the capacity of innovative SMEs to collaborate with others, which is even lower than in the other Mezzogiorno regions; the ability of patenting in hi-tech sectors, for which the region shows the worst value in Italy together with Calabria; and the percentage of population with a university degree, also lower that in the rest of the South (European Commission, 2016).

Figure 17.Sicily: RIS normalised data (0-1 scale, 1 for best performing regions and 0 for worst performing regions)

Indicator	Value
Population with tertiary education	0.199
R&D expenditure in the public sector	0.241
R&D expenditure in the business sector	0.195
Non-R&D innovation expenditures	0.409
SMEs innovating in-house	0.496
Innovative SMEs collaborating with others	0.043
EPO patent applications	0.106
SMEs introducing products or process innovations	0.471
SMEs introducing marketing or organisational innovation	0.419
Employment in knowledge intensive activities	0.459
Exports in medium-high/high tech manufacturing	0.253
Sales new to market and new to firm innovations	0.299

Source: Regional Innovation Scoreboard 2016.

Sicily shows many of the features of a weak RIS affected by organizational thinness. As defined by Tödtling and Trippl (2005) such type of system is characterized by an insufficient level of knowledge generation and diffusion, and by a low level of clustering. The latter feature, in particular, implies that the local firms are less specialized than clustered firms, that there is a low propensity towards networking and collective actions. The Sicilian R&I system is in fact characterised by the lack of stable interconnection between demand and supply side. Notwithstanding the presence of a good stock of excellence in some fields of research such as micro and nanotechnologies, sensors and new materials, intermediate actors connecting basic research with the market are missing, making it difficult to translate knowledge into innovation outputs (Curzio and Fortis, 2014; Regione Sicilia, 2015). The presence of major national public research

institutions and technology districts is not fully exploited. The region registers a low percentage of employees in R&D (1.7 per 1000 inhabitants) compared to Italy (2.8) and the European average (5.1) (Eurostat data, 2013)[59]. Moreover, there is a marked imbalance between the share of public spending in R&D as a percentage of GDP (0,8%) and the level of private investments (0.2%). Sicily's public spending on R&D is higher than the national average though significantly underperforming in terms of patents presented to EPO (European Commission, 2016).

6.1.3 Policy-context

6.1.3.1 Policy capabilities and quality of government

Sicily is one of the five Italian regions possessing a special status of autonomy recognised by the Italian Constitution (article 116), which is associated with particular forms and conditions of autonomy resulting from a higher degree of fiscal and political devolution. This entails a series of exclusive competences in fields such as agriculture, forestry, industry, trade and urban planning (Statute of the Sicilian Regional Government, Title II, Article 14), and full legislative competence on key policy areas such as regional transports and communication; public health and safety; healthcare; secondary and higher education; regulation of financial loans, insurance and savings; social affairs (labour relations, social welfare and care); agricultural taxes; provision of public services; and any other policy areas involving services at prevailing regional interest (Statute of the Sicilian Regional Government, Title IV, Article 17). Following the 2001 Reform of Title V, Article 117 of the Italian Constitution (Constitutional Law n. 3, 18th October 2001), which reviewed the vertical distribution of power, public planning has been radically reviewed between the national and regional NUTS2 level, in favour of the latter, Sicily, as happened for the other ordinary Italian regions, extended its skills in the field of industrial and innovation policy. Provided the observation of some fundamental principles set by national law in fields of particular national relevance that are still managed by the national Government - in correspondence with the beginning of the 2000-2006 programming period - the regional Government has assumed responsibility for the design and implementation of R&I policy. Opportunities offered by European funds and programmes, especially Cohesion Policy, have from the very beginning represented the principal resources for the re-launch of public and private investments in the region and, amongst these, for policies supporting innovation (Trigilia, 2012). As established by the regulations governing the ESIF 2014-

[59] Source: http://www.istat.it/it/archivio/16777[Accessed on 16th November, 2016].

2020 programming period, the multi-level management system is guaranteed by the signing of the Partnership Agreement (European Commission, 2013e), between the EC and the national and regional/local authorities and stakeholders. Horizontal coordination instead is assured through the Conference of Regions and Autonomous Provinces.

In face the consistent availability of national and European resources, Sicily has been known, throughout the last decade, for its low capacity to effectively spending EU funds. The region is among those that suffered most in terms of the capacity to use ESIF during the past two programming periods, especially in relation to the ERDF, where 43% of overall 2007-2013 resources (4,359 million euro) was still to be certified at the end of 2015[60]. The Sicilian socio economic context is historically characterised by the presence of non-economic factors such as low civic culture, high corruption and criminality that hampered its development potential and continue to represent a key barrier to the effectiveness of policies. The inability of local and regional public institutions to address these inefficiencies by furnishing the necessary collective goods and services and creating the context conditions required to stimulate firms' growth and innovation, has contributed to a very low perceived institutional quality of government (Trigilia, 2012). As a result, the region registers one of the lowest values in Europe in terms of Quality of Government index (EQI), ranking 216 out of a total of 236 observed regions, and placed well below the national average, though in line with the rest of the Mezzogiorno, recording the second best result after Basilicata (Charron et al., 2015).

Figure 18. Sicily: European Quality of Government Index (EQI)

NUTS code	Name	EQI (2010)	EQI 2013	EQI100 (2013)	Rank (2013)	EQI 2013 Italy
ITG1	Sicilia	-1.767	-1.588	19.67	213	-0.93

Source: Charron et.al. (2014, 2015)

6.1.3.2 Path dependence: the history of regional innovation policy

Innovation as policy theme has a relatively short history in Sicily. Up to 2000 there was almost no regional role on R&I issues. The first innovation strategy was developed during the 2000-2006 programming period. Yet, the document was modelled on a traditional system of incentives and aimed at addressing the endemic scarcity of infrastructural assets of the region rather than

[60] Source: www.opencoesione.gov.it/ [Accessed on 15th November, 2016].

qualifying the regional economic and social context through more system-based policies. A first change in the attitude towards the innovation theme is recorded within the Regional Innovation Strategy 2007-2013 (*Strategia Regionale per l'Innovazione 2007-2013* approved with DGR No. 225/2008), which represented the reference document for the implementation of interventions under the ERDF OP 2007-2013, Axis IV. The Strategy proposed a renewed priority setting by identifying a list of strategic sectorial investment priorities, namely: ICT, energy and environment, agro industry, advanced manufacturing systems, chemistry, transport and logistics, advanced materials and nanotechnologies and health and life science; and focused on the activation of potential synergies among national, regional and local resources. Particular attention is also put on the governance issue stressing that "the organisational structure of the Region had significantly impacted on its implementation capacity during the 2000-2006 period" (Regione Sicilia 2008, p.205). Together with the low level of collaboration between the administrative level and the regional scientific and business community, due to the presence of information asymmetries, the inefficiency of governance practices is highlighted as the main negative lesson from the past and therefore a key challenge to be addressed in order to improve the capacity to use EU funds in the future. As a response, the 2007-2013 Strategy suggested the establishment of an ad hoc department within the regional administration responsible for the RIS governance. The document also advanced a first reflection on the need to integrate measures supporting the development of networks among innovation stakeholders with more proactive interventions aimed at qualifying the innovation demand of regional firms and businesses (Regione Sicilia, 2008). For all this reasons, in respect to previous approaches, the Sicilian 2007-2013 R&I Strategy was evaluated by external advisors as a policy document of high quality both in the analytical approach and in the policy argumentations, and considered a great basis on which to build the RIS3, as confirmed by interviews (interview 10). Besides, evidence shows that the quality of strategies was not always correlated to the capacity to effectively deliver policies within the region. Even the drafting of policy documentation of note has rarely led to successful accomplishments, up to the point of not being translated into action at all, as confirmed by interviewed regional officials and external experts and advisors (interview 1; interview 10). During the last two ESIF programming phases, system-based policies were designed to create the necessary context conditions to enhance the regional innovation performance. Amongst these, the development of technological districts, whose establishment was promoted by the national level with the aim of modernize the pre-existing system of Italian regional industrial districts through the enhancement of the innovation and technology dimensions. Technological districts take the form of strategic partnerships (consortia) between national or international high tech enterprises (large or small) and public research institutions, committed to cooperating to

produce technological innovation, with a view of becoming poles of excellence at national and international level in both traditional and innovative sector centres. Technological districts are also characterised by a strong territorial dimension according to a model that in many ways could be considered a prototype of a place-based innovation policy, aimed at reproducing, in the field of R&D, activities and benefits of spatial continuity already explored through the industrial district (Barca, 2009). The constitution of a technological district is proposed at the regional level but is subject to evaluation and approval by the Italian Ministry for Education, University and Research (MIUR). Since 2004, the regional government also prompted the formalisation of productive districts (Regional Law 28/2004). Sicilian productive districts are defined as integrated systems of enterprises composed of at least 50 firms and 150 employees, characterised as productive, technological or service inter-connections, which decide to collaborate in the elaboration of strategic development plans to enhance their growth and development potentials. Productive districts are officially recognised by the regional department for Production Activity. Among the established criteria, participating firms have to be part of a vertical or horizontal production chain which might be dislocated across territories, also outside the region, and involve relevant stakeholders such as public institutions, consortia, productive association (Regional Law 28/2004). The creation of business incubators offering targeted services and support to start up as well as ILOs and university spin-offs with distinctive competences also go in the direction of addressing the regional innovation system inefficiencies and enhance the relational and networking capabilities among key stakeholders (Regione Sicilia, 2016).

Nevertheless, except for some positive results obtained through the activated SME support scheme, interventions have led to marginal spill over effects. There was no particular evidence of performance in terms of patents or spin-offs, nor improvements in the overall regional capacity to produce innovation (Regione Sicilia, 2016). Moreover, as clearly highlighted by the Sicilian RIS3 in the ad hoc section dedicated to 'Lessons from experience' (Regione Sicilia 2016; p.60) and underlined by the field work through interviews with regional officials (interviews 1 and 2) and the business incubator referee (interview 8), there is a list of planned interventions that have not been enacted at all, such as the systematisation of the normative framework of innovation incentives; the activation of a specific regional fund to support patenting; the development of supporting measures for innovative start-ups, as well as technological audits and e-business solutions of SMEs. Limited attention has also been paid to the enhancement of services for citizens and, more generally, to stimulate the innovation demand through bottom-up actions such as digital alphabetisation. The incomplete consolidation of a proper governance model with which to coordinate the different European and national tools, and the limited administrative capacity both in terms of the quantity

and quality of available skills, remain, according to interviewed actors from both the public and private sector, the key factors affecting the history of regional R&I policies. Sicily is a complex context historically characterized by the absence of proper relational assets due to the presence of strong informal institutional arrangements, antagonistic networks and diffuse corruption, which are very difficult to capture and to intervene in (Trigilia, 2012). During the past two funding phases, the policy-making process was conceived in a very traditional way. The regional administration has not been able to define responsibilities and a common vision because the process has not really been shared and the territorial innovation community have not really participated. Horizontal coordination between regional departments and vertical coordination with the national Government has also been inadequate, resulting in the fragmentation of competences and functions. As a result, strategies were affected by "an insufficient concentration of resources on a limited number of priorities, and public support to the development of a proper RIS resulted as inadequate and not in line with the firms' needs, further undermining trust and credibility in the public sector" (Regione Sicilia, 2016; p. 60). Though not completely starting from scratch, in the case of Sicily the necessity to break with the past is, from the very beginning, considered the main challenge connected to the introduction of the RIS3 process by the regional administrators (interview 1). The region enters the on-going programming phase with a strong need for change, especially as far as the public sector's role is concerned (Regione Sicilia, 2016).

6.1.4 Institutional landscape: RIS3 organizations and actors

The most relevant actors and organisations in view of the Sicilian regional innovation system are listed below.

Public sector pillar

The regional institutional structures in Sicily are the Regional Assembly (*Assemblea Regionale Siciliana*) and the Regional Government (*Giunta Regionale*), which is composed of the President of the region (*Presidente della Regione*) and the Ministers (*Assessori*). The Regional Assembly exercises legislative power, whilst the Regional Government represents the executive[61].

[61] Source: pti.regione.sicilia.it/ [Accessed on 3d October, 2016].

Higher Education and Public Research pillar

- 4 Universities, namely: University of Catania, University of Messina, University of Palermo, and the recently funded (2004) public-private institute Kore in Enna (Regione Sicilia, 2016);
- Public research institutions, including the National Research Council (*CNR)*, the National Institute of Nuclear Physics (*INFN*), the National Institute of Geophysics and Volcanology (*INGV*), the National Agency for New Technologies, Energy and Sustainable Development (ENEA), the Council for Research and experimentation in Agriculture (*CRA)*, the National Institute for Astrophysics (*INAF*) and the Institute for Environmental Research and Protection (*ISPRA*) (Regione Sicilia, 2016);
- 2 public private laboratories: the Wyeth Lederle laboratory, and the Oncology Technologies Hsr Giglio and University of Messina Laboratory (Regione Sicilia, 2015);
- 8 technological districts operating in the following fields: biotechnologies for agro-food and fishing (*AGROBIOPESCA*); maritime transportation and logistics (*NAVTEC)*; micro and nanotechnologies (*MICRO AND NANO SYSTEMS*); human health and biomedicine (*BIOMEDICO)*; advanced materials (DISAM); marine environment and resources (*AMAR*); cultural heritage (*DTBC)*; and advanced manufacturing (*ENLAB*) (Regione Sicilia, 2016);
- 1 Technological and Scientific Park located in the province of Catania, which takes the form of a consortia in which the Regione Sicilia and regional Universities, research centres and firms operating in traditional strategic sectors such as agro industry, environment and cultural heritage, as well emerging ones such as ICT, biotechnologies, bioenergy and advanced materials participate. The Park's constitution was launched in 1991 and became a physical network-based structure in 2001. Its mission is to enhance regional competitiveness through research, innovation and technology transfer activities. It is conceived as an interface between the business and the research world, as an instrument of excellence to build, share and fertilise new knowledge. The Park coordinated the establishment of the Biomedical district, which includes 51 actors (firms, research centres)[62].

[62] Source: www.pstsicilia.it/[Accessed on 3d October, 2016].

Firms pillar

- Few high-quality science-based large firms mainly held by multinationals and operating in the following main fields: electronic, pharmaceuticals, biomedical and biotechnologies, ICT and industrial systems, energy, agro industry;
- 23 productive districts, of which 11 operate in the agro food sector (including fish products and non-food activities) and 12 in the industrial sector (including craft activities)[63];
- 7 Business incubators of which: 2 located in Palermo (Consorzio Arca and LATI); 3 in Catania (Sol.Co., Working Capital Italia and Sviluppo Italia Sicilia); 1 in Messina (Sviluppo Italia Sicilia) and 1 in Siracusa (Impact HUB) (Regione Sicilia, 2016).

6.2 Analysis of the smart specialisation practice

The regional RIS3 process was formally launched in March 2013 through the public seminar "Sicily towards Smart Specialisation. The Role of Innovation in the 2014-2020 period" held in Palermo. The event involved regional public administration officials from various departments and exponents of universities, firms and external experts. Between March 2013 and July 2014, when the first draft of the strategy was completed, the region put in place a rich program of activities aimed at building the RIS3 partnership, as highlighted in Figure 19.

The first version of the RIS3 was formally adopted by the Regional Government in February 2015 (DGR n. 18/2015). This was followed by successive reviews and updates during 2015 (March and July), which led to the version approved by the EC in August 2015 with Decision C(2015) 5904. In line with the requests of the EC and the requirement to fulfil an Action Plan by the end of 2016, the strategy was further reviewed during 2016. A new version was developed in June 2016, which was formally adopted by the regional Government in November 2016 (DGR n.375/2016) and currently represents the reference document for the RIS3 in the region.

The review activity was based on the EDP evidence and focused on the translation of the RIS3 strategic choices into operational terms. Important advancements were made throughout the different versions with regard to the following elements: specification of the general objectives and quantification of the related actions, resources and targets; identification of the governance responsibilities; definition of an ad hoc monitoring and evaluation system including an effort to

[63]Source: http://pti.regione.sicilia.it/portal/page/portal/PIR_PORTALE/PIR_LaStrutturaRegionale/PIR_AttivitaProduttive/PIR_DipAttivitaProduttive/PIR_Distrettiproduttivi [Accessed on 3d October, 2016].

define the targets for each indicator. The introduced changes were submitted on a regular basis for the attention of the EC, the national MISE/MIUR Ministries, to the Regional Government and for appraisal by the innovation partnership.

Figure 19.The process towards RIS3 Sicily

<table>
<tr><td rowspan="2">Launch of the RIS3 process</td><td colspan="2">The creation of the RIS3 interdisciplinary task force (February 2013)</td></tr>
<tr><td colspan="2">Launch event “Sicily towards smart specialisation. The role of innovation in the 2014-2020 period” (March 13, 2013)</td></tr>
<tr><td rowspan="13">The RIS3 partnership building process</td><td rowspan="4">4 Thematic Focus (TF)</td><td>TF on social innovation</td></tr>
<tr><td>TF on the role of knowledge intermediaries</td></tr>
<tr><td>TF on financial instruments</td></tr>
<tr><td>TF on SMEs demand for innovation</td></tr>
<tr><td colspan="2">Individual audits and meetings with key stakeholder</td></tr>
<tr><td rowspan="3">Informative days</td><td>Patents and intellectual property (30 January, 2014)</td></tr>
<tr><td>HORIZON 2020 (28 February, 2014)</td></tr>
<tr><td>Pre-commercial procurement (26 March, 2014)</td></tr>
<tr><td colspan="2">On line community</td></tr>
<tr><td rowspan="2">Thematic working groups</td><td>Launch of six working groups on: agro-food; sea economics; energy; life science; smart cities and communities; tourism, culture and BBCC (8-9 May, 2014)</td></tr>
<tr><td>Restitutions from working group activities (5-6 June 2014)</td></tr>
<tr><td colspan="2">National and international activities (S3 Platform and national meetings)</td></tr>
<tr><td rowspan="2">Communication events</td><td>Inter-regional event "Innovation and smart specialisation: strategic priorities, participatory processes and network building" (December 2, 2013)</td></tr>
<tr><td>Regional event "The process of Sicily towards RIS3: first results and next steps" (April 28, 2014)</td></tr>
<tr><td colspan="3">First RIS3 version (July 2014)</td></tr>
</table>

Source: http://www.euroinfosicilia.it/programmazione-20142020/livello-regionale-po-sicilia-2014-2020/strategia-regionale-dellinnovazione-2014-2020/ [Accessed 20th November, 2016]

6.2.1 The governance challenge

In Sicily the main responsibility for the design and implementation of the RIS3 is maintained within the public administration, without delegating to external bodies or consultants. During the strategy design phase the RIS3 governance systems consisted of an interdepartmental working group created in 2013 within the regional Programming Department. In order to favour transversal interconnections, the RIS3 working group involved technical administrative resources with multidisciplinary skills from different regional departments, namely the Productive Activities Department, the Budget Department, the Social Policies Department, the Health Department and the Agriculture Department. It was also constantly supported by experts from the regional evaluation unit (Nuval) and from the national agency FormezPA, acting as facilitators to the

capacity building process. The group took responsibility for the following functions: activation of the EDP; development and management of the activities involving the stakeholders; and coordination with other competences within the regional structure.

The leadership of the RIS3 deployment instead moved to the department of Productive Activities. In March 2016 with Regional Law n.77/2016 the regional Government formalized the creation of a RIS3 Technical Coordination Unit located within the Department of Productive Activities. The Unit is responsible for the RIS3 implementation, evaluation and communication, and will be supported by a Steering Group composed of representatives of the public sector, business world, universities and research institutes, knowledge intermediaries, civil society organizations and external experts, selected on the basis of their knowhow and competences, and by permanent thematic working groups for each of the RIS3 innovation areas, involving scientific competences, both under adoption.

The RIS3 governance model is conceived by the regional administration as an on-going process built on the specificities of the regional context and aimed at promoting a sense of ownership of the process together with clear responsibilities. As clearly stated within the document, the innovation community will be involved in the different phases of the RIS3 policy cycle, from the design to the implementation and review phase (Regione Sicilia, 2016). This, or at least the intention, represents a radical novelty for Sicily. As highlighted by the regional official interviewed from the Programming Department, *the EC requirements stimulated from the very beginning a rethinking of existing governance mechanisms both within the regional administrations and in the means for stakeholder* (interview 1 – Regional Administration)[64].

6.2.1.1 Intra-organisation learning: a new role for the public sector

The RIS3 document is based on a critical evaluation of past experiences, especially as far as the public sector's role is concerned. The region started with a sound analysis of the existing situation in terms of scientific, technological and economic specialisations. As underlined by interviews with the regional executive responsible (interview 1), there was a strong need for knowledge of the context, given that in the past the investigations conducted, though broad and detailed, were shown to be "unable to identify existing territorial excellences nor priority sectors on which to concentrate efforts, determining an ineffective distribution of actions and resources" (Regione Sicilia 2016, p.

[64] Interview with regional executive of the Programming Department of the Regione Sicilia; Palermo, 1st July 2015.

60). The context analysis proposed within the RIS3 instead is based not just on traditional methodologies such as SWOT, forecasts and trend analysis of existing data but also on structured meetings with key stakeholders aimed at enriching the inquiry with qualitative elements. Particularly, the four regional Universities and the CNR research institute were actively involved in the first mapping exercise, which led the development of a database of existing R&I capacities in different scientific and technological domains, and to an update of the 'state of the art' of existing research facilities and their degree of accessibility (Regione Sicilia, 2016).

As part of the auto evaluation process an interesting reflection on past mistakes is encouraged. A specific paragraph of the RIS3 document is dedicated to the analysis of 'Lessons from past experiences' (Regione Sicilia 2016, p. 60), a choice which signals a clear will on the part of the regional administration to address the RIS3 challenge according to a responsible and conscious attitude, which is evaluated as particularly appreciable by external advisors, especially in the Sicilian context (interview 10). The retrospective analysis focused on the reasons that have determined non-fulfilment of many financed projects. Inefficiencies of past programming periods were highlighted as the consequence of the limited internal administrative capacity. This generated an insufficient concentration of resources on priorities and a fragmentation in the management of the different OPs (Regione Sicilia, 2016). As confirmed by the field work (interviews 1 and 2), in the regional administration's opinion enhancing internal capabilities is one of the key challenges to succeeding within the RIS3 agenda, and requires the strengthening of the quantity and, even more importantly, the quality of human resources. The perception of most of the interviewed regional agents is that they live and work in a difficult region, which suffers from a long-standing crisis and historical development problems but also has great strengths to be exploited. The quality of public administration is essential to create the conditions for promoting, developing and increasing the necessary relational assets to trigger new or renewed activities and skills in the region.

The region initially encountered difficulties in fulfilling the EC requirements and has been among the last of the Italian regions to complete and approve the RIS3, together with another two Mezzogiorno regions, Campania and Calabria. But according to the interviews with external evaluators and experts (interviews 10, 11 and 12) in a second moment improvements have been remarkable: *the experience of Sicily emerges for its engagement in carefully managing the process on the part of the RIS3 interdepartmental group. The responsibilities for setting up the EDP and drafting the strategy are maintained within the regional structure without delegating to external*

experts or other entities outside the administration, thus implying a strong internal learning dimension (interview 10 – EU Expert and Advisor on RIS3)[65]. Moreover, according to evaluators, the Sicilian RIS3 process was positively influenced by the presence of few so-called local heroes i.e. active public officials that from the very beginning believed in the strategy and created the internal conditions for learning, generating motivation and commitment on the part of the other members of the regional administration.

According to the interviewed regional officials (interviews 1 and 2), the RIS3 design has been extremely challenging, requiring the introduction of radical discontinuities, when compared with past routines. Firstly, a more collaborative and inclusive approach has started to replace the old bureaucratic public sector attitude. For the first time the regional administration has tried to play the role of animator and connector putting itself 'within the process' and promoting a more pervasive approach to innovation, not necessarily focused on science and technology. Due to the EC requirements the public sector cannot decide by itself anymore. The RIS3 must be based on the stakeholder needs i.e. on the capacity to listen and cooperate with them during each stage of the process. The need to gain trust from the other three helixes has resulted in a critical rethinking of the region's role, requiring the regional administration's capacity to capture and systematise the dispersed knowledge and promote the emergence of new opportunities. Secondly, a change in the decision-making process occurred. In comparison with previous experiences, the RIS3 drafting was inspired by a higher degree of openness towards co-decisions with public and private actors such as incubators, innovative start ups, young entrepreneurs, social innovators and civil society. In order to guarantee transparency for the first time the progress made during the strategy-making process were made accessible to the public through specific communication tools, and particularly the launch of the #Open FESR online community[66]. Thirdly, the interdepartmental group leading the design phase, with national and European support, guided the process using a collective leadership approach, which improved, and sometimes initiated, a constructive dialogue between regional departments that were not used to cooperate before. The roles and responsibilities of the single departments were discussed through interdepartmental meetings conducted between January and June 2014 from which a strong need to encourage contamination among different funds (ERDF, ESF; EAFRD, CF) and better synchronise the RIS3 with the OPs architecture emerged (Regione Sicilia, 2016).

[65] Interview with European Expert and Advisor on RIS3; Skype call, 20th July 2015.
[66] Website link: http://commenta.formez.it/ch/openfesr/

As a result, according to regional officials interviewed, the RIS3 allowed a move forwards in building a strategic public-private regional innovation partnership by generating a sense of ownership both within and outside of the regional structure. Building up trust in the public sector was a key goal of the regional RIS3 process (Regione Sicilia, 2016). At the same time, developing credibility in the public sector was highlighted as a long-term process that needs time and continuity: *even if there is a perception that through the RIS3 process something different is happening, the initial enthusiasm and curiosity towards the novel approach, if not supported by permanent transformations, won't be enough to start an irreversible process of improvement* (interview 3 – Regional Administration)[67]. In this respect the institutionalisation of the governance model as a stable area of activity within the regional structure and not just as a temporary service is regarded by the regional officials interviewed as the most critical step to achieve in order make the RIS3 exercise really helpful and consolidate the important learning process that is occurring within the regional administration. In their perception, the weak ESIF absorption capacity of the past was mainly related to institutional deficits and the fear of failing is still high. The region feels the responsibility of the expectations that the RIS3 has created in the innovation community: as highlighted in the interview with the regional executive of the Productive Activity department responsible for the strategy implementation: *the Sicilian RIS3 exercise entails some very elements of a good practice, emerging as a useful working method to orient the regional system towards excellence. The issue is to put all this into practice* (interview 3 – Regional Administration)[68]. This explains the regional choice to temporarily put the stakeholder involvement process on stand-by after the RIS3 formal approval by the EC in August 2015. Following the fulfilment of the ex-ante conditionality, efforts were concentrated on the review of the strategy and the definition of policy tools. Meanwhile, the RIS3 team structure was partially modified. In March 2016, the RIS3 leadership passed to the regional Productive Activities Department under the supervision of a new public official, which in turn led to a redistribution of responsibilities and resources among departments. According to external advisors, this was partly responsible for the slowdown in the process (interview 10).

The RIS3 implementation phase was publicly re-launched at a two-day event held in Palermo on April 13th and 14th, 2016, which saw the presence of a wide range of innovation actors from the

[67] Interview with regional official of the Evaluation unit of the Regione Sicilia; Palermo, 1st July 2015.
[68] Interview with regional official of the Productive Activity Department of the Regione Sicilia; Palermo, 14th April 2016.

research and business world[69]. On this occasion the regional administration presented the RIS3 and ERDF OP 2014-2020 action plan. In order to reinforce and integrate its administrative capabilities and competences during the on-going strategy deployment phase, the regional government recently enacted two measures. In June 2016, as part of the RIS3 governance model, the so-called Roster tool was launched,[70] which is aimed at creating a list of national or international experts (the call is also published in English) from the research and business world with technical skills in each of the RIS3 technological domains to be involved in the project evaluation. The tool was evaluated by the regional referee interviewed (interview 2) and by the external advisor (interview 10) and is considered a good example of the willingness to integrate the administration's expertise with high level technological and industrial competences for each RIS3 domain, that can allow effective assessment of applications based on the innovativeness and quality of proposals. Moreover, as part of a technical assistance service coordinated by the national agency Formez PA (Formez public call no.320/2016 *"Supporto transitorio per chiusura programmazione 2007 – 2013 e start up 2014 - 2020" Linea B*)[71] in July 2016 the regional administration also recruited a taskforce of junior and senior external consultants, who are currently supporting regional officials in the RIS3 operational phase.

6.2.1.2 Intra-system learning: rationales, mechanisms and tools for the involvement of stakeholder

The RIS3 ex-ante conditionality was, from the very beginning, interpreted by the regional administration as an opportunity to set up a more collaborative policy-making process at the system level (interview 1). As stressed by the interview with an EU expert and advisor on RIS3, *the Sicilian RIS3 process is in its form and contents one of the most interesting for completeness and originality of the proposed ideas, evidencing the regions effort in addressing particularly difficult issues such as social innovation and the very idea of entrepreneurial discovery process*" (interview 10 – EU Expert and Advisor)[72]. The EC requirements stimulated the identification of new tools for

[69] http://pti.regione.sicilia.it/portal/pls/portal/docs/145059481.PDF
[70] Source: http://pti.regione.sicilia.it/portal/page/portal/PIR_PORTALE/PIR_LaStrutturaRegionale/PIR_AttivitaProduttive/PIR_DipAttivitaProduttive/PIR_Ricerca_innovazione/Bando%20Roster%20Esperti%20S3%20-%20finale%20-%20correzioni%20approvate.pdf [Accessed on 20th October, 2016].
[71] Source: http://www.euroinfosicilia.it/avvisi-pubblici/progetto-supporto-transitorio-per-chiusura-programmazione-2007-2013-e-start-up-2014-2020 [Accessed on 20th October, 2016].
[72] Interview with European Expert and Advisor on RIS3; Skype call, 5th July 2016.

stakeholder inclusion within the regions, overcoming traditional negotiation mechanisms, and the identification of new relevant actors to be involved. EU experts interviewed (interviews 10, 11, 12 and 13) agree that the process was designed by the regional administration with a significant degree of innovativeness when compared with previous experiences, and characterised by the adoption of a rich set of tools to directly involve stakeholders and activate and deactivate them according to their contributions through the different phases of the RIS3 design. More precisely, the consultation phase was articulated through the following principle activities, which informed the final RIS3 document:

- 4 Thematic focuses on key issues namely: social innovation; knowledge brokers; innovative financial tools; SMEs innovation demand;
- Individual audits with targeted actors i.e. leader enterprises, major research centres and universities, SMEs representatives;
- 3 Informative events on specific topics, namely: intellectual property rights, Horizon 2020 and pre-commercial procurement;
- An on line community (#Open FESR)[73] activated in June 2014, to directly collect project reflections and contributions from the civil society; particular attention was given to the construction of a shared RIS3 vision through the launch of a competition of ideas on the theme of "Innovation in Sicily in 2020 is...";
- 6 thematic working groups to guide the priority setting involving representatives of the regional departments, research and enterprise world. National experts and facilitators had the possibility to provide concrete contributions to the different areas of specialisation; compared to more traditional consultation tools, this methodology was inspired by a greater degree of operability. Discussions focused on the identification of priorities and means of implementation to be systematically collected and organized within road maps. The more than 350 proposals received were categorised into sub-areas and niches in order to reach a higher degree of granularity and avoid duplications or overlapping, facilitating, instead, collaboration and integration opportunities. As expressed within the RIS3 document, the thematic working groups encouraged the identification of regional potential, leading to confirmations and denials e.g. it allowed identification of the region's relevant KETs, those able to achieve significant critical mass in terms of industrial research or widespread

[73] Source: http://commenta.formez.it/ch/openfesr/

> applications in the manufacturing and commercial sectors, namely micro e nano electronics and biotechnologies for human health; and to discover a host of interesting young start-ups operating in the field of social innovation (Regione Sicilia, 2016).

Moreover, as part of the partnership building activities, the regional administration made the effort to mobilize new actors, who were not usually represented by the traditional routes of consultation, with the aim of starting new partnerships inside and outside the region. More than 1,500 individuals, firms and stakeholder organizations were involved in the strategy design. These included not just public administrators, universities, research institutes or business representatives but also start up, business incubators, financial institutions (credit institutions, venture capital, business angels) and social innovators (Regione Sicilia, 2016). Particularly innovative was the methodology adopted to nurture the EDP in the field of social innovation. As explained by the interview with a regional consulting partnership located in Palermo (interview 9), in order to explore the reality of social innovation within the region, a Google Drive tool freely accessible to all those who 'felt they were social innovators' was launched in 2014. After initially creating a certain degree of displacement, being a completely new approach, the tool allowed discovery of more than 30 project ideas and innovative realities that were unknown to the regional administration, namely start-ups founded, principally, by young entrepreneurs operating in the field of smart cities, health care, food redistribution, among others. The Google Drive game was followed by the organisation of two more structured workshops aimed at capturing the innovation community's expectations from the implementation of the new agenda. As underlined during the interview, *this exercise represented a great novelty. Firstly, it promoted awareness of the fact that 'social innovation in Sicily already exists' and represents a valuable humus to be exploited; secondly, actors without any previous experience and competence in the policy planning fields were for the first time involved in the definition of policy tools and measures, which represented a challenging and stimulating task* (interview 9 – Consulting Partnership)[74].

According to regional officials (interview 2), and confirmed by interviews conducted with business incubators and firms (interviews 5, 6, 8 and 9) a determinant factor for the effectiveness of the partnership building activity was presence at the system level – as it happened within the regional administration - of a critical mass of committed and knowledgeable persons as part of the civil

[74] Interview with founder of a consulting partnership; Palermo, 5th July 2016.

society and the business world, who spread their enthusiasm towards the new agenda across their communities.

In terms of achievements, the actors interviewed mentioned both tangible and intangible results. Among the concrete outcomes cited by regional officials (interview 1 and 2): the discovery of new fields of action, ideas and projects that were unknown or underestimated, such as in the case of the activism registered in the field of social innovation thanks to the adoption of the innovative Google Drive tool; the identification of specific lines of action to be fostered, such as the measures supporting and qualifying the innovation demand of SMEs, thanks to the contributions captured through the involvement of start-up, incubators, investors, associations and consortia, that were usually not involved in the strategy making process; and a better understanding of potentials related to technological developments thanks to knowledge contributions by large firms and SMEs. But even more relevant, among the positives, stakeholders interviewed from both the business and the research world highlighted the feeling that a cultural change has started to take place within the region. During an interview with a University professor (interview 4), for example, it was stressed that the openness and availability demonstrated by the regional administration has contributed to building relational capital in both the private and the public sector. This is seen as particularly significant given the initial diffidence towards the public sector's actions and the historical low level of aggregative capacity of its innovation actors. According to those interviewed, though without yet assuming concrete forms, advancements have been made in the dialogue with Universities and research institutes, almost absent before. In Sicily in fact, the responsibility for development has been historically maintained within the public sector, and regional research institutions and universities were only allowed to play a secondary and integrative function. The introduction of the RIS3 agenda is helping to start to overcome this limit by *opening the negotiation rooms and visibly intensifying the sharing of knowledge and experiences. New links between the participants are generated, increasing the likelihood for the development of cross-sectorial partnerships* (interview 4 - University)[75].The increase in the degree of transparency that characterised the consultation process was also particularly appreciated, and namely the fact that materials, including single contributions were for the first time constantly shared and published on the website. Moreover, the regional administration's choice to start the strategy design process from the evaluation of existing assets such as regional productive districts is highlighted and signals an

[75] Interview with University professor; Palermo, 13th April 2016.

important step forward in moving from a dissipative towards a generative regional economy, as explained by the interview with the University (interview 4). A new awareness of innovation issues also emerged through interviews to firms and related institutions (interviews 5, 6 and 8), though according to the external advisors interviewed (interview 10 and 13) some key partners are still missing, especially with reference to some key productive sectors, and the presence of regional stakeholder results still biased on the supply side, more than the demand side.

Among the negatives, the fieldwork suggested that temporary interruptions of the stakeholder consultation process, which followed the EC RIS3 approval in August 2015 and lasted till the re-launch of the implementation phase in April 2016, was perceived by the innovation community as a worrying signal. Delays in formalising the governance model and setting out the monitoring system could undermine *the capacity to timely deploy the strategy through an effective mix of policy tools with the risk of losing the important relational capital that has been accumulated through this intense partnership dialogue* (interview 8 – Business Incubator)[76].

Expectations expressed by the regional stakeholders interviewed are high. RIS3 is seen as a concrete tool to re-orient research towards more marketable results able to support young entrepreneurs and promote professional networks, as underlined by the interview with a business incubator (interview 8). Firms and their aggregations instead aim at more synergies among funds, especially Horizon 2020, through the activation of compensation mechanisms; and ask to be more involved in the definition of action plans and tools. As stressed during interviews with two big industries located in the region, *existing aggregations are not sufficient for reaching critical mass at the global level. It is hard to become leaders in Horizon 2020 projects, but this is the very objective required to attract researchers and stop the brain drain trend* (interview 6 – Industry)[77]. *The process was brilliantly coordinated by the regional administration but now more certainty about timings and a better definition of priority investments is needed* (interview 5 – Industry)[78]. More precisely, it is stressed that strategic projects are needed. Likewise, the university looks at RIS3 as a way to attract talent and skills, asking for measures to support the experimental, enactment, economic and connective dimensions of knowledge creation(interview 4).

Concluding, as brilliantly summarised during the interviewed with a local consulting partnership: RIS3 is about transforming limits into resources avoiding alibis. Money makes the process more

[76] Interview with president of business incubator; Palermo, 14th April 2016.
[77] Interview with industry project manager; Palermo, 15th April 2016.
[78] Interview with industry project manager; Palermo, 15th April 2016.

difficult. Sicily has developed among the most interesting RIS3 in the Mediterranean area. The regional administration has moved forward: the existence of a diverse Sicily has emerged and a general increase in the degree of confidence in the public sector was registered. But '*designing a RIS3 is not enough, now the strategy must be repeatedly implemented*" (interview 9 - Consulting Partnership)[79].

6.2.1.3 Inter-system learning: horizontal and vertical connectedness

Sicily joined the S3 Platform in 2012 and participated to two peer review meetings in Seville (April 9, 2013) and Faro (July 3, 2013), presenting its advancements[80]. The Platform is recognised by regional administrators (interview 1) as an important opportunity for exchange with other European regions, and led to qualified suggestions being adopted to set up the EDP process. Particularly useful in the view of the regional officials interviewed is the benchmarking methodology proposed by the Platform to identify reference regions on the basis of structural similarities. During the strategy design phase the tool facilitated comparisons and learning through others' experiences, and allowed more awareness of the regional competitive position compared to other EU regions and within global value chains. The Region has also actively participated in the Bench-Learning Conference for Pioneering Innovation Regions conference organized in June 2014 by the Committee of the Regions in Brussels[81]. In this occasion practical proposals for interregional cooperation were discussed, and methods were transferred for the activation of potential partnerships. Likewise, the fieldwork highlighted that the S3 Platform support was considered positive by the regional administrators overall, though not enough. The interaction of policy-makers with non-local experts has effectively integrated the Platform assistance scheme. Particularly, the personalised support received by the external advisor made available by the DG Regional and Urban Policy of the EC, was seen as especially effective and formative (interview 1 and 2). A positive evaluation was also given by regional officials during interviews on the assistance received as part of the nationally supported Capacity Sud project (February 2012 – May 2015), coordinated by the national agency FormezPA and mainly focused on the transferring of methods and tools for effective and active stakeholder involvement[82]. The region also participated in thematic meetings organised within the "Support for the definition and implementation of a smart specialisation

[79] Interview with founder of consulting partnership; Palermo, 5th July 2016.
[80] Source: http://s3platform.jrc.ec.europa.eu/regions/ITG1/tags/ITG1?rel=1 [Accessed on 10th January 2017].
[81] Source: http://www.educore.nl/media/programme-18-june-2014.pdf
[82] Source: http://capacitaistituzionale.formez.it/content/capacity-sud [Accessed on 25th January, 2017].

strategy" service (*Supporto alla definizione e attuazione delle politiche regionali di ricerca e innovazione - Smart Specialisation Strategy*) launched by the Italian Ministry of Economic Development (MISE) with the aim of aligning the regional and national processes of RIS3 construction (May 2013 – December 2014)[83]. Within this frame, working groups to promote interregional exchanges were activated, and networking activities were initiated around specific RIS3 themes, namely: with other regions in the South of Italy on tourism and culture; with Emilia Romagna on agro-food; with Liguria on economics of the sea (Regione Sicilia, 2016). Interviews stressed that the contacts developed had been very informative, even if sometimes leading to the risk of duplicating or imitating others' contents and/or methodologies (interview 3).

As far as vertical multilevel coordination is concerned, a first attempt to start a dialogue at the urban level was made as part of the RIS3 process by involvement of two large cities, Palermo and Catania, in the smart cities theme, though this had still not been translated into concrete action (interview 2). Furthermore, the RIS3 document reports that Sicily can count on the presence of a critical mass of pre-existing links that were built by local actors supplying key components or services to global value chains. As stressed by the interview with the regional official of the Productive Activity department (interview 3), a promising smart specialisation is emerging for example in Palermo in the field of biomedical research, thanks to a special relationship with the University of Pittsburgh. In this respect, one of the external experts and advisors interviewed suggested that in order the enhance the RIS3 outward looking perspective: *these important relational assets, which make the involved companies much more valuable to the future of the local economy, and to its innovation potential, than the absolute data would suggest should be exploited as they are potentially able to significantly increase the outward looking perspective of the RIS3 and thus its inter-system learning dimension* (interview 10 – EC Expert and Advisor on RIS3)[84].

6.2.2 The policy-mix challenge

As assessed through the interviews with external experts and advisors, substantial improvements have been made throughout the successive versions of the Sicilian RIS3, signalling a step-by-step process and an important learning dimension occurring as part of the introduction of the new agenda. Sicily *has made the effort to produce a strategy that marks a positive discontinuity*

[83] Source: http://www.invitalia.it/site/new/home/cosa-facciamo/sviluppiamo-i territori/innovazione/smart-specialisation-strategy.html [Accessed on 20th January, 2017].
[84] Interview with European Expert and Advisor on RIS3; Skype call, 22nd January 2017.

compared with the past, and shows promising evolutions (interview 10 – EC Expert and Advisor on RIS3)[85]. The document, created by the regional Programming department, is well organised and graphically clear. A specific appendix is dedicated to the description of the participatory process (Regione Sicilia 2016, p.191), including an accurate indication of the number of participants at each event and the main outcomes (interviews 10 and 13).

Figure 20.Sicily RIS3 specialisations

RIS3 strategic priorities	Existing assets	Potential development trajectories
Life science	7 biotech firms (10th place in Italy) employing 67 people with a value added of 59mil. Euro and R&D investments account for about 34milion euro (7th place in Italy) Presence of leader actors (ISMETT and RI-MED Foundation)	The bio medical chain has the potential to become a cutting-edge centre in R&I, able to attract investments and internationally competitive
Energy	Many research projects developed by the University in the smart grid and energy efficiency fields, in collaboration with public entities, firms and transnational cooperation networks	Exploiting the research outputs requires the creation and consolidation of regional productive chains that can respond to the rising domestic demand of technologies, and at the same time compete internationally through export
Smart cities	Good degree of cooperation in the renewable energy and education fields. Both show an effective use of EU and national resources	Sicilian cities show a low quality of life which is not necessarily interconnected with the smartness
Tourism, cultural heritage and culture	Rich and worldwide known material and immaterial cultural heritage. Among the first Italian regions for touristic arrivals in historic and artistic cities	Presence of SMEs and new innovative firms in the cultural and creative sector (26.828 firms registered in 2014) with a high incidence of young entrepreneurs (8,4%)
Economics of the sea	Around 10,000 firms operating the in the economics of the sea field, especially in the fish and shipbuilding sector	Creation of new firms and innovating in a sector like aquaculture can generate positive effects on employment and skills formation and attraction, thus impacting on the whole economic value of the sector and its international positioning
Agro-food	Around 240,000 agro-food firms of which about 220,000 are agricultural firms, while no more than 23,000 operate in the agro industry chain	Leadership position in biological agriculture at the national level (7.632 firms in 2012 adopting the biological production method) of 12%

Source: RIS3 Sicily (Regione Sicilia, 2015)

The logic behind the priority setting is also clearly explained within the document and, according to external experts, convincingly based on both context analysis and EDP evidence (interview 10).

[85] Interview with European Expert and Advisor on RIS3; Skype call, 22nd January 2017.

Desk and field instruments informed the selection of the chosen RIS3 priorities. More precisely, the first step was the recognition of existing productive vocations, material and immaterial assets that are underused, and the identification of the KETs with a higher impact on the territory. This was done through the examination of data from different sources, namely official statistics, sectorial studies and the assessment of resources spent on R&I during 2007 - 2013. Based on this analysis, six relevant specialisations emerged, that were further deepened through the establishment of thematic working groups and the launch of an online consultation. These participatory tools informed the identification within each selected area of a list of sub-priorities based on market opportunities and economic potentials linked to existing or potential future innovation niches. Development trajectories were discussed to better the general sector or value chain performance and simultaneously expand the knowledge base towards new areas, especially as far as the application of KETs was concerned. During the investigation of sub-priorities, the region also made the effort to focus on opportunities at the interface between different industries in the attempt to promote inter-sectorial hybridisations, in line with the principle of related variety (Regione Sicilia, 2016).

The selected areas of specialisation are inspired by the wider view of innovation advocated by the RIS3, thus entailing: technological areas in respect to which the region, due to the presence of critical mass with high commercial potentials, can play the role of generator of new knowledge and compete on the national and European level, namely micro and nano-electronics and biotechnologies for human health; sectorial areas, namely the agro food sector, that despite possessing less potential represent a strong specialisation in the region for its economic and social relevance, thus making its modernisation through a higher focus on innovation strategic; and the cultural and natural heritage and the tourism sector, whose valorisation passes through the transversal and diffuse use of ICT; and other areas characterised by the presence of relevant endogenous factors and scientific competences, namely living standard technologies, energy and sea economy (Regione Sicilia, 2016). As highlighted by the interview with an external advisor (interview 10), some of the selected sectors and technologies were natural candidates due to their relevance within the regional economy and the need to give continuity to previous policy actions, such as micro and nanotechnologies and agro-food; others instead were included in the innovation policy mix for the first time because of the pressure to modernise traditional sectors such as tourism and cultural assets, signalling an effort to enlarge the innovation focus in the perspective of smart specialisation. Besides, the interviews (interview 10 and 13) stressed that two main weaknesses of the Sicilian RIS3 document, namely the road map, which did include a realistic action line and budget allocation for each speciality, and the governance issue, especially as far as its formalisation is concerned.

6.2.2.1 From strategic orientations to Operational Programs

The Sicilian ERDF OP was approved by the EC in August 2015 with a total budget of €4,557 million, of which 10% is allocated to TO1 - Strengthening research, technological development and innovation (457,185,572 euro). The RIS3 policy mix was conceived by the region according to a dual logic, namely mission-oriented measures aimed at impacting the regional context; and diffusion-oriented policies, supporting to the capillary diffusion of innovation in its different forms and applications (Regione Sicilia, 2016). More precisely, for each of the three RIS3 objectives - i.e. foster the productive system's orientation towards innovation by supporting the positioning in technological areas in which the region possesses distinctive competence and the technological upgrading and discoveries in traditional productive sectors (mission oriented); support the diffusion of innovative solutions and services in response to social, economic and environmental needs (diffusion oriented); and promote a wide diffusion of the innovation culture (mission/diffusion oriented) - specific action lines were planned within the document, resulting in a diversified set of tools, with some elements of originality such as in the field of social innovation (Regione Sicilia, 2016).According to interviews with external advisors (interview 10), the region applied the RIS3 strategic orientations in quite a focused and articulate way within the 2014-2020 ERDF OP. The OP pillars of intervention were designed in strong coherence with the choices made within the RIS3, and focus on four lines of action. Firstly, the consolidation of scientific and technological areas already considered excellent through strategic and complex projects to be developed together with other R&I EU programs, especially Horizon 2020 (actions 1.2.1 and 1.2.3). Secondly, the enhancement of the innovation capacity of existing enterprises operating in the RIS3 selected areas through measures supporting the collocation of research output into the market, the use of existing technologies or the introduction of new solutions by a wide range of beneficiaries (1.1.2; 1.1.3; 1.1.5). Thirdly, the activation of support measures for innovative start-ups as well as fab labs and living labs in order to build a new innovation based productive system (1.4.1 and 1.3.2). Finally, the creation of an innovation-friendly environment by fostering research infrastructures and supporting the supply of technological solutions and digital services, as well as stimulating the innovation demand trough pre-commercial public procurement (actions 1.5.1 and 2.1.1; and part of actions 1.3.1; 2.2.1; 2.2.3; 2.3.1). Priority investments specifically dedicated to the RIS3 deployment are found within Axis 1 - R&I and Axis 2 - ICT of the 2014-2020 ERDF OP, stressing that actions are explicitly required to have an impact on the RIS3 domains. As part of Axis 3 - Enhancing the competitiveness of SMEs, the need to encourage the creation of enterprises in the areas identified by the RIS3 is mentioned within the description of actions 3.1.1, 3.3.2 and 3.5.1. The coherence

with the RIS3 principles is also advocated, at least in the intentions, within Axis 11 - Institutional and administrative capacity, by proposing the activation of two strategic interventions developed within the RIS3, the creation of a Regional Observatory on Innovation and the construction of a Regional Network of Innovators (action 11.6.3). Moreover, as part of priority Axis 12 - Technical assistance, a specific action to support the implementation of the RIS3 through the creation and functioning of an hoc governance mechanisms is proposed (Regione Sicilia, 2015b).Within the RIS3 the region also made the effort to quantify the financial resources to support its implementation though without differentiating among the single specialisation areas and sub-areas. In addition to the ERFD, ESF, EAFRD and EMFF resources, a variety of other sources are listed. Namely, it is stated that the strategy will be pursued through specific priority actions as part of the Cooperation Programmes Italy-Malta (Axis1) and Italy-Tunisia (TO2- Education, research and innovation); through national resources specifically targeted to R&I (such as the national OP on R&I - Axis 1 and 2; the OP Enterprises and Competitiveness - Axis 1 and 2; the OP Education - Axis1, 2 and 3; the OP Metro - Axis 1; the OP Culture - Axis 2; and the OP Governance - Axis 2) or through more general development programs such as the Development and Cohesion Fund (Regione Sicilia, 2016).

Concluding, as confirmed by interviews to both experts (interviews 10 and 13) and regional officials (interview 3), the articulation of the developed policy mix and financial plan reflect the efforts so far made by the region in reaching more coherence compared to previous approaches. Nevertheless, *the quality of documents, as past experience teaches, is not a guarantee for successat implementation. With regards to some key aspects, like the clear definition of a road map, the Sicilian RIS3 remains tentative and vague. The capacity to timely and effectively deploy the strategy is still an open issue, as the worrying delays already accumulated in publishing the first RIS3 calls are showing*[86](interview 10 - EU Expert and Advisor on RIS3).

6.2.2.2 Towards policy action: the translation into policy tools

As of January 31, 2017, the activated RIS3 policy tools include, as already mentioned in paragraph 6.2.1.1, the creation of a list of experts to better the evaluation mechanisms of proposals to be financed under the ERDF - Axis 1 (the so-called Roster). The call was launched in June 2016 and led in November 2016 to the selection of 341 professionals with specialised competences in eight

[86] Interview with European Expert and Advisor on RIS3; Skype call, 22nd January 2017.

different fields, these are each of the six RIS3 specialisation areas, in KETs in general, and in the assessment of the economic-financial sustainability of projects[87]. A measure to stimulate private R&I investments was also launched in August 2016, which includes the creation of a catalogue of accredited suppliers offering supporting services in the field of technological, strategic, organizational and commercial innovation to SMEs. Funded under the ERDF, Axis 1 - action 1.1.2, this call will be followed by the activation of vouchers to support the acquisition of services by entrepreneurs. The February 2017 updated ERFD OP action plan lists another series of measures to be activated within Axis 1 during the first semester of 2017. Amongst these, the financing of strategic, complex R&I projects in each of the six RIS3 innovation areas through negotiation procedures involving SMEs and/or large enterprises, incubators, healthcare companies, research institutions and technological districts (action 1.2.3). The measure will consists of three steps and involve the Roster experts. A call to support to technological development of firms through the financing of pilot lines and early product validation actions and demonstrations on a large scale is also planned (action 1.1.5). Beneficiaries will be single or associated businesses in partnership with research institutions and facilities, and proposals should focus on the development of prototypes and demonstrators with industrial applications. The consolidation of networks and the employment of young researchers with high scientific and technical profiles within large firms will also be financed with the aim of enhancing the industrialisation of research outputs (action 1.1.3). Moreover, measures to support the physical, organisational and commercial development of start-ups, as well as the creation of fab lab and living labs (action 1.4.1), are awaiting approval by the regional Government which should arrive during the first semester 2017. Pre-commercial public procurement actions to enhance and qualify the public innovation demand are also under definition (action 1.3.1)[88]. Furthermore, in order to foster the interconnections between the supply and demand sides, the Open Research Sicily project is under adoption. Within this initiative three actions are proposed: the opening of the research laboratories; the creation of a regional observatory on innovation; and the launch of a regional innovators network (Regione Sicilia, 2016).

According to the regional officials interviewed (interviews 2 and 3), in absolute terms the proposed policy tools are not radically new either in content or in the established access rules. Nevertheless,

[87] Source: http://www.euroinfosicilia.it/decreto/por-fers-20142020-avviso-pubblico-per-la-formazione-di-un-roaster-di-esperti-individuali-al-servizio-della-strategia-regionale-di-specializzazione-intelligente-per-il-periodo-20142/ [Accessed 1st March, 2017].

[88]Source; http://www.euroinfosicilia.it/programmazione-20142020/livello-regionale-po-sicilia-2014-2020/ [Accessed 1st March, 2017].

some of these come as a novelty for Sicily, especially the introduction of mechanisms such as the Roster evaluation tool, and its publishing in the English language, and the activation of strategic measures that in past programming periods had been planned without being put into practice, such as supporting schemes for innovative start-ups; large, complex projects co-created by firms and the research world. As stressed by external advisors (interview 10) many elements are still missing. Particularly, the region is encountering difficulties in establishing the criteria to identify potential beneficiaries for RIS3 projects. Access rules are not clearly defined within the published calls, often limited to the general indication that 'measures have to be developed in coherence with the RIS3 principles', without clear identification of potential beneficiaries and thus risking a selection based on the sectorial classification of beneficiaries (e.g. through the traditional ATECO codes), which would significantly compromise the initial spirit of the RIS3.

6.2.3 Evaluation practices

The region can count on a good base in terms of developed monitoring tools and available data on which to build its RIS3 monitoring system. As highlighted during the interview with an official from the regional Evaluation Unit (interview 2), what is critical is not the availability of data but the organisation of these huge amounts of evidence in a more systematic way. This is also confirmed by the University, stressing that *there is a strong need within the region for more rigorous evaluation schemes, and for more resources dedicated to evaluation. The effective and continuous collection of data is in fact of central relevance within the RIS3 for the effective functioning of the implementation-knowledge-reviewing-implementation cycle* [89] (interview 4 – University). For this purpose, as part of the Open Research initiative, which was designed by the regional administration in close partnership with regional Universities, the creation of a Regional Observatory on Innovation is advanced within RIS3. The tool's precise aim is to improve the management system of existing knowledge and facilitates the move from a fragmented RIS towards a reticular and cooperative one (Regione Sicilia, 2016). Within this frame, actions are foreseen to build up capabilities and put an effective evaluation system in place through which to measure RIS3 progress and support a process of policy learning and adaptation. In June 2016 the region developed an ad hoc Action Plan for RIS3 Monitoring Indicators, in which an articulated and original set of context and result indicators is proposed. As explained by the interviewed public official

[89] Interview with University professor; Palermo, 13th April 2016.

responsible for its implementation (interview 2) the region is currently working on the indicator's sources in partnership with the national statistical institute ISTAT, and on the definition of targets. A RIS3 synthesis indicator is also introduced, i.e. the RIUS Sicily, based on the UIS 2015 - The Innovation Union performance scoreboard for Research and Innovation methodology presented by the EC in 2015.

6.2.4 The role of political commitment

In Sicily the introduction of the RIS3 agenda took the form of a mainly technical exercise. The political level was maintained outside the strategy drafting process, and was engaged only once the first RIS3 version was developed (July 2014) and only for the purpose of obtaining its formal validation, which was acquired six months later, in March 2015. This, according to the regional officials interviewed who were leading the RIS3 design process (interview 1), was the result of a conscious choice. Sicily is a context which is historically characterised by a low level of social capital, by a low reputation of the political class and, more generally, by a diffused distrust in the administration's capacity to provide goods and services. The regional government is often perceived as a place for administrative practices rather than a centre of regional development, and this directly and indirectly hindered its development potential by generating a vicious cycle of low confidence in collective action, opportunism and particularistic politics. Therefore, *avoiding political interference was initially seen by the technical officials responsible for the RIS3 as the only way to aspire to the introduction of real change and discontinuities in the strategy-making process*[90] (interview 1 - Regional Administration). Previous policy-making experiences in the field of innovation showed to be unable to create a common vision around strategic objectives and the assumption of responsibilities on the part of the stakeholders involved, thus leading to unsatisfactory results. The new agenda instead asks for a collective, collaborative and inclusive leadership approach to be put in place, a requirement that in the case of Sicily needed a preliminary investment in trust acquisition both within the public administration and at the system level. The low involvement of the political class is one of the factors that, according to the interview conducted with the regional administration (interviews 1 and 2) permitted the set up of a more inclusive policy-making routine, development of new interactions and mobilisation of new actors around the new agenda. This is what happened for example during the discovery process in the field

[90] Interview with regional executive of the Programming Department of the Regione Sicilia; Palermo, 1st July 2015.

of social innovation through the launch of the Google Drive Game, which was conducted without involving either the political or the administrative level. Likewise, the recognition that politics might be a problem does not mean that policies are possible and, what is more, implementable without seriously taking into account the role of politics. As expressed by the regional official leading the RIS3 implementation phase (interview 3), the participation and contributions offered at the political level during the public event of April 2016 represented a very positive signal. Nevertheless, the challenge is still open. As has happened in other Italian and EU regions, delays have been accumulated over the last year, considering that the first OP 2014-2020 public calls were not published before the end of the first semester 2016, including those aimed at the RIS3 deployment, and at the beginning of 2017 most of these measures are still under definition. Timing, as confirmed by interviews, is a highly critical point on which short term political interests could have a negative influence. The late definition of the RIS3 governance structure resulted in a worrying slow-down of the process, which is putting the region's ability to use the huge quantity of ESIF resources at risk in the short span of time available. During the forthcoming months, therefore, politics will play a key role in speeding up the delivery process. And even more importantly, as confirmed by external experts (interview 10 and 11), the political attitude will make the difference in avoiding a normalisation of practices (e.g. enlargement of the audience of the eligible projects and beneficiaries in order to respond to interest group pressures) that might betray the original RIS3 ambitions. At the political level, absorbing *the RIS3 principles implies becoming aware that the new agenda is an opportunity to re-design and enlarge the innovation policy constituency at the regional level, and that this is achievable also through the implementation of more innovative and thus risky decisions*[91] (interview 10 – EC Expert and Advisor on RIS3). A step that in the case of Sicily seems still far from achieved.

[91] Interview with European Expert and Advisor on RIS3; Skype call, 22nd January 2017.

CHAPTER 7. DISCUSSION: OPPORTUNITIES AND BOTTLENECKS FOR RIS3

This chapter reviews the evidence from the case study analysis(chapters 5 and 6) and draws the main conclusions of the thesis. In the first part, the chapter provides a comparative analysis of the key opportunities and challenges associated with the design and early experiences of implementation of the smart specialisation agenda in the two regions of Apulia and Sicily, and highlights the lessons learnt. The second part details some final observations in terms of both theoretical considerations and policy recommendations around the organisational, institutional and systemic features that in the on-going policy practice are shaping and conditioning the emergence of learning processes as part of the introduction of the RIS3 agenda.

7.1 Evidence from the case study analysis: comparative analysis of RIS3 practices in Apulia and Sicily

In the two investigated contexts of Apulia and Sicily, the introduction of the RIS3 agenda has triggered a learning process that is characterised by diverse degrees of emphasis at the different levels and throughout the various phases of the policy cycle, as shown in figure 21. Namely, two different key points have emerged from fieldwork. Neither of the two experiences appear as a winning model, nevertheless both were turned out to be very informative with regard to the research goals, thus confirming the relevance and appropriateness of the case study selection made within this thesis. The implementation of smart specialisation has created context-specific challenges, whose nature varies greatly, and as a result reflecting the different socio-economic conditions, organisational set-ups, institutional structures, systemic characteristics and policy capabilities in the two investigated regions. Regional innovation systems have thus shaped RIS3 realisation practices in distinct ways. At the same time there is evidence that smart specialisation induces changes in regional innovation systems, supporting policy learning and system building efforts in both of the considered LDR. Related opportunities and bottlenecks emerging at each policy-learning dimension will be discussed in the next paragraphs by distinguishing between the process, the program and the political dimension.

Figure 21.Case study comparative analysis: RIS3 practices in Apulia and Sicily

RIS3 practice: comparative analysis			Apulia		Sicily	
			Design phase	Implementation phase	Design phase	Implementation phase
Context specific challenge: regional RIS3 ambitions			'Guarantee continuity in change'		'Break with the past'	
The process dimension	Intra-organisation learning		High between the region and its agencies, and built on existing capabilities and skills	Medium-high: weakened by organisational and political changes	High, supported by few committed officials and inspired by the need to build in-house competences	Medium-high: weakened by changes in the RIS3 leadership and team composition
	Intra-system learning		High and relying on established practices of participatory policy-making	Medium-low: interruptions in the stakeholder involvement activities	High and representing a very positive discontinuity in respect to past routines	Medium-low: interruptions in the stakeholder involvement activities
	Inter-system learning	Horizontal	Medium-low and not fully reflected in the RIS3	Medium-high in the frame of EU territorial cooperation programs	Medium but mainly related to pre-existing links autonomously built by local actors	Medium but yet not based on concrete cooperation
		Vertical	Medium low: based on traditional transfer mechanisms with the national and EU level Low with the local urban level	Medium low: based on traditional transfer mechanisms with the national and EU level Low with the local level	Medium low: based on traditional transfer mechanisms with the national and EU level Low with local level	Medium low: based on traditional transfer mechanisms with the national and EU level Low with local level
The program dimension			Partial congruence between RIS3 and the ERDF-ESF 2014-2020 OP	Tools in continuity with previous experimentations. Potential novelties emerging through the synergies with internationalisation policies	Medium high coherence between RIS3 and the ERDF 2014-2020 OP	Through not radically new tools in partial break with past measures (social innovation). No innovativeness in access rules.
The political dimension i.e. political commitment			Very high	Medium-high: weakened due to political elections	Almost absent	Medium-low: increasing after the launch of implementation phase

7.1.1 The process dimension

Intra-organisation learning

The importance of setting in motion an intra-organisational learning process was confirmed in the case of Apulia where, building on existing internal capabilities, the RIS3 was conceived, from the very beginning, as a tool to better coordination mechanisms and dialogue between the regional administration and its system of agencies i.e. ARTI, InnovaPuglia and Puglia Sviluppo. Moreover, as suggested by interviews, through the introduction of the new agenda the regional administration sought to strengthen its role as an active player within the innovation game by focusing on three key issues: the qualification of public demand for innovation; the enhancement of contaminations among different policies; and the stimulation of private investments to address social challenges, according to a demand-led approach. The significance of the RIS3 intra-organisational process dimension was also prevalent in the case of Sicily. The region has put a great deal of attention on building in-house competences and culture as a prerequisite to starting a learning process both internally and externally of the public administration. In this case, key enabling factors were; how tight-knit the RIS3 team was, being maintained within the administration and supported by a few committed public servants; and the capacity to promote and maintain, throughout the process, an auto-critical assessment of the past, that has legitimised the efforts to change.

Beyond the differences in the adopted approaches, three elements emerged as determinant in stimulating a renewal in commitment – in the case of Apulia - and a new engagement – in the case of Sicily - towards innovation policies at the intra-organisational level. First, the availability of specialist expertise. The knowledge requirement of a strategy inspired by the RIS3 principles is significantly greater than that resulting from more traditional approaches, especially since the new agenda requires a greater capacity for analysis and evaluation of complex innovative, inter-sectorial and global processes. As a response to these requirements, Apulia and Sicily tried to give an answer by respectively aggregating existing skills, and enlarging the available expertise through the acquisition of external assistance to support the strategy design phase. However, it has to be noted that this represented only a partial response. To support the on-going implementation phase, more technical competences focusing for on the individual areas of specialization and the use of external resources as well as able to absorb exogenous knowledge are required, according to the at ecosystem of innovation approach to open innovation that is proclaimed advised in the description of the theories of innovation processes of enterprises and that it is so often absent in the reality of policy management. The problem was significantly addressed only in the case of Sicily through the activation of the Roster tool, whilst in the case of Apulia the issue seems to have been left out of the

agenda. Second, a decisive factor was the human element of governance relationships. This included: the transience of the actual people involved in RIS3 management; the development of the personal capacities needed to lead and/or participate in the process; and the recognition of the power and relevance of different narratives in order to speak to different audiences (public, private, research). As an example, in both regions the presence of a few committed leaders among the public servants was fundamental to guiding activities and generating motivation within regional structures. Third, another relevant element, which is a combination of the first two, was the role assumed by regional managers within the process. The outsourcing of the EDP to external consultancy firms, that may be technically qualified but are not politically entitled, showed to be failing because they missed the opportunity to build on internal capabilities. In Sicily, the RIS3 design phase coincided with the emergence of new structures and people within the public administration, whose work was legitimized by the new agenda, which allowed them to insert positive discontinuities in the strategy making. Apulia instead could rely, to a certain extent, on pre-existing technical skills of regional officials. As a result, their role was sometimes perceived as simple continuation from the past, hampering the introduction of substantial changes, which due to a stronger influence played by path dependency were accepted more passively rather than interpreted and managed proactively.

Intra system learning

The fieldwork suggested that the quality of intra-organizational learning processes was reflected in the intensity of the dialogue triggered at the policy network level. In both regions, the launch of the RIS3 stimulated a socialization of the innovation process. Apulia and Sicily made the effort to address the barriers that usually constrained their capacity to work across different innovation domains, and that historically prevented the regional stakeholders from talking to each other due to different sectorial or technological mind-sets and silo approaches to discipline endemic within government and research institutions.

As far as the concrete declination assumed by the EDP is concerned, strategic actors such as single entrepreneurs or universities still play a weak role in both cases. Nevertheless, the two analysed regions emerged due to the wealth of the stakeholder involvement activities that were put in place to build upon the RIS3 partnership according the EC requirements. In the case of Apulia this was facilitated by the presence of established practices of social dialogue and participation in the planning of R&I policies. The region emerged as a good example with regard to the degree of innovation of the mechanisms and tools adopted to engage the demand-side of things (regional innovation partnerships, public procurement, Living Labs); and for the capacity to incorporate new

actors (citizens, credit institutions). Whereas in Sicily, the adoption of a participatory approach appeared as new and radical. The RIS3 priority setting was conducted in an inclusive way like never before, leading to the design of an evidence-based strategic document which represents an important discontinuity in respect to previous experience. Moreover, the region came to the forefront due to the valuable efforts in involving those actors that were potentially able to challenge existing practices, an element which was particularly appreciated in a context like Sicily.

Evidence from the fieldwork suggested two determining factors for the effectiveness of stakeholder learning. Firstly, the adoption of innovative demand-pull tools such as the Living Labs in Apulia and the Google Drive Game in Sicily, which allowed for the looking into the 'black box' of innovation and fostered conversations between actors that were not used to networking with each other. The real value of RIS3 comes from establishing a common language. Territorial innovation is the result of interactions between political deciders, teams of experts, SMEs and users. These actors contribute to the articulation of the innovation demand, and help to define societal findings and needs. The ability to stimulate their participation through appropriate mechanisms had proved to be essential. Secondly, as for the intra-organisational learning dimension, the identification of individual leaders belonging to the different parts of the Quadruple Helix (government, business, research, civil society) was identified as essential. Acknowledging that some people have a strong interpretative power, and are thus able to affect the dominant perceptions of their communities, appeared strategic in engaging the right actors at the right moments throughout the whole RIS3 process.

Besides the positives, a common criticism emerging from both within the administrations and at the territorial level is the recently registered deceleration of the learning process. Once the ex-ante conditionality was fulfilled, the regional administrations concentrated their efforts on the RIS3 reviewing activity as requested by the Action Plans agreed with the EC at the expense of their engagement in continuing to nurture the stakeholder involvement process. In Apulia, this was exacerbated by the political elections held in July 2015,which were followed by an organisational reform that, despite maintaining the composition of RIS3 team, generated a certain degree of uncertainty in the definition of roles and competence. Likewise, in Sicily a change in the RSI3 leadership and the transferring of responsibilities between regional departments i.e. passing from the Programming department to the Productive Activity department that partly changed the team composition, generated a series of interruptions and further delayed the launch of the strategy implementation phase. Furthermore, it has to be noted that none of the regions have yet formalised the RIS3 governance structure as a permanent unit within its administration.

As a result, at the time of this research the RIS3 early implementation phase took the form of a step-and-go process, which is negatively perceived by the innovation community, thus impacting on the potential contributions of RIS3 on the regional economy, and increasing the expectations that will have to be fulfilled by the public sector.

Inter system learning

The degree of inter-system learning was revealed as being insufficient in both regions and across both specialisation domains between regions and across spatial scales (EU, national and local). This in turn curtailed the capacity of regional policy actors to undertake interventions that support regional changes through exogenous sources for path development. Despite acknowledging the importance of an outward orientation for an effective RIS3 priority setting, given that to choose specializations a region should first be aware of its distinctive role in respect to others, then RIS3 of Apulia and Sicily evidenced a low international projection. Even where some kind of horizontal connections existed, these were not fully reflected in the RIS3, nor did they assume concrete forms.

The two regions made an effective use of the S3 platform support especially peer reviews during the design phase, and the benchmarking interactive tool in the on-going implementation phase. But beyond periodic and mainly formal meetings, strategic orientation has not yet resulted in the launch of working groups with other regions or with other international partners (industrial, research) that can stimulate thinking outside the usual routine and develop concrete collaborations. In Apulia an interesting assessment was started regarding the synergies between the RIS3 and the regional internationalisation policy. During the current implementation phase the region's international connections are increasing in the frame of EU territorial cooperation programs. But these elements don't seem fully connected with the local EDP. Whilst in Sicily the international perspective has mainly derived from pre-existing links autonomously built by local actors that still need to be framed into practical initiatives within the OP. Also in its vertical multi-level dimension, potential benefits from learning processes were shown to not be sufficiently exploited. As part of the strategy design process, policy transfer mechanisms were established to exchange knowledge between the regional and the national level, but these mainly took the form of traditional policy transfer mechanisms such as thematic meetings and focus groups. The national RIS3 coordination process was primarily focused on getting insights into regional technological and productive specialisation that could assist the design of the national RIS3. Knowledge flows happened mainly from the regional to the national level, rather than the other way around. Informative and effective learning flows in both directions i.e. from the European to the regional level as well as from the local to the European one, were instead encouraged through the personalised support offered by the EC experts,

whose action has proven to strongly improve the practical delivery of the RIS3 guidance in the two cases.

Finally, attempts were made in stimulating an increase in the connections with the local spatial scale. Namely, an alignment was proposed along with the smart city initiatives, stressing on one side the role of cities as potential engines for smart specialisation because they are able to contribute to the reinvigoration of the S3 demand-driven innovation dimension. Cities are incubators for innovative solutions, places of intersection of knowledge, technologies, and skills which are scattered across territories, populations and organisations, thus representing key drivers for innovation. On the other, smart specialisation is seen as a useful tool to reinvigorate the business-led economic development urban agenda: the RIS3 can help developing dense polycentric networks of demonstrators around emerging strategic themes/sectors (e.g. mobility systems, energy efficiency solutions, circular economy models) that affect urban realities in the two cases and are expected to offer broad business and job opportunities in the years to come. Nevertheless, this reasoning remains at a mainly theoretical level, without yet operationalizing the new ideas into concrete projects.

Common lessons

Concluding, three main lessons can be drawn from the analysis of the RIS3 process in Apulia and Sicily. First, the cases confirmed the role of path-dependence. None of the two regions started from scratch, building instead on what had been done, or not done, in the past. Apulia showed the relevance of approaching the new agenda on the basis of a qualified earlier experience both inside the public administration and its agencies and at the system level. Sicily instead departed from the consideration of previous errors and inefficiencies, which was confirmed as an equally valuable and relevant basis on which to build the new agenda. The second lesson, strongly interrelated with the first, is that the degree to which the new agenda was recognized and accepted by regional administrators as a necessary discontinuity was decisive in determining the process' form and outcome. Discontinuity was an implicit assumption in the RIS3 European approach and part of the top-down imposition of the smart specialisation paradigm introduced by the EC. The challenge of discontinuity was noted as being more difficult in Apulia, where a trend of renewal in the field of innovation had already started to take place during the 2007-2013 programming period. Besides the positives, in terms of a higher likelihood to produce a strategy that fitted well into the RIS3 principles, the case of Apulia highlighted the risks connected with the possession of positive records from the past. In regions depending on a certain amount of previous experience, continuity results in being more appealing than change. The very concept of discontinuity could be misunderstood as

an obligation to deny the work done up to that point or to review the system of relations with universities and research institutions, businesses, associations and so on, who constitute the established constituency of innovation policies. As a result, a tendency to be less innovative in choices and to embrace a more conservative approach might emerge, as partly confirmed by the case of Apulia. In Sicily however, the need to shift away from the past clearly stemmed from the shared and highly critical evaluation of previous policies. Cultural changes were facilitated by the fact that the region could refer less to the past. On the other hand, evidence from the fieldwork suggested that in this case the strong emphasis initially put on the need for change might be easily betrayed if not supported by solid organizational mechanisms and skills.This points out the third concrete lesson to be drawn, and points to the fact that RIS3 is primarily an organizational challenge. Learning within smart specialisation is about resources, skills, culture and organisational changes. The new agenda requires managerial specific capabilities and technical skills for the different productive or research fields, and a diffused attitude to choosing and the risks associated. These issues go well beyond the ability usually possessed by the community of insiders involved in the regional ESIF management structures. Continuous learning is required among administrators. To find solutions the two regions activated ad hoc administrative strengthening plans, and involved external experts and academics. But the identified actors have not always been able to take the lead and spread awareness, create networks and propagandize the message. To be effective, these actions need more organization. RIS3 is a fragile process, thriving on long pauses and sudden accelerations that need to be supported by the realization of solid governance structures. This was confirmed as key in order to: clearly define roles and responsibilities; guarantee continuity in the accumulation of capabilities and knowledge; and establish appropriate long-term and thus credible regulations for the stakeholder involvement. Otherwise, the RIS3 will result in a stop and go process, and every time difficulties arrive, inertia will tend to prevail over change.

7.1.2 The program dimension: avoiding normalisation in the operational modes

The introduction of the EU RIS3agenda challenged the strategy-making processes in the two regions but the same cannot be said when assessing the tools and mechanisms activated for its deployment. Translating the EDP proceedings and new ideas into concrete policy propositions, was confirmed as the most difficult step. Even well developed and innovative strategies run a tangible risk of being applied in a distorted manner so as to betray their very essence. The fieldwork signalled the emergence of a desire for normalization both inside and outside of the regional administrations once the ex-ante conditionality was fulfilled, so that after the efforts of the RIS3 writing, a less challenging form of ‘business as usual’ was restored, weakening the expected

innovativeness of the new generation of R&I interventions. This was exacerbated by the delays accumulated in publishing the first RIS3 public calls, which generated a worrying shrinking of the available time for strategy deployment. Moreover, in the definition of the calls' access procedures, an excessive amount of focus was put on the delimitation of the domains areas according to traditional criteria such as statistical ATECO codes, and with a tendency to enlarge the audience of projects and beneficiaries that are eligible for financing as much as possible, at the expense of a stronger selection in the access rules and contents. The public calls should be targeted to each specific RIS3 specialisation domains and not as a whole. Moreover, these should be designed according to a stronger demand side focus that is in line with the principles that guided the EDP e.g. launching calls for ideas. More attention should also be paid to reflecting on which actions are necessary in order to remove the barriers to potential competitive advantages and support the access to calls e.g. not just focusing on the amount and content of public support but also on facilities, norms and procedures that might stimulate their deployment. As a result, the fieldwork indicates that, behind the innovativeness recorded during the strategy design phase in the two regions, the experimental character of the RIS3 decreased when transposed into the ERDF OPs and related rules, contents, targets and evaluation procedures, and ran the risk of unbalancing and excessively simplifying the RIS3 policy mix. In its definition, the two analysed regions focused on the identification of mix of mission and diffusion oriented tools, that are able to respond to the complex needs of innovation in a coherent and well-balanced way. At the strategy level this was done, albeit with some weaknesses, especially regarding the ability to activate private funding. A wide idea of innovation was embraced, and the two regions were particularly committed to enhancing the demand-side approach to innovation, in line with the RIS3 requirements. A special role was recognised, in both cases, in social innovation not only because of its impact on welfare but as a way to mobilize creativity more widely at territorial level. Interesting experiments were developed to move in this direction, aiding a virtuous layering process (Mahoney and Thelen, 2010) through which demand-based innovation was incorporated into the strategic orientations. But this consistency and balance though significant is not a sufficient condition to guarantee a synchronised implementation of policies, and must be verified ex post.

A primary lesson to be learnt, which emerged from the desk analysis and was confirmed by the fieldwork, is the need to better transpose the demand-led approach into the RIS3 policy toolbox. Demand-side innovation in markets is one of the main new aspects of the new agenda that is expected to generate higher returns of public investments. Apulia made the strategic and justified choice of consolidating through the RIS3 and its R&I policy repertoire by, for example, building on previous experiments in the field of living labs and public procurement rules. If this is in line with

the very essence of the new paradigm as a policy aimed at tackling stocks of progresses and not 'reinventing the wheel', the region could have introduced more significant innovation in the definition of policy instruments. Moreover, the tools have not been conceived transversally to the whole RIS3 programming focus, but instead on specific Axis of the OP, namely Axis 1. Smaller revisions of the existing set of instruments were introduced but there is a tangible risk that the proposed measures aimed at contributing to the renewal of existing strongholds will by default be more easily accessible for actors who already participated in the past, thus producing less incentives to change than desired. Sicily instead introduced tools that despite not being innovative per se (in absolute terms) represented a radically new approach in the history of R&I policy of the region. Some of these, also due to the effect of the coordination role played at national level during the RIS design phase, resulted from an adaptation of instruments used by other Italian regions such as in the case of the catalogue of innovative services to be deployed through vouchers, which was inspired by the mechanisms activated by the region of Tuscany [92], or the Roster tool to better project evaluation, which amongst others was launched also by the region of Lombardy[93]. This form of emulating and replicating others' experience is not negative per se but will have to demonstrate their responsiveness to the local specific features and needs. A second lesson to be studied, considers the capacity to reach high quality and threshold effects. More efforts should be made in launching flagships initiatives in single RIS3 specialisation domains, and to foster synergies across policies and programmes, primarily Horizon 2020. Third, as touched upon above, technical skills are required in order to transform the EDP evidences into knowledge that is practically usable, intellectually provocative and action-oriented, and that also permits a better selection of projects. Lastly, a fourth crucial observation concerns the monitoring, evaluation and revision of RIS3 policies. The new agenda asks for discontinuity in assessment practices with respect to methodologies adopted up until now as part of ESIF evaluation. Under RIS3, the priorities emerging today will not be supported forever (Foray et al., 2012). A dynamic evaluation system which ensures the opportunity to review, adapt or modify priorities in function of the emergence of new opportunities in the economic and technology scenario, and the evidence emerging through the EDP during the entire policy cycle is required. Both the investigated regions were late in the establishment of effective RIS3 evaluation systems. In addition to context and result indicators

[92] Source: http://www.regione.toscana.it/smart-specialisation-strategy [Accessed on 10th February 2017].
[93] Source: http://www.finlombarda.it/lavoraconnoi/consulenza/avvisoistruttorietecniche [Accessed on 10th February 2017].

established by the Partnership Agreements, key performance indicators for each of the selected domains as well as output indicators able to generate knowledge spreading and diffusing information were proposed, and reviews began within the regional administrations around the need to design indicators characterised by a short-term return and able to timely capture not just the economic but also the intangible cultural changes occurring as part of the RIS3 implementation. However, in order to provide actual feedback and learning, the setup of knowledge management systems for the RIS3 monitoring, according to which the projects are conceived from the very beginning as single experimentations that address specific knowledge gaps that occur within a determined sector, or shared by more specialisation areas and domains, would be desirable. Within such a frame, the metrics through which evaluating the degrees of success and failure of each experimentation as well as the channels through which the successful projects might be transferred to other contexts, should be defined in advance. It has to be noted that under the RIS3 paradigm, effective monitoring mechanisms are essential in offering a way out in the face of possible policy failures, which are intrinsically part of innovation. Thus, monitoring emerges as not only a matter of keeping systems informed but also as an organisational and consensus issue, and confirmed as an essential step of the logic of smart specialisation, which, at the same time, requires the ability to make more precise choices.

7.1.3 The political dimension

In the experience of both the investigated cases, the influence of politics, especially elected governors and councillors, in shaping the on-going RIS3 practices was confirmed as strong. The two regions made contrasting choices. In Apulia, the RIS3 agenda was, from the very beginning, created as a political process. Despite the temporary weakening of political commitment that followed the regional elections, the political class has been an active interpreter and protagonist of the regional RIS3 process, and has so far, been able to positively support it. Whereas in Sicily, the introduction of the new agenda has worked precisely for the opposite reason. The region initially witnessed a substantial lack of ability of regional political elites to really perceive the scope and significance of the RIS3 experience, and in particular the EDP concept which is frequently misunderstood. The political level showed difficulty in perceiving that a broader involvement of entrepreneurs and an even greater inclusiveness of actors that were not yet integrated into the practices of consultation could provide an opportunity to build a new social and political consensus around regional innovation policies. This entailed the effort of looking for a strategy that was not top-down and desk-constructed but the result of a bottom-up process, a requirement that was conceived as definitely more difficult to manage and riskier to accept than traditional strategy

making practices, especially in a state centric context like Sicily that is historically characterized by a strong role of the public sector, and also due to its special degree of autonomy that shaped the room for manoeuvrability for policy making at the regional level, and by limited levels of stakeholder involvement. Therefore, the region made the cautious choice to initially keep politics outside from the process, limiting the role of politicians and framing RIS3 as a mainly technical exercise. An increase in the role of politics was registered as an afterthought, following the internal re-organisations of functions and responsibilities among regional departments and the recent launch of the implementation phase in April 2016. This difference in approach was also the result of the different political climates in the two contexts at the time of the introduction of the RIS3 agenda. When the new paradigm was launched, Apulia could count on a strong and consolidated political mandate to develop regional innovation policies legitimised by previous experience in designing evidence-based and effective R&I strategies. As a natural consequence the regional government, from the very beginning, took a leading position within the RIS3 process, and instead made the ability to assign a more proactive role to other stakeholders the main challenge to be addressed in such a situation. Sicily instead came out from a decade of accumulated policy failures in the field of R&I, which had further lowered the already weak reputation of the regional political class and generated a diffused distrust in the administration's ability to provide goods and services through an effective use of ESIF funds. As a result, the RIS3 agenda deployment had to be completely devised through new, feasible, slim and agile procedures, which primarily required putting technical skills and competences to work, and more than to political support. This was together with the overall conditions formal competences and power (autonomy) (i.e., the degree of decentralization of innovation policy) to design regional innovation strategies and financial resources to implement them independently are key factors in this regard. Whilst they set and shape the room for manoeuvrability for innovation policy making at regional level,

Despite the different declinations assumed by the role of politics in the two analysed regions, the findings presented in this thesis suggest that political instability leads to a lack of continuity in policy making, which in turn negatively impacts on the quality of processes and programs. Similarly, political decision makers have a strong role to play in speeding up the on-going RIS3 implementation process. The centrality of political processes clearly emerged from the case study experience. The EDP, though being conceived as a bottom-up demand led approach, needs to be encouraged by a sound and continuous political investment. Regional elites have a major role to play in succeeding within the new generation of European R&I policies: political leadership is arguably the most important factor in the policy mix (Morgan, 2016c). The RIS3 Guide (Foray et al., 2012) was the first regional policy to treat political elites seriously based on the evidence that

during the past Cohesion Policy programming periods poor governance mainly correlated with low innovation, poor services and 'cronyism'. Nevertheless, in both cases regional political leaders somewhat underestimated the challenge. The political mandate of people working on RIS3, their attitude and support instead has proven to be able to make the difference. Even in the case of Apulia, where the high political commitment represented of the main strengths of the design phase, a greater attention should be posed by local politicians on the EC request for discontinuity and the opportunities linked to an innovative approach to strategy-making, inspired by a stronger public recognition of the value of failure and learning. The more inclusiveness the higher the political content of actions will be. The constant push from the political level is thus confirmed an essential ingredient in generating added value through the RIS3 implementation.

7.2 Final observations

Over the last few years an intense practical experimentation has started to take place across Europe as regions have engaged in the design and implementation of the RIS3 agenda, not least due to its adoption by the European Commission as a condition for attracting ESIF funding assistance under the on-going programming period. RIS3 signal a paradigm' shift in the design of Cohesion Policy, advocating innovation-based endogenous development and growth in all types of regions (Capello & Kroll, 2016). In operational terms, RIS3 draw on the EDP principle, a highly questionable concept of which both pre-conditions and outcomes are uncertain and unpredictable (Blazek and Morgan, 2015). It is therefore claimed that the effective deployment of the new agenda also requires innovation in the policy sphere, which may take the form of small and gradual revisions and renewals until the introduction of more radical changes (Borras, 2011).

The analysis of RIS3 on-going practices as part of the field work conducted within this thesis, as well as based on a desk analysis of secondary sources, suggests that the market and coordination failure rationales, which are advanced as the main justification for the emphasis put on the need to promote an EDP to select investment priorities (Foray, 2015), tend to underplay the influence of context specific organisational learning capabilities, systemic connections and institutional deficiencies, especially in less advanced regions. The economic rationale according to which identifying innovation specialities through an EDP will catalyse structural change processes i.e. transition, modernisation, diversification via the stimulation of knowledge and market externalities, is grounded in the theoretical assumption that these spill-overs will follow from the concentration of activities generated by economies of scale and scope. But this logic does not fully cover the overall complexity of the reality of innovation processes within regional and trans-regional systems. According to a territorial system failure perspective, collective knowledge benefits dependent, and

more directly, on regional relational and institutional properties in shaping interactive learning processes between organisations and across these (Vallance, 2016). Particularly, policy learning mechanisms influence the capacity of regional economies to diverge and evolve through path renewal based on related variety or new path creation based on unrelated diversification, reducing the likelihood of locking into more rigid trajectories such as path extension or path exhaustion (Lundvall, 2010; Moodysson et al., 2015; Tödtling and Trippl, 2013).

Most of the emerging RIS3 practices launched by EU regions and Member States were supported by an active involvement of experts from the academic and scientific world, such that the theoretical discussion around RIS3 and the policy practice are currently in a stage of deep co-evolution, though policy continues to run ahead of theory (Foray, 2015). This thesis aimed to contribute towards this emerging body of knowledge by proposing a policy-learning framework for the exploration of the progressive development of RIS3 practices in two less advanced Italian NUTS2 regions; Apulia and Sicily. More precisely, the thesis is based on the assumption that the effectiveness of the strategy-making is affected by the capacity to stimulate policy learning at three distinct and equally relevant levels: the intra-organisational, intra-systemic and inter-system level; and that the degrees of knowledge flows and exchanges occurring at these various dimensions are reflected in the RIS3 program dimension despite being strongly politically biased. The analysis of the thesis findings suggests policy learning to be: a strategic element and key ingredient for an effective deployment of the RIS3 agenda; a dynamic and polycentric phenomenon; and characterised by an inescapable political nature. It is to say, learning at all of the three levels is required in order to enhance the likelihood of generating paradigm shifts and new path developments as part of the introduction of the new EU agenda. Intra-organisational learning emerged as particularly important in both regions, and especially in the case of Sicily, to build the preconditions in terms of public sector capabilities for an effective management of RIS3. Though it failed to appear as a sufficient condition. The RIS3 performances of the two regions were reported to have not only been determined by characteristics of the government system and capabilities of policy-makers but strongly influenced also by the question of how the other non-policy actors and stakeholders that make up the regional innovation systems have assimilated the new agenda. In the absence of continuous learning at the system's network and at the intra-systems levels, the field work suggests that the RIS3 agenda might not be able to contribute to building the entrepreneurial search networks and create the common language which are essential to prompt changes in programs based on collective discoveries. These elements exhibited strong interrelationships and were specific to each region, in line with the common understanding in regional studies that one size doesn't fit all (Tödtling and Trippl, 2005). Besides the strong relevance of context specific

declinations assumed by the new agenda, from the combination of the field and theoretical research conducted within this thesis some general conclusions around the factors that in practice are shaping and conditioning the emergence or absence of effective policy learning processes as part of the territorial EDP that should be underpinning RIS3 are traceable and are presented here below.

The importance of keeping the ball rolling

Firstly, evidence has shown that RIS3 is not a one-off exercise but an open-ended process that needs to be continually energised. Even more so, it is a trial-and-error process which continuously generates uncertainties. The new agenda is experimental in character, and in its implementation EU regions are immersed in a policy learning process. As confirmed by the two case study regions, the crucial question is not whether perfect solutions are found and transferrable to other settings or not. Neither of the two investigated RIS3 practices emerged as a perfect model. Instead, what mattered was the capacity to adapt EC requirements and principles to the specific local preconditions, entailing socio-economic as well as institutional factors. To allow for this, the consolidation of structures, competences and culture and working relationships that make up the RIS3 process within and outside the regional administrations were shown to be key. The requirement that the RIS3 exercise leave a lasting mark on the way in which public authorities approach the issue of innovation has two main dimensions: one is strictly internal to the public sector, and mainly concerns the issue of coordination of the process management and evaluations; the other instead regards the relationships with the society and the economy, especially in those situations where the RIS3 mandated a more stringent collaboration between companies, civil society and institutions. The setting up of RIS3 governance models was proposed as part of almost all the developed strategic documents and EU regions are, though slowly, realizing it. There is no unique model to best institutionalise the EDP into a high-quality governance structure. What was confirmed essential is the capacity to develop strategic coordination structures able to mix political (i.e. top-down), technical (i.e. bottom-up) and social (i.e. spontaneous) approaches in the management of innovation processes, and thus allow for the continuation over time of the dialogue, involvement, engagement and coordination mechanisms through which RIS3 decision-making takes place. Implementing a RIS3 in a region that has gained some previous experience in cooperative networks and has instilled trust between actors such as for Apulia reported as being very different from setting up the same process in a historically centralised region characterised by a rather weak system of relational assets such as Sicily. Nevertheless, the two cases suggest that if the process is conceived as a permanent procedure that does not end with the writing of the document, and thus strong enough to resist political interferences, the likelihood will increase for achieving results, and also leading to those

changes in mental frameworks and culture that, though not yet demonstrating tangible results, are suggested to be the first necessary step for the RIS3 learning process.

Territorial differentiation and experimentalism in tools

Secondly, more context specificity and experimentation in the operational modes are needed to really renew the strategies' implementation phase. There was probably insufficient time to develop tailor made adaptive solutions able to respond in a place specific manner to the diversity of EU regional needs. At the time of this research, the analysis of the two case study regions of Apulia and Sicily highlights that selective choices made at the strategic level during the strategy design phase were not fully kept within the ERDF 2014-2020 OPs, with the risk of a loosening of the mesh of smart specialisation. Namely, this resulted in the emergence of an excessive concentration of priority investments on few Axis, especially Axis 1 as requested by the ex-ante conditionality, which responds to that narrow view of innovation that the new paradigm was aimed at overcoming; and an extensive interpretation of the eligibility criteria for the beneficiary selection. These evolutions often derived from the need to speed up the release of public calls and the allocation of subsidies by simplifying procedures. Selecting the financially viable projects on the basis of their belonging to areas or sectors of economic activity as defined by the official statistics rather than on the innovation and quality of the proposals, as well as copying and emulating others instruments and methodologies, is a play-it-safe interpretation that has been adopted by many EU regions when moving from the strategic to the implementation phase. Instead, it should be agreed upon more clearly that under the RIS3 approach there must be a limit to automatic procedures. Administrative efficiency and objectivity cannot be at the expense of a thorough assessment of the specific contents of individual projects. At the same time, on a more conceptual level, the cross sectorial nature of the areas of specialization and the need to give visibility to cross cutting and cross sector innovation processes inspired by related variety could lead to a significant broadening of the range of eligible sectors with the aim of reducing the political risks of inappropriate exclusions. As a result, the originally RIS3 selective connotation might turn out to be seriously compromised.

Legitimizing discontinuity for - and not in contrast with - continuity

The European RIS3 agenda imposed on Member States and regions the introduction of a new policy approach for the design and implementation of R&I policies. As verified by the investigation that was carried out in Apulia and Sicily and confirmed by large-scale similar exercises and surveys (Kroll, 2015; McCann & Ortega-Argilés, 2016; Trippl et al., 2016) conducted at the EU level, the degree of acceptance of the smart specialisation paradigm as a necessary discontinuity with

previous approaches has been very different across the different settings due to the strong influence of path dependency. More precisely, what clearly emerges when exploring the processes dimension of the RIS3 agenda is not the relevance of path dependence per se, which is widely acknowledged by the literature and the policy practice, but how the very characteristics of path dependence operated in different socio-economic and institutional settings, and how two different path dependences generated different policy outcomes. The case study analysis concretely showed which consequences derive from path dependency, and namely that a region with stronger record from the past will tend to have a more conservative RIS3 vision whilst a region with a strong need to break away from the past will tend to be more inclined towards being innovative and introduce radical discontinuities. Breakings find particularly fertile contexts in regions with little or no previous experience, where the role of history is less strong and power dynamics among actors are less consolidated. Those contexts that instead have advanced more in the past, though possessing the necessary capabilities and institutions for the design and implementation of complex strategies like RIS3, show more resistances both in existing ideas and mental frameworks. This dichotomy relates not only to general features such as the economic and innovation performance of the region but even more so to its hard and soft institutional failures (Valdaliso et al., 2014). In policy terms, this leads to the consideration that those EU regions that could play more with discontinuity in terms of introducing innovations that are new to the region were facilitated in the task of writing and implementing the strategy. Moreover, together with discontinuity, the RIS3 agenda asks for long-term stability in other aspects. As an example, the persistence of a few procedures or methodologies forms a prerequisite for regional industrial change because it provides the predictability and certainty in the rules of the game that permit entrepreneurs and innovation actors to dare to take on high-risk investments related to experimentations (Moodysson et.al, 2015). Embracing this balance between change and stability at the various policy levels within the innovation system's organisational and institutional support structures was confirmed as a complex and demanding undertaking for the regional administrations leading the process. The overall ambitions of the RIS3 agenda and its basic principles were well received by the interviewed actors. In both of the case study regions, we assisted an on-going conversion and, in part, to a gradual layering process (Mahoney and Thelen's, 2010) through the introduction of new principles, practises, methodologies as well as more intangible elements such as changes in the administrative culture or in the degree of engagement of the public and private sectors, which are reorienting and modifying existing governance procedures and programs. Within the frame of this thesis, this is interpreted as a very positive and encouraging achievement obtained through the RIS3 coercive obligation imposed by the EC. Nevertheless, the ways through which transforming the strategic visions embraced by

regions into effective territorial development and planning remains an open-ended question. Communication by the EC was not adequate in this respect. It is the time to use policy learning as an effective argument through which to legitimise more courageous policy decisions on the part of the regional and national administrations. The very concept of discontinuity should be conceived by the responsible public authorities as not in contrast but in favour of continuity within and in support of the introduction policy changes, which does not necessarily mean betraying what worked in the past. According to this thesis evidence, a powerful new policy concept like smart specialisation results in a better adaptation and produces more tangible results in complex contexts, especially regarding governance (stakeholder involvement) and institutional processes, rather than in consolidated realities, where the necessity to reshape innovation policy is perceived as less urgent and necessary. Conceiving policy making in a learning perspective adds much of the needed validity to the efforts aimed at reconsidering the risk adverse public policy mentality towards a more experimentalist logic also able to tolerate the failures that the modern idea of innovation requires. Regional innovation policies are increasingly conceived as combinations of learning modes and knowledge bases (Asheim et al., 2011), as part of which identify and fixing possible failures is key (Borras, 2011). Mechanisms able to predict policy failure consequences are essential to preventing resistance and fully embracing a learning culture (Morgan, 2016c). The RIS3 method is a feature, which is performing extremely well in terms of allowing set up of inclusive governance approaches. But the new agenda has not carried over the importance of making learning from failures a policy priority. Evaluation is confirmed the key-missing step. Quality and consistency of evaluation is essential in order to address both policy accountability and learning. Yet, at the time of this research RIS3 monitoring and assessment is seriously lagging with regards to practice and is conceived in a rather conservative way, eliminating much of its potential. In addition to traditional program outputs, which will be measurable in the medium-long term, new levels of evaluation should be adopted in order to capture and share other important advances made as part of the strong RIS3 process dimension. In the absence of timely and comparable monitoring, the RIS3 agenda runs a real risk of being re-absorbed by bureaucracy via the adoption of a business-as-usual logic evaluation inspired by the capacity to spend resources.

The effective deployment and evaluation of RIS3 is a much bigger challenge than the strategy design on which the real value added of the new paradigm will depend. If unable to translate the elaborated RIS3 vision into innovative plans, EU regions will easily disregard the chance to induce policy changes and to assure their territories to move up the value chain of global competitiveness through the introduction of the new agenda.

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