When Regional Innovation Policies Meet Policy Analysis.

Have Governments Been Smart During the Crisis?

Susana Borrás, Copenhagen Business School, Denmark
Jacint Jordana, IBEI, Universitat Pompeu Fabra, Spain

This version: November 26th, 2015

**Keywords**: regional government, regional innovation system, policy analysis, smart specialization, regional advantage, innovation problems, policy mixes, policy instruments, regulatory governance.

**Abstract**:

In spite of recent advancements regarding regional innovation policy rationales, there are only few studies conducting analysis about the actual features of existing regional innovation policies. A policy analysis perspective is important in order to recognize distinctive policy patterns and strategies. To this purpose, this paper examines regional innovation policy priorities and changes of direction, discussing to what extent they have reacted to transformations in their environment during recent years. The paper adopts a multi-level perspective, identifying how national and international actors are involved in the regional innovation system. It compares the innovation policy priorities in four Spanish regions in 2000-2015, examining the extent to which these regional policies have been constructed in a ‘smart specialization’ way, responding to existing problems and creating new opportunities during and beyond the severe economic crisis.

Our findings show no major reactions to the crisis, as regional governments’ priorities remained largely unchanged. Hence, we find that our four regional cases suffer, with different intensities, of policy lock-ins that survive attempts of introducing changes in institutions and budgetary priorities. Thus, policy designs are rarely based on sound evidence or experts’ diagnose about the problems and opportunities in each territory. Rather, they tend to follow idealized expectations and/or highly normative prescriptions. These findings call for a renewed analytical approach that integrates policy analysis in the theoretical frameworks of regional innovation systems, and in particular in smart specialization analysis.
1. Introduction

There is today a widespread view across academics and policy-makers alike that regional innovation policies must be designed in a way that they address the problems posed by the specific innovation and socio-economic context of the region in question. This overall context-based policy rationale emphasizes innovation policies to be responsive to the needs (challenges and potentials) of the socio-economic development of the territory in question. This widespread view comes from previous frustration about ‘one-size-fits all’ responses (Tödtling F & Trippl M 2005). It comes as well from the recent sophisticated analyses of territorial patterns of innovation, which provide good basis for developing evidence-based regional innovation policy design (Camagni R & Capello R 2013). However, for all its usefulness and relevance, these studies have tended to overlook the real life of policies. ‘Real life’ refers to the actual policies that regional governments have been developing through time, and that today form part and parcel of the institutional framework of the regional innovation system in question. Any exercise that aims at guiding regional governments on how to develop strategies to address the problems and bottlenecks of their innovation systems logically requires to know about the actual policies that those regional governments have already in place. This is the reason why these advanced forms of regional innovation policy rationales need to be complemented by the study of the actual policies of regional governments. The latter is an exercise of policy analysis, which aims at providing evidence about the trends, features and nature of regional innovation policies.

Policy analysis takes the regional innovation policies as an object of study on their own right, studying particular features and dynamics of policy instruments, initiatives or overall policy structure. It is worth noting that policy analysis is analytically different from the normative formulation of policy rationales, but that both might complement each other in at least two important ways. Firstly, because the recommendations of policy rationales must not take for granted the complexities of regional policy-making and the difficulties of breaking through with new courses of policy action. And secondly, and perhaps most importantly, because regional innovation policy can be seen as part and parcel of its regional innovation system. By defining some regulatory and/or governance- based institutions, and by seeking (successfully or unsuccessfully) to transform innovation dynamics, the regional innovation policy is (with its strengths and weaknesses) intrinsically embedded in the socio-economic functioning of the innovation system.

With the purpose of bringing forward the policy analysis of regional innovation policy, this paper conducts a careful study of the real life of this policy. In particular, it examines two distinct but interrelated issues: the multi-level coordination of European, national and regional policy actors’ initiatives, and the ‘smartness’ of individual regional innovation policies in terms of their ability to respond to existing problems and their ability to generate new opportunities in the regional innovation system. These issues are examined one by one,
following a specific framework for regional innovation policy analysis related to the notion of ‘smart specialization’.

To be sure, there is a relevant but very limited literature on the policy analysis of regional innovation policies. The review in the next section will summarize their contributions, and will identify further analytical possibilities in this understudied field. The current paper builds from this existing but limited literature, developing a novel focus on ‘smart policy’, and examining the extent to which these policies have been adapting to their changing context in relation to the economic crisis, one of the most significant socio-economic challenge for regional development in recent years.

The paper proceeds as follows. Firstly it reviews the literature on regional innovation policy analysis, putting particular attention on the literature that provides analytical frameworks that are (or might potentially be) associated to approaches that study multi-level policy features, and ‘smart’ dynamics of policy change regarding institutions and budgetary priorities. The section after that brings forward some analytical tools for the study of the dimensions of policy analysis in this paper. Section 4 provides an overview of the multi-level issues regarding innovation policy in Spain, as well as the 17 Spanish regions’ initiatives and expenditure in this area. Section 5 presents the case selection and identifies the more relevant problems for each region constraining their development. Next sections are dedicated to the empirical analysis of our 4 case studies. After a brief presentation of the policy initiatives in the 4 regions during the period 2000-2015 in section 6, section 7 compares these 4 regional policies from the perspective budgetary priorities and institutional change. The concluding section summarizes the findings regarding the extent to which the regional governments have developed ‘smart policies’ to address challenges and develop new opportunities, and concludes with a plea for a renewed approach that integrates policy analysis in the theoretical frameworks of regional innovation systems, and in particular in smart specialization analysis.

2. Regional Innovation Policy Rationales and Policy Analysis: A look at the Literature

As mentioned above, there are two distinct sets of literature in the field of regional innovation policy, namely, the literature on regional innovation policy rationales, and the (very scarce) literature on regional innovation policy analysis. Whereas the first puts forward a series of normative principles suggesting lines of action for regional policy-makers, the second literature studies the existing regional innovation policies identifying patterns and trends. These two sets of literature have not really spoken to each other. Rarely has the literature of policy rationales provided concrete policy implications which take into consideration existing policies at the specific region in question. And vice versa, rarely has the scarce policy analysis of existing regional innovation policies taken into consideration the
general rationales for action suggested by economic analysis. Bringing these two literatures together is necessary if we want to understand the extent to which current regional innovation policies are truly context-based, that is, if these policies are responding to the innovation-related problems and needs identified by economic geographers’ empirical studies. This section reviews briefly both sets of the literature in view of providing some specific clues that will serve to operationalize the analysis of this paper.

There is a vast literature dealing with regional innovation policy rationales. At first sight it can be overwhelming to look at that, given the changes through time and the subtlety of theoretical and empirical arguments sustaining normative propositions. According to Lagendijk, one can distinguish between meta-rationales, which are typically assumptions at the highest level of abstraction regarding f.ex. market failure, welfare distribution or systemic failure; and policy rationales properly, with more concrete policy guidance towards knowledge production, dissemination, etc. (Lagendijk A 2011). He also points at the tendency of the knowledge-based economy policy rationales to be rather ambiguous and broad, due to two main reasons, namely, the nature of knowledge itself (its tacitness or possible codification, which is rather broad), and the complex and indeterminate role of proximity and distance as competitive advantage in the economy (not only based on localized knowledge sources but also to the absorption of external knowledge sources too).

Critical remarks about ambiguity of general policy rationales have also been put forward by Laranja et al. who have pointed to this issue from a regional perspective. They stress the fact that general innovation policy rationales have been either developed at the state level or have tended to adopt a rather ‘aspatial’ perspective” (Laranja M et al. 2008) p. 284. They indicate the very few attempts to make links between specific policy rationales with specific regional innovation patterns. For that reason, “the territorial implications of different economic theories of innovation and technical change remain unclear” (Laranja M et al. 2008) p. 284.

During the past few years there has been an increasing effort to fill these deficiencies and to reduce ambiguity in innovation policy rationales at the regional level. With this in mind, scholars have started to develop policy rationales for regional innovation policies, either from theoretical developments with geographical and territorial considerations like ‘smart specialization’ and ‘constructing regional advantage’ (see below), or from solid empirical studies of regional patterns of innovation.

Starting with the former, two general models of regional innovation policy rationales have developed recently, namely the ‘smart specialization’, and the ‘constructing regional advantage’ approach. These meta-rationales share some common traits, as both are anchored in the evolutionary and institutional innovation systems’ theories, and both aim at providing context-based policy rationales that address the needs of the particular territory. As an overall policy rationale, the ‘Smart Specialization’ is perhaps the one that has received most public attention, as it has been developed within the European Union, and is used in the EU’s RIS³ policy. Put in a nutshell, the smart specialization advocates for the idea that “regions – in particular the less advanced and transition regions – need to build capabilities –
not only generic capabilities but also capabilities within specific fields, technologies, and sub-systems in order to build competitive advantages in a few market niches.” (Foray D 2014) p. 492. Smart specialization is the spontaneous outcome of entrepreneurial discovery, combination of different knowledge sources, spillovers in the form of entry and agglomeration of firms, and subsequent structural change. However, when this does not take place spontaneously (especially in peripheral regions), policies might seek to foster that putting forward a policy towards smart specialization (McCann P & Ortega-Argilés R 2013). This vision is at the backbone of several EU regional policy initiatives, yet it is still somehow discussed among scholars on several grounds, namely, because it tends to disregard the larger variety of possible innovation patterns beyond core-periphery dichotomy, and to overestimate the linkage between knowledge production and its exploitation for growth, which is not a direct one (Camagni R & Capello R 2013). Another meta-rationale for regional innovation policies is the ‘constructing regional advantage’ approach (Boschma R 2014). It is anchored in the tradition of knowledge-bases in the region (Asheim B et al. 2007), and puts emphasis on the fact that regions have different industries which differ in their knowledge bases, requiring a more diversified policy design inside each region. This is particularly important for peripheral regions, which suffer from institutional and organizational thinness (Martin R & Trippl M 2014).

Looking now at the second large move towards regional innovation policy rationales, one of the most significant first movers in using empirical studies into rationale identification was the paper by Tödtling and Trippl. They took a first step into relating specific features of the regional innovation system together with specific policy rationales at the regional level. Avoiding ‘one-size fits all’, they identify three types of overall problems in different types regions, namely, peripheral regions have problems of organizational thinness; metropolitan regions have problems of the fragmentation of existing capabilities; and old industrial regions have problems of lock-in and lack of knowledge diversity. These regional system problems are the goal for the definition of more tuned and specific regional innovation policies. In a similar vein, a more recent study of the OECD moves in the same direction. “Past and present experience of OECD regions reveal that regions face three main types of choices, with three corresponding families of strategies: building on current advantages (science push, technology-led, or a mix); supporting socio-economic transformation (reconversion or identification of a new frontier); and catching up: towards the creation of knowledge-based capabilities.” (OECD 2011b) P. 78-79. This broad typology is derived from the OECD categorization of regions according to major economic and innovation-related data, pointing out at problems inherent to the different regional innovation systems. More recently, some authors have developed a new empirically-based taxonomy of innovation patterns in region, dissatisfied with the previously mentioned ones. Focusing on the different modes of knowledge-innovation nexus and on the link between these modes and the territorial conditions in the regions, Camagni and Lenzi identify five distinct clusters of regions: European science-based regions, applied science-based regions, smart technological applied regions, smart and creative diversification regions, and imitation innovation regions.
These authors focus more on potentials than problems, as there are several trajectories from knowledge to innovation, and innovation to growth. Hence regional policy aims must address and mobilize those specific potentials.

There is currently a fluid and unfinished process between the development of the meta-rationales on the one hand, and the specific policy implications derived from economic taxonomies. This fluidity is reflected in the vibrant scholarly debates that criticize, substantiate and/or aim at revoking some of the assumptions from these meta-rationales, while searching for policy-friendly guidelines that are both theoretically and empirically solid from the perspective of knowledge economics (Boschma R 2014).

The rapid development of these rationales for regional innovation policies has not been followed by a similar rapid growth of policy analysis. There are today only a few numbers of studies of regional innovation policies. There might be two reasons for that. Firstly the conceptual difficulties associated to the multi-level dimension of policies. This has to do with cross-national diversity on the role of regions (OECD 2011a), with the difficult analytical distinction between regional policies from national policies with regional effects (Magro E & Wilson JR 2013), and with the complexities of multi-level coordination in the region (Nilsson M & Moodysson J 2014). And secondly, the empirical difficulties of dealing with data that is not easily accessible. We will address these issues below. In the meanwhile it is worth noting that there are relevant results emanating from the scarce policy analyses. One of the first studies has shown the large diversity of policy instruments used and developed by regional governments. In their 2003 study Asheim et al identified no less than 40 distinct policy instruments in 11 European regions (Asheim BT et al. 2003). Through time, the subsequent studies have been gradually providing more sophisticated approaches to the policy mixes of regional innovation policies. From the initial distinction of Garofoli and Musyck of 7 general set of policy instruments (Garofoli G & Musyck B 2003), to the larger pool of 31 policy instruments identified by a later study of the OECD (OECD 2011b). Likewise, regarding the choice of innovation policy instruments, some authors suggest an even more detailed picture of policy instruments, according to the innovation system approach (Borrás S & Edquist C 2013).

In contrast with these comparative studies above, single-case studies have provided a detailed analysis of individual regional innovation policies or instruments. Studying one specific instrument in Germany, Eickelpasch and Fritsch have shown that the critical issue is not really on their design, but on their implementation, and how these instruments tend to transform through time (Eickelpasch A & Fritsch M 2005). Likewise, studying one region, some authors have found the tendency of regional governments to be too generic when designing policy instruments, not customizing enough regarding the specific needs of the industries in the region (Martin R et al. 2011).

The literature on policy analysis reviewed here provides useful insights about the developments of regional innovation policies from the perspective of innovation policy.
instruments and their mixes. However, it leaves unsolved a series of relevant issues that need further attention. The next section deals with them.

3. Operationalizing Policy Analysis

This paper suggests the operationalization of regional innovation policy analysis to be based on two interrelated issues, namely, the study of the multi-level dimension of innovation policies in which the regional policy is embedded; and the study of the (changing) priorities and focus of each regional innovation policy through time. The first of these issues, the multi-level dimension, will examine the degree of coordination across governmental levels in implementing innovation policies at the regional level. The second of these issues, the study of policy priorities, will provide insights in terms of the ‘smartness’ of individual regional innovation policies, considering critically the extent to which they have responded to existing problems and they have generated new opportunities in the regional innovation system.

Regarding the first issue, the design, development and transformation of public policies at the regional level (sub-national level) takes always place in a complex multi-level system, engrained in the specific politico-administrative nature of the state in question. This multi-level dimension is an unavoidable issue in any form of policy analysis, because it helps identifying the legal, organizational and economic resources that regional governments possess in order to develop their regional policies, as well as the complementarity or overlap of different levels’ actions. Often these frameworks are dynamic, with observable changes through time in terms of the resources, as well as of the mechanisms put forward to coordinate and negotiate policy action at different levels. The growing regionalization of innovation policy refers to the growing attention about the relevance of the regional dimension of innovation processes, and hence of suitable regional innovation policies (Fritsch M & Stephan A 2005). Yet, in spite of several new mechanisms for coordination in Europe, coordination has generally not gone very far given the lack of attention to the large diversity across regions and countries (Kaiser R & Prange H 2004). This shows that coordination is far from automatic, but a complex process that deserves analytical attention on its own grounds.

Regarding the second issue to be examined, the ‘smartness’ of regional innovation policies are based on analytical framework of Smart specialisation mentioned earlier in the paper. Smart specialization policies are public interventions in situations when the spontaneous process of Smart specialization (based on three subsequent dynamics of: entrepreneurial discovery and spillovers; agglomeration and entry of complementary business; and structural change and diversification in the economy) do not take place. Smart specialisation policies are designed with the purpose of generating this Smart specialisation, and they do so by aiming to transform the regional economic structures and to build capabilities in new fields. This paper examines these issues in the recent development of some regional
innovation policies. In particular, it examines the extent to which regional governments have
given attention to the institutional set-up of the innovation system, and have changed the
budgetary priorities in this regard, aiming the implementation of these new policies.

The ‘smartness’ of regional innovation policies are analyzed here in those terms. In so doing,
we aim at analyzing the policy changes (or lack thereof) on the basis of a series of
expectations based on the ‘smart specialization’ framework. This is naturally something
different than EU’s RIS³ regional policy. For this reason, this paper is not an evaluation of the
way in which RIS³ plans have been implemented in the EU regions, but an analysis of policy change based on the analytical clues provided by the principles and premises defined by the
‘smart specialization’ approach.

Our study expects to find evidence about two following trends. Firstly, given the severe
nature of the financial and economic crisis, we expect some visible signs about a change of
path regarding the coordination efforts across different levels of government, to improve
effectiveness of policy implementation, given the shortage of resources. As mentioned
above, coordination is far from an automatic process. Severe crisis might trigger
strengthened policy cooperation across levels of government, or on the contrary, it might
trigger distributive conflicts due to diverse perceptions associated to zero-sum games and/or
lack of trust among partners. In other words, we expect some form of change of trajectory in
the way in which the multi-level governance was organized before the crisis compared to the
years after.

Likewise, the second expectation of this study is that the economic crisis has triggered a
significant change of regional innovation policies since 2008. Regional governments,
confronted with slow economic growth or recession, and with increasing losses of jobs,
might increase their interest on issues of growth and job creation, including the promotion
of smart specialization strategies. Hence, we expect that regional governments to put more
emphasis on entrepreneurship discovery-related areas like university-industry collaboration,
innovation networks, technology transfer, incubators, and other entrepreneurship-oriented
actions. Hence, we expect some change of trajectory of regional policies in that direction,
both in terms of institutional transformations as well as budgetary priorities.


Spanish innovation policies in recent decades show some institutional characteristics that
make this country especially appropriate for our study. On the one hand, Spain has been
hardly hit by the economic crisis during the period 2008-2014. With a double peak and
strong fiscal deficit in the last years, governments had to confront many changes in their
environment, and to make hard choices in their innovation policy priorities. On the other
hand, Spanish regions have the possibility to formulate their own regional innovation
policies, although financing is not supported by the central government. This reveals strong
preferences by regional governments, when they promote these policies. Also, national innovation policies in Spain have been very homogeneous over the territory during several decades, without establishing differentiated regional strategies. Thus, all strategic variations remain at the regional level.

Spanish research and innovation policy in Spain has not developed a collaborative inter-governmental approach in recent decades. During the 1980s, strong confrontations occurred between the central government and regions like Catalonia or the Basque Country, related to who had formal responsibilities for this policy. Spanish governments used the article 149.1.15 of the Spanish Constitution stating that “promotion and general coordination of scientific and technical research” is an exclusive competence of the central State, to concentrate all responsibilities and resources in their hands (Garcia Arroyo et al., 2007), and the Spanish Parliament enacted the Science Law 13/86 establishing the policy framework and the instruments to implement a research and development policy in Spain, not taking into account the role of regions at all. This law was strongly opposed by the Basque and Catalan regional governments, which contested it in the Spanish constitutional court, arguing that it was entering regions’ responsibilities. Finally, the Constitutional Court ruled against the Catalan demand (sentence 90/92, 11 June), validating the 1986 Science Law (Cueto, 2002). However, the Court accepted that Spanish regions might have their own R&D promotion policies, but without any financial support from the central government (Diez Bueso, 2012).

This original confrontation prevented the development of Inter-governmental relations within the Science Law framework. From the central government, there was not any attempt to promote regions as active actors in Spanish R&D policies, neither by mean of focused plans, or by establishing particular agreements adapted to the characteristics of each region. For example, in spite of defining a General Council of Science and Technology, to involve regions in policy formulation, in fact this Council almost never met (Garcia Arroyo et al., 2007). In addition, the National Plans developed since the establishment of the law, and all the instruments progressively introduced during the period this law was active, never had a regional policy dimension. On the other side, over the years regions started to develop their own policy initiative in this area, some with a complementary focus to the national innovation policies, others developing progressively a comprehensive policy design aiming to shape the regional research and innovation system. Only in January 2009, the Basque Country obtained the devolution of the R&D policy to its regional government, including the appropriate funding. Thus, for this region, the role of the Spanish government in R&D policy remained residual, considering only general coordination and planning issues. However, for all other regions, funds for their innovation policies should be detracted from own sources, including also European regional development funds. In fact, European regional policies contributed largely to the development of innovation policy frameworks in many Spanish regions. As EU programs required the development of strategic planning capabilities at the regional level to articulate funding initiatives, many regions started to elaborate multi-
annual R&D planning documents, forcing them to make more explicit and coherent their strategies.

In the summer 2011, at the very end of the Socialist government, a new science law was passed (Law 14/2011) in the Spanish parliament. This new law reinforced the role of a coordination body between the central government and the regions for R&D policy, establishing a stronger Council and providing regions with some additional responsibilities. However, the Council meet very scarcely in the years after (only two times in four years, from 2012 to 2015), under the Conservative government, and it did not assume the leading role expected when the law was negotiated. In fact, the position of Catalan and Basque representatives was not to reinforce such multilateral Council with all regional representatives, but to assure that the new regulation would not undermine the basis of their own regional policies, while seeking bilateral relations with the Spanish government whenever possible. Thus, we find that inter-governmental relations in the area of innovation policies have not worked at all in Spain, besides some formal linkages between EU initiatives and programmes and regional governments (often under the supervision of the central government). This unusual situation has allowed the coexistence of a standardized innovation policy for the whole Spain, on the hands of central government, and separated innovation strategies and goals promoted by each regional government, partiality sponsored and promoted by EU regional development programs, involving for example the use of the partnership principle and the most recent RIS3 methodologies for promoting smart specialization.

Looking now at the set of policy instruments and R&D&I funding at the Spanish and regional level, the picture does not look better. Since the mid-1980s the Spanish government has been launching multi-annual National Plans for R&D, investing significant resources to promote research in the whole country. These National Plans, however, did not integrate a collaborative framework with the regions; neither did it adapt its various instruments to different region’s level of development or to their particular industry characteristics. These Spanish programs have been designed as a set of public policy instruments offered to all parts of the Spanish territory, essentially focusing on research and basic science, with very few of them promoting technology transfer and innovation (Fernández-Esquinas M & Ramos-Vielba I 2011). There are only few cases of joint initiatives or bilateral collaboration between the Spanish and regional governments on some instruments, usually involving EU-funding (for example the instrument InnoEmpresa, funded by the ERDF), or involving co-funding of scientific infrastructures.

As a consequence, regional governments not completely satisfied with national policy in R&D developed their own policies to complement or emphasize those goals and strategies they considered fundamental to their regional development objectives. In fact, this particular environment creates an opportunity, as a natural experiment, to examine how regional governments separately develop and implement instruments aiming to match their respective regional innovation problems.
Between the mid-1980s and 1990s most regional governments in Spain have created regional innovation policies. This offers an opportunity to examine the extent to which (and how) have their specific instruments aimed at matching their respective regional innovation problems. Variations regarding regional government expenditures in R&D policies are relatively large, particularly during the crisis period. Figure 1 shows variations in regional government expenditure in R&D in million Euros in 2009 and 2012. We can see that all Spanish regions, but Galicia, decreased; most of them quite dramatically. The figure allow us to identify how important are considered these policies by regional governments. While 2009 was a year in which public spending was still expansive, aiming to confront the crisis, 2012 was in a middle of a strong fiscal adjustment, with multiple cuts in most areas of spending. Thus, avoiding a large cut (or indeed increasing spending as in Galicia), was a tremendous effort for those regions who tried to keep their commitment with these policies.

Figure 1: **Evolution 2009-2012 of regional governments’ expenditure in R&D (Milions Euro)**


5. **Selection and characterization of regional case studies**

The main aim of this paper is to analyze the actual features of regional innovation policies, focusing on the identification of regional government priorities to cope with the economic crisis and beyond. Thus, to gain variation in our dependent variable, we should compare regions as different as possible, within a broader context being as similar as possible. This will allow us to better identify and assess the relevance of variables strongly related to the
local level on regional innovation policy, as far as we control external variables at the national and international levels.

The case of Spain represents a natural fit to these requirements, as far as inter-regional diversity in Spain is very large, both in terms of economic development levels, industrial and services activity and overall innovation performance in the regional economies. We selected some Spanish regions that cover the most substantial variations identified by the literature. We undertake the analysis of four regions, namely Catalonia, the Basque Country, Andalusia and Galicia. Based on Tödtling and Tripl (2005) typology of regional problems, they represent an old industrial region having lack of knowledge diversity (Basque Country), a metropolitan region with problems of fragmentation in their capabilities (Catalonia), and two peripheral regions with problems of organizational thinness (Andalusia and Galicia). We also choose these regions because they are the more committed to regional innovation policy in Spain. All of them show a continued policy involvement in regional innovation over the economic crisis, at least. They are the only four regions in Spain having a higher share of regional expending than the share of national-funded expending in 2012 (see figure 2).

Figure 2. Share of R&D expenditure in Spain by regions, funded by Central Government (AGE) and Regional Governments (CCAA), 2012

![Figure 2. Share of R&D expenditure in Spain by regions, funded by Central Government (AGE) and Regional Governments (CCAA), 2012](source: Instituto Nacional de Estadística, 2015.)
After a careful consideration and exploration of different types of data, we will rely on a mix of qualitative and quantitative assessments about major differences in the policy strategies among the four idiosyncratic regions selected. We aim to identify the influence of multi-level policy making in the regional policy, and to observe the variations in their policy priorities during the last two decades, examining in detail the extent of policy change, and gauging its policy coherence. In doing this, we will be able to discuss more in detail the expectations placed in the previous section of this paper. Previously, an initial characterization of our case studies making use of the literature to classify Spanish regions according to their system of innovation, allows us to an identification of their most relevant problems, expecting to confirm our adaptation of Tödtling and Trippl (2005) typology of regional problems.

Among several attempts to identify Spanish regions’ differences in innovation policies, we should highlight the early report of Sanz-Menéndez & Cruz-Castro (2005), who distinguished between two approaches to innovation policy by regional governments. On the one hand, the academic approach, evident in those regions where most of the R&D initiatives are focalized to the academic community (mainly universities and public research centers); on the other hand, the business approach, noticeable in those regions focused to applied research and technological development within the business community (mainly technological centers and innovative firms). Considering the period 1980-90s, they found a predominance of the first approach in most regions, with only a case clearly related to the second (the Basque Country). They also identified some attempts to change the approach towards a business-oriented policy in some regions (Catalonia in the 1980s, Andalusia and Galicia in the 1990s), which didn’t reach the critical mass necessary for a tangible policy change. They conclude their analysis by suggesting that resistance to policy change was related to strong path-dependence and the dominant influence of well-established academic communities (Sanz-Menéndez & Cruz-Castro 2005). In the next section we will examine, regarding our four case studies, to what extent regional policy approaches have changed over the last decades (2000-2015), or remain almost unaltered, in spite of pressures for smarter innovation policy strategies, particularly during the period of the crisis, from 2008 onwards.

However, the distinction proposed by Sanz-Menéndez & Cruz-Castro to regional innovation policy, between academic and business approaches, is too simple for our purposes, as it focuses mainly on the beneficiaries, not on the problems. To understand better constrains of regional innovation policy, and the strategic options of regional governments in pursuing smart specialization, we need to rely on more refined distinctions of regional innovation patterns, that condense their main structural settings. Two recent economic studies have focused on the features of regional innovation systems in Spain. Based on the dissimilarities they highlight, we provide here an initial characterization of problems our four regions should face to introduce a smart innovation and specialization strategy.

The first study is the recent typology of regions according to different dimensions of the regions’ innovation patterns (Capello R & Lenzi C 2013a). Their multi-dimensional approach
separates knowledge from innovation, acknowledging that there are different possible patterns and pathways in which these two relate to each other in the knowledge-based economy. Thus, this approach does not assume that there is a superior or ‘one-size-fits-all’ pathway, but alternative ways or organizing the nexus between knowledge and innovation. Therefore they undertake three different analysis of European regions’ typologies according to three different dimensions, namely, industrial and high-tech service specialization (typology I), technological activity and human capital endowment (typology II), and linkages to external sources of knowledge (typology III).

When examining the positioning of our four cases, we can find somehow unexpected results. In the typology I, Catalonia and the Basque country are considered ‘advanced manufacturing regions’ whereas Galicia and Andalusia are found as ‘low tech regions’ (Capello R & Caragliu A 2013). It is worth noting that no Spanish region is ‘technologically advanced region’ which is the most intensive high-tech type in this typology. Regarding the typology II, that looks into scientific human resources, only the Basque Country, Navarra and the Madrid region are considered ‘scientific regions’. Catalonia is a ‘human capital intensive region’, whereas Galicia and Andalusia are ‘regions with no specialization in knowledge activities’ at all (Colombelli A et al. 2013). This is somehow surprising for the case of Catalonia given its extensive emphasis on scientific knowledge production. As the findings of these authors indicate Catalonia shows a significant quantity of human capital, but with below-average specialization in knowledge production. Last but not least, typology III examines the linkages to external sources of knowledge along the axis of low/high informal or formal linkages. The Basque Country is a ‘globalizing region’ with high formal linkages and low informal linkages; whereas Catalonia, Andalusia and Galicia are all three ‘non-interactive regions’ scoring low on formal and informal linkages (Miguelez E et al. 2013).

The second one is an assessment of the fragmentation/connectivity between the different types of actors and activities within each regional innovation system (Alberdi Pons X et al. 2014). The authors identify deductively four possible sets of gaps or forms of fragmentation to which they assign some variables for the empirical analysis. Hence, they distinguish between ‘managerial gaps’ (the weakness of knowledge and managerial capacities within the companies and between companies and their external environment), ‘structural holes’ (the weakness of firms’ associative connections, innovation collaborations, and market interactions buying external services), ‘innovation gaps’ (lack/low relationship between productive system in the region and the innovation-related structures), and ‘the valley of death’ (availability and number of firms obtaining risk-willing capital to finance their innovative activities).

Focusing on our four cases, we find out that, on the aggregate level, Catalonia and the Basque Country have relative positive levels of integrated innovation systems, with low fragmentation and good connectivity among the actors in the innovation system. This is not the case for Andalusia and Galicia, regions that pertain to the least integrated and most fragmented ones among Spanish regions. It is worth noting however, that Catalonia is
relatively weak compared to the Basque Country on the ‘innovation gap’. Particularly revealing are the relative low scores in Catalonia about the amount of public support to firms’ innovative activities, to the firms’ external contracting of R&D services, and to the firms’ interactions with public research organizations (including universities). Regarding ‘managerial gap’, both Catalonia and the Basque Country perform less well relative to other regions in Spain. These remarks point to the fact that, even if Catalonia and the Basque Country are relatively more integrated than other regions in Spain, they still suffer from visible weaknesses, and are notably behind best performers in a European comparison. Andalusia and Galicia, as expected, appear as highly fragmented regional systems of innovation, and Andalusia in particular, presents manifestations of a very low innovation capability.

Summarizing the main results of these studies, we may emphasize that each region has a particular set of challenges to improve its regional system of innovation. Catalonia appears as a large metropolitan area with low fragmentation but persistent innovation and managerial gaps, still lacking of global links as to their innovation initiatives. This is a region with a traditional advanced manufacturing and well-trained human resources, but feeble science-based activities that habitually remain quite isolated in academic settings. The Basque Country appears as an old industrial region with global linkages as to their innovation activities, and a labor force having a stronger scientific basis in advanced manufacturing. The regional system has low fragmentation, but many innovation and managerial gaps continue, where the academic side remains underdeveloped. On the other side, the two regions of Galicia and Andalusia show a lack of technological specialization, weak human resources capabilities and low global linkages. They are peripheral regions, with fragmented systems of innovation and multiple shortcomings as to their capabilities to promote sophisticated policy strategies.

6. The Regional Innovation Policies of Catalonia, Andalusia, Galicia and Basque Country

This section and the following present and discuss the four cases of regional innovation policy in Spain identified above, aiming to explore the institutional strategies of their regional governments, and to examine how they address the specific problems of their regional context. It is critical to remind that all four selected regions share a committed effort to invest significant amounts of their own regional public resources into the regional innovation system.

Starting with the Catalan case, during the 1980s and 1990s its policy priority was intensively oriented towards supporting basic research activities in universities, reinforcing an orientation already intense at the Spanish level. However, since early 2000s, a policy change began, and new priorities emerged. On the one hand, the Catalan government started to
promote separate structures outside universities, namely, public research organisations (PROs), mainly in basic science. On the other hand, some few policy instruments were introduced promoting technology and innovation in firms, as well as technology centres (i.e., sectoral cluster programs). Separate regional governmental ministries, having few contacts among them, leaded these initiatives. This created what (Bacaria J et al. 2004) called “the bipolar structure of the Catalan regional innovation system”, two separated policy frameworks, while the later almost ignored basic science and academic research, and the former perceived the business world as very distant.

This bipolar structure has remained quite stable during the last fifteen years in Catalonia. While the Catalan Agency of Economic Development supported a network of technology centers and provided some direct assistance to industrial clusters and innovative firms, the establishment of basic science-oriented Public Research Organisations (PROs) separated from universities (although with weak links with them in many cases), was aimed to raise Catalan scientific and research performance, and to reach top-level quality at the international science scene. Prioritizing excellence in science and basic research has continued during more than fifteen years, while Catalan universities are no longer the leading actors in the public research efforts, and some of their best faculty have moved out to the new PROs.

The advancement of technology and business-oriented innovation policies in Catalonia has never reached the same high level of political priority as the academic and science excellence development strategy. The Catalan Agency for Business Development promoted technology centres since early 2000s, but they were not entirely successful. These centers were to run large projects in collaboration with the industry (i.e., European research grants), and to establish some weak links with universities, attracting some of their researchers. However, overall, they did not manage to play a nodal role connecting firm knowledge and technology needs with research activities. Furthermore, firms have not been the target of any significant R&D&I programs by the Catalan government (and firms rely almost entirely on the support provided by the Spanish technology agency CEDETI).

Only during the period 2007-2009 there was a short-lived attempt to shift priorities to build a more integrated innovation policy in Catalonia. A new regional government merged the Vice-Ministry for Research and Universities with the Ministry for Economic Development, uniting for the first time all responsibilities for research and innovation in a single department. However, effective coordination proved to be quite difficult, and the new innovation-oriented policy priority never truly took off. Consequently, most of the bipolar policy structure remains unaltered.

Most relevant is the fact that during the economic crisis hardest years of budgetary retrenchments (2011-2014) the new regional government made efforts to keep the Catalan bipolar model unaltered. On the academic side, while university resources were cut very significantly, basic science PROs kept most of their levels of funding. On the firm-based
innovation side, the regional Ministry of Economic Development experienced a large reduction of the funds available for innovation policy instruments. Only a few innovation programs subsisted, and most technological centers were merged in order to gain effectiveness. Simultaneously some few new programs seeking to foster connections of universities centers and universities with firms have started to emerge in the strict context of European Union’s RIS3 policy (Regional Innovation Strategies).

Moving to Andalusia, we find a different development path in its regional innovation policy, but the problems are similar to the Catalan case. Andalusia also initiated its own policy in the 1980s, with an orientation focused to reinforce universities’ research activities until 2000 (Romero et al., 2003). In a similar vein than Catalonia until early 2000s, university and research policies in Andalusia were stronger and better funded than technological and innovation policies, which remained completely separated in other administrative bodies. In Andalusia, university and research policy was located within a ministry, while technology and innovation policies suffered of institutional instability, with discontinuous policy implementation (Quesada & Rodriguez Cohard, 2014).

In the 2000s, a new policy design for innovation policy was introduced in the region, strongly influenced by European narratives on industry and innovation in the framework of the Lisbon strategy. The establishment of technological centers became the central strategy to promote development and innovation, while cluster policies were also introduced. This represented also a case of policy transfer within Spanish regions: while the later where inspired in Basque Country and Valencia initiatives, the former replicated the few initiatives launched in Catalonia during the previous decade. However, fragmentation of innovation policies in the region remained. This new policy initiative also represented significant priority shift: while funds for innovation and technological development escalated at that time, funding for universities and research stagnated or decreased.

Aiming to overcome the bipolarity problem, in 2004 a governmental reorganization merged research, universities, firms and development policies in a single department. The involvement of universities to promote innovation and economic development was one of the main goals behind this strategy. The new institutional strategy involved also the creation of new agencies to strength collaboration between industries and universities. The new institutional design was quite impressive, but it proved to be excessively large and complex to the needs of the Andalusia regional innovation system, making policy implementation difficult due to a multitude of practical problems (Quesada Vazquez J & Rodriguez Cohard JC 2014). Years after, during the crisis, this design was substantially simplified, although policy priorities remained unchanged.

According to region experts, this integrated model is far from functioning effectively. The capacities of the productive system to absorb scientific knowledge and foster innovation remains quite week, without knowledge transfer mechanisms to SMEs, for example. However, instead of addressing such problems, most efforts in recent years by the regional
government went to prioritize technologically intensive sectors and provide high-tech services to big firms (Quesada & Rodríguez Cohard, 2014).

The origin of the regional system of innovation in Galicia was very feeble, with few policy initiatives and frequent failures until the 1990s (González López, 2003). In addition, R&D spending was not a priority for Galician governments at that time. Until the year 2005 the amount invested remained below 1% of the regional GDP. Only in the second half of 2000s research, development and innovation became a priority (reaching 1.8% in 2010). The Plan Gallego de I+D+I 2006-2010 launched by the regional government, aimed at increasing human resources devoted to research and development, in particular within public universities.

During this period, there was a strong institutional stability regarding the public bodies in charge of the policy. The regional Ministry of Education was responsible for the main strategy focused in supporting research and development in universities. In addition to improve actual levels of academic personnel—and to improve its productivity-, a major focal point for funding was the establishment of a number of large research centers within universities, in particular at the Univ. Santiago de Compostela (where 26 centers were established). Likewise, a network of technological centers was also established (RECETGA), each center devoted to a very specific area of activity, often in collaboration with firms operating in the area. The network aimed to support business development in some economic areas with relevant potential. However, the low levels of private R&D investment, and the absence of high-tech firms, lack of patents, and few policy instruments, undermined the effectiveness of the newly created network of technological centers (Vence X 2010).

The subsequent plan, Investigación, Innovación e Crecemento 2011-2015, strengthened development and innovation programs by the regional government. In this context, the Galician Innovation Agency was launched, as a tool to promote a more articulated innovation policy. The new agency, created in January 2012, was separated from the agency supporting SMEs. Thanks to the resources made available to the innovation agency, it assumed soon a key role in implementing R&D policies in the region, introducing new programs fostering connections between firms and knowledge centers (including universities) and supporting research broadly. In parallel, traditional programs to support human resources at universities remained within the Ministry of Culture and Education, where universities are highly influential in defining the higher education policy.

The Basque Country has developed a regional innovation policy centered on supporting the business and industrial communities, that includes many elements of continuity since the 1980s. For most of this period, the Department of Industry has been the leading public body responsible for the design of regional innovation policy, focusing on the modernization of the Basque economy (implemented by the Basque Agency of Business Development, SPRI). The development of well-funded technological centers aimed to establish solid links with the
industry, and direct support to firms engaged in innovation and research activities, have been the two main pillars of the region innovation system for more than 30 years.

The Basque innovation system initiated a policy priority shift in mid-2000s that started with the introduction of new institutional developments. The overarching Basque Council of Science, Technology and Innovation was established in 2007, and was aimed to coordinate all the relevant actors, including universities, government departments and agencies, key politicians, and firm representatives. Some new implementation agencies where created at the same time: Ikerbasque, focused to fund and promote basic research, and Innobasque, oriented to innovation initiatives and to stimulate connectedness within the regional innovation system. Also, in 2010 the well-established technological centers merged in a single organization (Tecnalia), to gain more operational capabilities. Introducing these new agencies was an attempt to remedy the separation between the academic and business communities, and to broaden innovation policies beyond technological developments.

During the 1980s and 1990s, the university and its research activity was not considered relevant for Basque strategy of innovation policy, and the interaction with industry was residual. Thus, research in universities was not strongly sustained by the regional government. In fact, basic science was not a priority of the regional government until late 2000s, once the new institutional design had been established. The 2010 plan on Science, Technology and Innovation, introduced as new goals the need to impulse basic research, and also to strength linkages between science and industry, not well recognized until then. The view behind was to expand the knowledge base of industry, to make the industry capable of absorbing broader innovation possibilities, having wider and better relations with the scientific research community. However, the traditional separation between these two worlds created an institutional path that remains difficult to rectify (OECD, 2011), and scientific weaknesses is still a challenge in the regional innovation system.

7. Regional innovation systems in Spain: comparative perspectives

In this section, we use data from the yearly R&D survey elaborated by the National Statistical Office (Instituto Nacional de Estadística, INE) from 2001 to 2013, to examine R&D expenses in our four regional cases in Spain, identifying the sources of the funding (who is paying), and the sector performing the R&D activities (who is making the expenditure). This data does not allow us to identify which level of government (EU, national or regional) is the funding source, as it only refers to ‘public administration’. However, it states whether the sources of funding are public administration, universities, private sector, or foreign. To avoid problems of scale when comparing the four regions, we transformed the data to Euros per capita (and adjusted Euros to inflation). We also provide some information about the share of regional expenses, respect to the total national expenditure, from the same source.
Figure 3 shows the total amount of R&D expenditure in the region by all sources of funding combined. We observe how the economic crisis has been reducing real expenditure in recent years after a peak in 2008 for all regions. It is worth noting that Catalonia and Galicia suffer larger reductions. However, most relevant is the amount of real expenditure among regions. While Andalusia and Galicia had some reduction but kept about the 100€ expenditure level per capita during the crisis years (probably with a large effort), Catalonia had about 250€ per capita expenditure in 2013, descending from 300€ level before the crisis. Most impressive is the Basque country, with approximately five times more expenditure than Andalusia or Galicia year after year since 2006. The share of Basque Country in R&D expenditure respect to the Spanish total expenditure moved from 9% in 2007 to 12% in 2012; while Galicia remained about 3%, Andalusia about 8%, and Catalonia descended from 22% to 21%. Thus, we observe that the two old industrialized regions have sustained a larger expenditure level than the two less developed regions during all the period, and in particular the Basque country made an extraordinary effort since 2006-07, coinciding with its new strategic development (see next section).

**Figure 3: Total R&D expenditure in the region, in Euros (constant price) per capita**


How is this expenditure distributed among main regional actors in innovation policy? Figure 4 shows the evolution of R&D performed by firms, which is funded by public administrations. It is possible to observe the low levels existing in all regions, except for the Basque Country (six times higher than the other regions, in spite of decreasing during the crisis). This data shows very clearly the business-oriented nature of the Basque country innovation policy (although its readjustment during the crisis), compared to the other regions, where public support to R&D performed by firms remains quite limited. Most relevant is the extremely
low level of R&D performed by firms in Catalonia, compared with its industrial tradition (see section 5).

**Figure 4: R&D performed by firms and funded by public administration (regional and national), in Euros (constant) per capita.**

![Figure 4](image)


Figure 5 shows the levels of expenditure in R&D performed by universities in region (in Euros per capita. Most of the funding sources are the public administrations (national and regional), while the EU, mainly through its FP6, FP7 and H2020 programs, funds about 3-5% and another 8-10% originates from private sources (firm contracts). What is interesting in this figure is the change of regional priorities through the years. If Catalonia was the region with higher expenditure per capita until 2008, and Galicia was very similar to the Basque Country levels, readjustments during the crisis period allowed the Basque country to be the region with the higher level of R&D performed by universities, while Andalusia is gaining positions compared to the previous years.

All in all, these changes illustrate the capability of the Basque policy-makers to readjust the policy priorities in recent years during the time of the economic crisis. In other words, after their institutional innovations in mid 2000s, and the establishment of new policy priorities in their strategic planning, the region was able to implement these new priorities in their expending distribution, in spite of the difficulties created by the crisis. On the other side, we observe the relative similarity of expenditure levels of all other regions, showing their difficulties to keep real levels of expenditure during these years.
Figure 5: R&D performed by universities, all funding sources, in Euros (constant) per capita.


Figure 6 shows the R&D activities performed by public administration, from all sources of funding. It reflects the activity of all public research centers, either the Spanish Higher Council for Scientific Research (CSIC) (the Spanish traditional PROs system), or the various regional public research organisations (PROs) networks and regional technology centers. Catalonia is the region with the most remarkable change of tendency from 2006 onwards, increasing five times the funding of these PROs; while the Basque country expands its funding as well, but only three times. The other two regions are more stable, although Andalusia also presents some expansion during the same period. Behind this figures, we find out the promotion of large basic research centers by regional governments during the 2000s, and the expansion the National network of CSIC. This reflects the significant effort made by Catalan Government to consolidate its own network of highly competitive basic science PROs, and the aim of Basque country to promote basic research more intensively. It is also worth noting in figure 6 the fact that the budgetary adjustments during the crisis are relatively limited. It is also important to highlight the capacity of some of the regions to attract foreign resources (particularly EU R&D funding), particularly the Catalan PROs (that represent about 30% of Spanish total for this performing sector).

The data reflects the importance of such strategies in Catalonia and Basque country, as far as this represents about 20% of total R&D expenditure in the region overall, and 8% in Basque
Country (but a much larger proportion if we consider only the regional governments as funding sources, particularly in Catalonia). While in the Basque country this reflects a strategy to strengthen basic research, in parallel to a similar effort for funding R&D performed at universities, which is considered the missing link in their innovation system; in Catalonia this policy priority reflects a governmental expectation to raise the levels of scientific excellence of basic research in the region, in spite of lowering universities research funding and missing an important opportunity to reduce the persistent bipolarity of the innovation system by seeking to redress the extremely low levels of R&D and innovation activities performed by firms in the region (see figure 4).

Figure 6: R&D performed by public administration (PROs and public technology centres), all funding sources, in Euros (constant) per capita.


8. Findings and Conclusions

In previous sections we have shown the evolution of the institutional framework and budgetary priorities of the four regional policies during the period 2001-2013. The extent to which these policies are ‘smart’ in the sense of the ‘smart specialization’ notions of regional innovation policy is a matter that requires considering the findings above in relation to the analysis of the regional innovation system patterns described in section 5. Starting with the
Catalan case, the analysis of Capello and Caragliu indicated that the Catalan innovation system is characterized as a weak science-based metropolitan region, having a profile as a ‘human capital intensive region’ type, but not a ‘scientific region’ type. This is basically because the region performs below average in terms of specialization of knowledge production as a whole (that is, the knowledge produced by all actors in the region, including industry, not just public research by universities or PROs). However, the priority of the Catalan government during the period examined was on funding basic research in PROs (see figure 6), to overcome low scientific performance of universities, but still having an strong academic approach to innovation policy, without major interest on other key performing sectors in the innovation system (firms own R&D and innovation activities, and technology and commercial R&D activities more generally). A policy attempt to address this situation in late 2000s, introducing institutional changes at ministry level, failed to produce relevant changes, and the dual system has persisted though time. This sustained strategy favoring academic excellence by successive Catalan governments, while renouncing to foster firm-oriented innovation policy programs, has been unable however to disseminate outcomes and create sufficiently diversified knowledge base in the regional economy – inhibiting a widespread scientific basis in industrial production. Likewise, this policy priority has not helped to redress the categorization of Catalonia as a ‘non-interactive region’, scoring below average among European regions on firms’ formal and informal linkages with international sources of knowledge production.

Regarding the connectivity of innovation actors in the Catalan regional innovation system, Alberdi Pons et al find that this region has generally a good level (Alberdi Pons X et al. 2014). However, it suffers from an ‘innovation gap’ due to the comparatively low levels of interaction between universities/PROs and the industry; and it suffers as well from a ‘managerial gap’ (or the weakness of firms’ knowledge capacities), scoring lower than other Spanish regions. Again, the lock-in of the Catalan government in support of science-based PROs to the comparative disregard of other key parts of the innovation system (most notably industrial innovation) might have exacerbated the effect and limited developments in advanced manufacturing during last decades, and was clearly not a smart move in order to overcome the severity of the decline in economic growth during the crisis years. This behavior was particularly visible during the crisis, with Catalan government’s remarkable reduction in all its public support to R&D, but not to basic science PROs, which suffered significantly less cuts than the other innovation policies (in particular compared to programs in support of technological developments by firms).

The Basque Country’s innovation policy has traditionally had a strong focus on firms and technological development. However, in 2007 the regional government initiated a policy change putting increasing attention to universities and PROs R&D performance, while keeping its traditional pro-firm and technological development policy. Against all odds, the regional government stuck to this in spite of the crisis that initiated shortly after. Apparently, results started to emerge few years later: according to Capello and Lenzi’s analysis (2013), the Basque Country is characterized as a ‘science region’ type as it has both
high level quantities of human capital and an above-average specialization in knowledge activities. Likewise, it is a ‘globalizing region’ with high formal linkages to international sources of knowledge production, but low informal linkages. The Basque government made efforts to create a series of institutional developments aiming at remedy the separation between the university/academic communities and the firm sectors. In this sense, introducing such policy change and sustaining it during the crisis can be considered ‘smart’ as they have addressed real problems and bottlenecks in the innovation system. According to Alberdi Pons et al, the ‘innovation gap’ of the Basque Country in the mid-2010s was smaller compared to other regions.

The two peripheral regions considered, Andalusia and Galicia, have made highly significant institutional and budgetary efforts during the period examined here. Most relevant is the budgetary dimension: Andalusia reduced relatively little its public commitment to R&D expenditure in the mid of the severe budgetary retrenchment in 2012, whereas Galicia in fact augmented it (figure 1). Both regions were also involved in institutional transformations during the 2000s, establishing new agencies to promote closer links between firms and scientific organizations, and reorganizing policy responsibilities. However, both regions have weak developmental basis, and are considered as ‘low tech regions’ and ‘regions with no specialization in knowledge activities’, with very limited interaction with international sources of knowledge production. Their innovation policies started to change during this period, but the crisis and its shortcomings probably made more difficult a bigger shift. They still continued, as in previous decades, to put emphasis in supporting university research activities, but did as well specific efforts to create a network of technology centres (Galicia), or to create a cluster policy and to coordinate economic development policies with innovation policies (Andalusia). In 2013 Galicia, invested a 50% more per capita than Catalonia to R&D expenditure performed by firms. It is perhaps in these two peripheral regions, where the absence of more integrated multi-level policy between the Spanish and the respective regional governments undermines the regional efforts to redress the regional innovation policy – a failure with more dramatic effects during the crisis period.

All these Spanish regions suffer, with the exception of the Basque Country, of regional innovation policy lock-in, and the scarce attempts of policy changes involving new institutional developments, usually do not evolve into serious changes in budgetary priorities. This is particularly the case for Catalonia, which has a relatively high level of economic and industrial development and consequently, better policy capabilities and more resources. Therefore, it is difficult to understand the Catalan government continuous policy choice in favor of research in PROs, to the detriment of a more innovation-focused approach towards the creation of specialized knowledge-base in the firms. Most likely this continuous choice is due to policy-makers’ idealized expectations to replicate world-class scientific environments in the expectation that these will eventually generate innovation and economic growth, without considerations regarding a realistic diagnose about the problems and opportunities in the territory. This calls for a renewed approach that integrates policy analysis in the theoretical frameworks of regional innovation systems, and in particular in
smart specialization analysis, putting emphasis on the deficiencies and bottlenecks in the system, which must in turn be addressed by ‘smart’ regional innovation policies.

REFERENCES


OECD (2011b) Road maps and smart policy mixes for regional innovation. In: OECD (ed) OECD Reviews Regional Innovation Regions and Innovation Policy, pp. OECD, Paris