Postprint version of the book entitled "An overview of the European Union innovation policy from the regional perspective", published in the book "Regions and Innovation Policies in Europe. Learning from the Margins", edited by M. González-López & B. Asheim, pp. 113-138, Edward Elgar. ISBN: 9781789904154.

Chapter 6

An overview of the European Union innovation policy from the regional perspective

Author: María del Carmen Sánchez-Carreira, Department of Applied Economics, ICEDE Group, Universidade de Santiago de Compostela
orcid.org/0000-0001-9265-2521

Abstract:

This chapter approaches the EU innovation policy, focusing on its key moments, rationales, objectives, main tools and trends. Among other actions, the Framework Programmes and the European Structural Funds underline. The EU innovation policy has traditionally focused on research, according to the linear model of innovation. However, innovation has been gradually introduced.

The EU innovation policy is characterised by a multilevel model, in which the regions have increasingly become relevant actors. Thus, the chapter tackles the regional perspective in the EU innovation policy. It also refers to the links between EU innovation and regional cohesion policies, from the background to the current smart specialisation strategies. The EU innovation policy, and mainly the Framework Programmes, have hardly considered territorial dimension, economic development or innovation level of the regions. Several attempts to include some cohesion element in the EU innovation policy have been made over time, through different tools.

Keywords: innovation policies, regional innovation policies, regional cohesion, Framework Programmes, European Structural and Investment Funds, European Union

1. Introduction

The innovative capacity of a given territory is a main driver for its long-term growth and development. Therefore, a combination of policies from different levels of government addresses to improve the innovation environment and capabilities. The different levels of government (European Union, national, regional or local) can design and implement policies that affect innovation, both directly and indirectly.

This chapter approaches the foundation and evolution of the EU innovation policy over time, focusing on its key moments, rationales, objectives, tools and trends; and emphasizing the regional perspective. The EU innovation policy has traditionally focused on research, according to the linear model of innovation. However, innovation has been gradually introduced. Among other actions and tools, Framework Programmes (FPs) and Structural Funds (SFs) underline.

Innovation policies are characterised by a multilevel model, because powers to implement policies are distributed among different levels of governments. Regions have increasingly become relevant actors. Nevertheless, the EU innovation policy, and mainly FPs, have hardly considered the territorial dimension, the economic development or innovation level of the regions. Several attempts to include some cohesion element in the EU innovation policy have been made over time, through different tools, outstanding SFs.

This chapter is structured in four sections. The first section deals with the foundations and evolution of the EU innovation policy, the key moments and rationales. The second section tackles the main tools of the EU innovation policy. The third section approaches the regional perspective of the EU innovation policy, focusing on the links between EU innovation policies and regional cohesion, from the background to the current smart specialisation strategies. The last section presents the main conclusions and implications from the analysis.

2. The foundation and evolution of the EU innovation policy

2.1. The context of the EU innovation policy

Innovation is a crucial factor to trigger economic development and growth. Therefore, policies that foster innovation are supported from different theoretical perspectives. The specific characteristics of innovation (uncertainty, indivisibility, not appropriability, externalities, public goods, …) argue for public intervention to boost innovation, based on different reasons depending on the theoretical perspective (Arrow, 1962; Dasgupta and Stoneman, 1987; Lundvall and Borrás, 2005; Vence, 2007; Foray, 2009; Fagerberg, 2017). The neoclassic perspective, based on the existence of market failures, justifies public intervention to generate incentives; whereas the evolutionist perspective, focused on systemic failures, underlines interrelations among the actors and elements that compose the innovation system.

Innovation policy should be understood in a broad sense, including scientific and technology policies, and industrial policy. Thus, it can be defined as any public intervention aimed at improving and encouraging the productive system (Rothwell, 1983; Lundvall and Borrás, 2005; Vence, 2007) or as all policies that have an impact on innovation (Fagerberg, 2017). In a narrower perspective, it refers to policies that attempt to affect innovation (Edquist, 2004), focusing on direct policies. Anyway, innovation policy is an overarching policy, which means that "it is not a single policy, but an entire set of policies and instruments" (Reillon, 2016, p. 30).

Based on the traditional importance of the linear model of innovation, innovation policy evolves from scientific to technological policy and later to innovation policy. Therefore, the focus moves from research and production of new knowledge to technologies and sectors, and later to innovation, attempting to improve competitiveness and economic performance (Lundvall and Borrás, 2005). This shift towards a systemic and interactive model of innovation means different and more complex policies, underlining the interactions among the different agents involved in innovation (see Chapter 1).

The three original treaties of the European Economic Community refer to research. Thus, the European Coal and Steel Community (ECSC) and European Atomic Energy Community (Euratom) treaties include research in the specific fields approached. The

Treaty of Rome leads to different research programmes prioritising advanced technologies (European Commission, 2016).

Within the EU framework, four different levels of government can design and implement innovation policies: local, regional, national and EU. This complex organisation requires coordination among the different levels of government (Kaiser and Prange, 2004; Barca, 2009; OECD, 2011; Uyarra et al., 2007; Baier et al., 2013).

The foundations for the EU innovation policy are found in the articles 179 to 189 of the Treaty on the Functioning of the EU. The EU has different competences on innovation, from making recommendations to the Member States (MS) or setting monitoring and benchmarking activities to full competences. The gradual inclusion of R&D and innovation policy in the EU treaties allows innovation to become a shared competence. However, this option has never been used yet. The EU innovation policy aims at supporting MS and regions in the development and implementation of an update and efficient innovation policy (Reillon, 2016). The intervention of the EU on innovation is based on the subsidiarity principle, which means supplementing national and regional actions, and consistence between national and EU policies (Reillon, 2017).

The Department of the European Commission (EC) in charge of the policy on research, science and innovation is the Directorate-General for Research and Innovation (DG RTD). However, due to the cross-cutting nature of innovation, other departments manage some innovation issues, outstanding the Directorate General Enterprise and Industry.

Opposite to many other EU policies, which are implemented and/or executed from the national and/or regional governments, most EU innovation actions are directly implemented by the EC. They tend to consist of funding for research and innovation, additional to regional and national budgets.

Beside the EU and national powers, the increasing role of regions underlines (Landabaso, 2000; Fernández et al., 2007; Fernández et al., 2010; De Brujin and Lagendijk, 2005; Tödtling and Trippl, 2005). However, the EU regional innovation policies differ concerning the level of competences, budgets, resources and capabilities, as well as their focus and main instruments (see Chapters 2 and 4, and the case studies in Chapters 9-12). Three different levels can be identified in regional innovation

policies: EU actions with regional focus; national actions with regional focus; and innovation policies specific to each region.

2.2. Key moments and rationales in the EU innovation policy

Beyond the references mentioned above in the founding treaties, the EU innovation policy comes back to the mid-eighties, focusing on research. Research and technological development were included in the Title VI of the Single European Act, becoming a formal community policy. It aims at strengthening the scientific and technological basis of European industry to become more competitive worldwide, considering the existing innovation gap with the USA and Japan. The Treaty of Maastricht included the title XV (Research and Technological Development), extending the scope to cover all research activities, from basic research to any field concerning EU goals, becoming a horizontal policy. Afterwards, the Treaty of Lisbon included research as a shared competence (Guzzetti, 1995; Reillon, 2015, 2017).

A relevant fact is the launching of the First Framework Programme (FP) of Research and Technological Development in 1984. These multiannual programmes are the main basis of the EU research and innovation policy and they have continued until nowadays. Nevertheless, there were some previous EU initiatives concerning research.

Within the context of the linear model of innovation and the importance of science-push, several international research organizations were created since 1950 and mainly in the 1970s. They are the European Organisation for Nuclear Research (CERN, 1954); the European Southern Observatory (ESO, 1962), Airbus (1972), European Molecular Biology Laboratory (EMBL) (1974), European Science Foundation (ESF, 1974) or European Space Agency (ESA, 1975) (Borrás, 2003; Lundvall and Borrás, 2005; Reillon, 2017).

Moreover, COST (Cooperation in Science and Technology) is an intergovernmental programme established in 1971 to support transnational cooperation in several scientific areas. It was the precursor of advanced multidisciplinary research, EU FPs, and Eureka, which started in 1985, focused on collaboration networks for firms, including non-EU countries.

Several programmes fund research beside FPs. These programmes tend to be sectorial (environment-LIFE-, energy-COMMET, THERMIE, VALOREM-, ICT-ESPRIT, RACE-, industry technologies-BRITE) or focused on SMEs (SPRINT) or peripheral regions (STRIDE). The STAR programme attempts to promote the access of SMEs of peripheral regions to telecommunications. The VALUE programme addresses the dissemination and utilization of the results of scientific and technical research (Vence, 1998; Rossi, 2005, Reillon, 2017).

The EU focus on innovation is recent. Thus, the EU have included explicitly innovation policies since the mid-90s. Two key facts were the Green Paper on Innovation, published in 1995, and the First Action Plan for Innovation in Europe launched in 1996 (Rossi, 2005). The Green Paper aims at identifying the factors that affect the EU innovation, proposing measures to increase its innovation capacity (European Commission, 1995). The Plan attempts to foster innovation culture, establish a favourable framework for innovation, and improve articulation between research and innovation (European Commission, 1996).

Two main EU strategies highlight in the twenty-first century. The first one is the Lisbon Strategy, approved in 2000, aimed at becoming the world most competitive and dynamic knowledge-based economy, capable of sustainable economic growth with more and better jobs and greater social cohesion. The Barcelona Summit, held in 2002, set up the goal of achieving 3% of GDP allocated to R&D expenditures by 2010, being two thirds executed by the private sector. This goal was ambitious, but the resources were limited. Therefore, the interim report shows the limited progress (Kok, 2004), which results in a revision of the strategy in 2005. One of the recommendations was to use cohesion policy instruments to advance in the Lisbon Strategy, as it happened for the 2007-2013 programming period.

Within the context of the Lisbon Strategy, the European Research Area (ERA) was created in 2001, as a European internal market for research. Thus, researchers, technology and knowledge can freely circulate. It also aims at gathering and coordinating EU research, to increase its impact. Other relevant facts were the creation of the European Research Council in 2007 to support frontier research across all fields, and the European Institute of Innovation and Technology (EIT) in 2008 to contribute to the sustainable economic growth and industrial competitiveness, strengthening the EU

innovation capacity. The EIT was the first EU initiative to foster and integrate higher education, research, firms and other agents involved in the innovation process, supporting knowledge and innovation communities (KIC) in key issues.

The second strategy is the Innovation Union Flagship, one of the seven flagship initiatives of the Europe 2020 Strategy for Smart, Sustainable and Inclusive Growth. It was approved in 2010 aimed at improving conditions and access to finance for research and innovation in the EU, to ensure that innovative ideas can be turned into products and services that create growth and jobs (European Commission, 2010, 2013). The Innovation Union sets the target of investing 3% of the GDP in R&D. It may be considered the first EU comprehensive innovation strategy, because it encompasses the whole process, from research to commercialisation, and it involves all agents. In this sense, the European Innovation Partnerships underline as a new initiative, which fosters cooperation along the whole innovation chain, joining relevant public and private actors at different levels (EU, national and regional levels) across policy areas and industrial sectors in specific societal challenges.

3. Main tools of the EU innovation policy

The EU innovation policy consists of different tools, underlining the FPs. Other relevant tools are the SFs, Other funds for research and innovation, and Other Actions.

3.1. The Framework Programmes

The main tool of the EU to foster innovation and mainly research was the multiannual R&D FPs, which set the thematic priority areas for science and technology in a certain period. Since the Treaty of Maastricht, the FPs have been not only a programming tool, but also a financial tool (Guzzetti, 1995; Vence, 1998; Reillon, 2017).

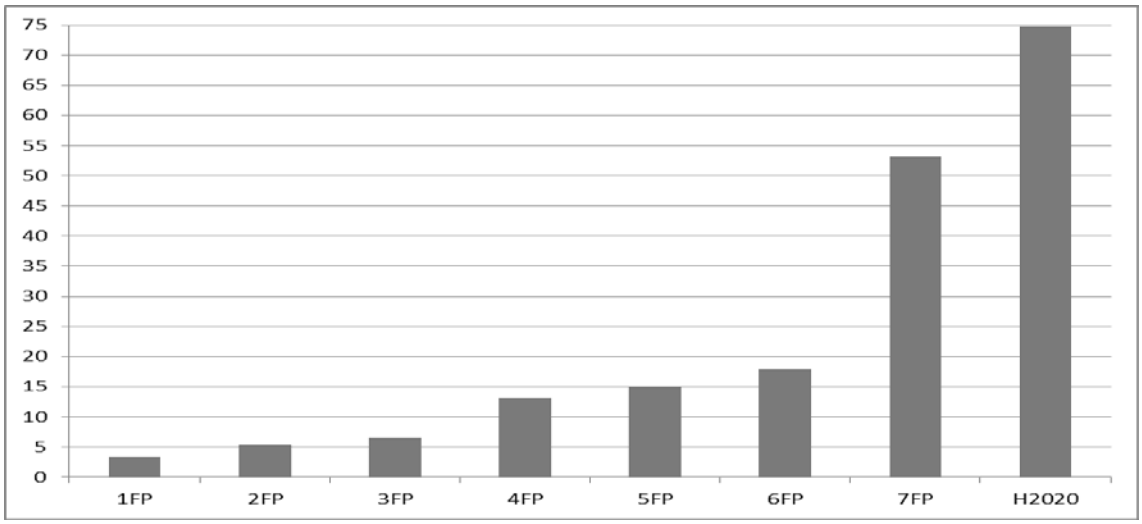
The First FP was launched in 1984 and focused on biotechnology, telecommunications and industrial fields. The FPs continued until the Seventh FP (2007-2013) (European Commission, 2016), when were substituted by the Horizon 2020 (2014-2020). They focused on funding research and projects, mainly on advanced technological areas, promoting cooperation among different disciplines, partners and countries[1].

The Fourth FP (1994-1998) was the first one after the Maastricht Treaty and it joins the different fragmented R&D community actuations to improve efficiency and coordination. It acts under the subsidiarity principle, providing European added value, and it introduces targeted socioeconomic research. The Fifth FP (1998-2002) meant a significant change, because requires that research serves society and citizens. The ERA also supposes changes in the goals and structure of the FPs (Vence, 1998; European Commission, 2016; Reillon, 2017).

The current EU FP for Research and Innovation is called Horizon 2020 (H2020). It was launched within the context of the Europe 2020 Strategy, addressing three main issues: excellent science, industrial leadership and tackling societal challenges. H2020 gathers the EU R&D&I funding and attempts to simplify the procedures, reducing bureaucracy and time. Its scope is broad, because provides funding from the idea to the market, covering research and innovation. It is not structured by thematic areas, but also by challenges. The main challenges are social ones, such as health, clean energy or transport.

The evolution of the FPs (Figure 6.1, Table 6.1) shows an increasing budget, mainly from the Seventh FP. The larger budgets show the growing relevance of research and innovation for the EU. Thus, the EU allocated less than 2% of its budget to research in 1981, while nowadays is roughly 7.5% (Reillon, 2017). Despite their main focus on research, more attention to innovation issues is noticed. Thus, the increasing focus on the SMEs is another feature, which is clear in the Seventh FP, complemented with the Competitiveness and Innovation Programme (Rodil, 2007).

Figure 6.1. Evolution of the budget of the Framework Programmes (Billion euros)



Source: Own elaboration based on Vence (1998), European Commission (2016), Reillon (2017), EUR-Lex and EC Information

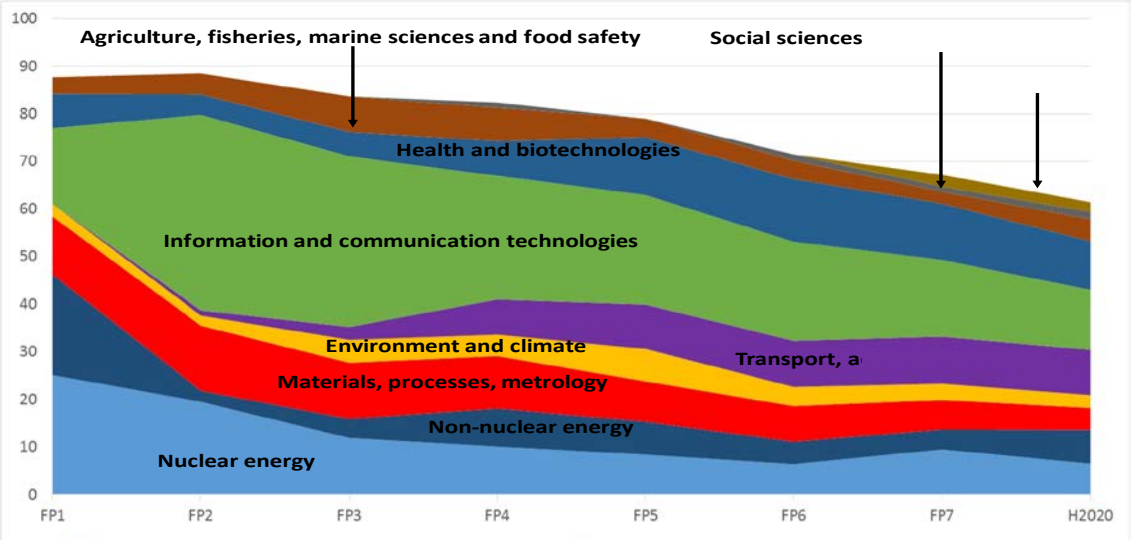
Table 6.1. Summary information of Framework Programmes

Framework Programme	Period	Budget (€ Billion)	Thematic priorities
First Framework Programme	1984-1987	3.27	Agriculture Industrial competitiveness Raw materials Energy Development aid Living conditions
Second Framework Programme	1987-1991	5.36	Quality of life (health and environment) ICT and services (including transport) Modernisation of industrial sectors Biological resources Energy Science and technology for development Marine resources
Third Framework Programme	1990-1994	6.60	ICT Energy Environment Quality of life Biotechnology
Fourth Framework Programme	1994-1998	13.12	ICT Industrial Technologies Environment Life sciences Agriculture and fisheries Energy Transport Targeted socioeconomic research
Fifth Framework Programme	1998-2002	14.96	➢ Quality of life and management of living resources - Health, food and biotechnologies - Agriculture, fisheries and forestries ➢ User-friendly information society - ICT - Future and emerging technologies ➢ Competitive and sustainable growth - Products, processes and organisation - Materials and measures - Transport and marine technologies - Aeronautics ➢ Energy, environment and sustainable development - Environment - Energy
Sixth Framework Programme	2002-2006	17.90	➢ Quality of life and management of living resources - Life sciences, genomics, biotechnologies - Food quality and safety ➢ User-friendly information society - Information society technologies - Nanotechnologies, materials and processes ➢ Competitive and sustainable growth - Transport - Aeronautics and space - Energy, environment and sustainable development - Citizens and governance in knowledge society
Seventh Framework Programme	2007-2013	53.20	Health Food, agriculture, fisheries, biotechnology ICT Nanotechnologies, materials, processes Space Transport and aeronautics Environment and climatic change Energy Socio-economic sciences and the humanities Security
Horizon 2020	2014-2020	74.80	ICT Nanotechnologies, materials, processes Biotechnologies Space Health, demographic change and wellbeing Food, agriculture, forestry, water, marine Smart, green and integrated transport Climate action, environment, raw materials Secure, clean and efficient energy Inclusive, innovation and effective societies Secured societies Future and emerging technologies

Source: Own elaboration based on Vence (1998), European Commission (2016), Reillon (2017), EUR-Lex[2] and EC information

Moreover, the range of topics has been broadened, shifting the focus from advanced scientific and technologic areas, to address societal changes (Table 6.1, Figure 6.2). However, the main areas funded by the FPs have been ICT, energy, health, transport and space, environment, materials and processes, and agriculture (Guzzetti, 1995; Vence, 1998; Andrée, 2009; Reillon, 2017).

Figure 6.2. Evolution of thematic activities of Framework Programmes



Source: Own elaboration based on EC information, EUR-Lex, EPRS and Reillon (2017)

Another trend is the decreasing number of specific programmes attempting to reduce fragmentation. Nevertheless, the horizontal actions aimed at supporting the EU research and innovation capabilities have been expanded and diversified, from the initial grants for transnational cooperative research projects to partnerships, as well as the bodies that manage them (Vence, 1998; Rodil, 2007; Reillon, 2017).

Table 6.2 shows other actions included in the FPs, which tend to be horizontal and broader, attempting to include all innovation aspects (from the initial support to international research cooperation, training and mobility, innovation and SMEs, societal challenges, access to risk finance or different kinds of partnerships). As a result of the implementation of these new instruments, the relative weight of thematic priorities was reduced from 90% in the First FP to roughly 60% in the current H2020. However, the budget for each thematic priority raises, since the overall budget has been continuously increased. Concerning the horizontal actions, the most relevant focuses on “Human Resources”. Other outstanding actions are “Innovation and SMEs, technology transfer,

dissemination of results" and "Research Infrastructures". "International cooperation" was one of the main instruments for implementing the FPs. However, its importance has constantly decreased, because it stopped being a specific activity to be included in the thematic priorities (Reillon, 2017).

In addition to the calls of the FPs, there are other initiatives that receive budget from them managed by countries (Joint Programming Initiatives, Article 185 initiatives and ERANETs) or industry (Joint Technology Initiatives). These initiatives attempt to join research efforts and enhance cooperation to achieve a higher funding scale to tackle social challenges and avoid fragmentation, which leads to a lower effectiveness (European Commission, 2008).

Table 6.2. Other actions included in the Framework Programmes (FP)

	FP1	FP2	FP3	FP4	FP5	FP6	FP7	FP8
Development and international cooperation		X	X	X	X		X	
Human resources (Training and mobility)	X	X	X	X	X	X	X	X
Innovation and SMEs, technology transfer, dissemination of results	X	X	X	X	X		X	
Research Infrastructures		X			X	X	X	X
Coordination and policy	X	X				X	X	
Science and Society						X	X	X
Joint Research Centres					X	X	X	X
European Institute of Innovation and Technology							X	X
Other Actions*						X	X	X

Note: Other actions include Research Potential, Regions of Knowledge, Access to risk finance, Spreading excellence and widening participation, among others.
Source: Own elaboration based on Vence (1998), Reillon (2017), EC information and EUR-Lex

3.2. Other Funds for Research and Innovation

Another relevant tool of the innovation policy is the EU SFs[3], which may contribute to fund research and innovation, and to develop and upgrade technological capabilities and labour skilled in less favoured regions (Fernández et al., 2007; Rodil, 2007; Fernández et al., 2010; Reillon, 2015). The relative weight of SFs differs by region, showing a trend to be more relevant in less developed regions, according to their allocation criteria.

In this sense, the Technological Fund underlines as an ERDF fund in the period 2007-2013. It was created to promote business R&D&I in Spain, mainly allocated to less developed regions. Its budget amounts to 3.3 billion euros. Moreover, the European

Fund for Strategic Investments (EFSIs) are one of the pillars of the Investment Plan for Europe, launched in 2015 during the financial crisis. This plan, called Juncker Plan, aims at mobilising private investments, allocating roughly 41.1 billion euros to research and innovation.

Other tool, named Innovative Actions (IAs), aims at fostering regional innovative capacity in less favoured regions, under Article 10 of the ERDF. They include Regional Technological Plans (RTP), Regional Innovation Strategies (RIS), and Regional Innovation and Technology Transfer Strategies (RITTS) (Landabaso and Reid, 1999; Fernández et al. 2007; Fernández et al., 2010, Zabala-Iturriagagoitia et al., 2008). These actions will be approached in the next section.

SFs and IAs are mainly focused on less developed regions. Therefore, there is a link between innovation and regional cohesion policies, issue that will be approached in the next section. In fact, the EU cohesion policies increasingly include innovation (see Chapter 5).

Other relevant actions that link innovation and regions are the Regions of Knowledge and Research Potential programmes, as well as the Vanguard Initiative. The Regions of Knowledge Programme aimed at strengthening research and innovation capabilities and potential of regions. It focused mainly on supporting and encouraging regional research-driven clusters, as well as enhancing cross-border regional cooperation in research. This programme was launched in 2003 as a pilot action, which later became a programme. The Research Potential Programme was set up in 2007 for less developed regions (convergence and outermost regions), attempted to build links and collaboration among universities and to help researchers to participate in EU projects. These programmes did not fund research, but also the development of strategies for regional innovation in the first programme, linking several regional partners (universities, research centres and enterprises) to strengthen the capacities and research potential; and staff exchanges, workshops, conferences and working groups, networking, advices, knowledge transfer, recruitment of researches and equipment in the second programme. They highlight the relevance of supporting local knowledge basis, and the role of universities and research institutions on regional development. Both programmes ended, but their basis and experience remain in the current SFs, Cohesion Policy (including Smart Specialisation, SS) and H2020 (European Commission, 2014b). Moreover, the Vanguard Initiative for New Growth through Smart Specialisation launched in 2014 was driven by a group of

European industrial regions[4], with an agenda for influencing innovation and industrial policies. This regional network set a political commitment to engage in growth-oriented industrial collaborations, based on combined strengths linked to EU priorities, as well as mobilisation and alignment of resources based on smart specialisation and interregional cooperation principles. This initiative aims at fostering collaboration, co-creation and co-investment in projects across Europe, seeking the alignment of strategic investment and the development of industry-led and scalable projects, which contribute to the industrial renewal in Europe. The collaborative projects will be close to the market and emerge as a result of an interregional entrepreneurial discovery process among different players. The Vanguard Initiative seeks relevant knowledge and expertise to develop European value chains in priority areas, and to lead by example in developing interregional cooperation and multi-level governance for supporting clusters and regional eco-systems. It has developed pilot projects[5], based on building synergies to enable world-class clusters and leading new industries. They have been implemented following a four-step approach: learn, connect, demonstrate and commercialise (Vanguard Initiative, 2014-2017).

Another tool refers to other funds for research and innovation. Some of these funds are sectorial, like in the fields of space (Copernicus, Galileo), nuclear energy (Euratom Research and Training Programme-RTP-, International Thermonuclear Experimental Reactor-ITER-), coal and steel production (Research Fund for Coal and Steel). Moreover, other programmes are indirectly related with research and innovation. They do not fund directly research and innovation, but they have impact on innovation (Reillon, 2015). These programmes are COSME (EU Programme for the Competitiveness of Enterprises and SMEs), Erasmus+ Programme, Third Health Programme, Life Programme or Connecting Europe Facility Programme (CEF). The Interreg Europe is also a community initiative funded by the EFDR since 1990 to enhance territorial cooperation, supporting cross-border, trans-national and interregional actions. It aims at improving the implementation of regional development policies and programmes, sharing knowledge, experience and best practices, focusing on four main topics: research and innovation, SMEs competitiveness, low-carbon economy and environment and resource efficiency. Finally, it should mention some EU initiatives focused on funding innovation, mainly under H2020.

3.3. Evolution and recent trends: A brief overview

The evolution of the EU innovation policy is in accordance with the analysis of Borrás (2003) and Lundvall and Borrás (2005). They identify an initial focus on scientific policy in the 1960s; then, there was a shift to technology policy and later to innovation policy. According to the classification of innovation policies followed by Fernández et al. (2007) and Fernández et al. (2010), the EU policy corresponds mainly with the first generation, focused on scientific and R&D activities, and based on the linear model of innovation. However, some measures suggest the emergence of a second generation of innovation policy, more focused on systems and infrastructures. Finally, the third generation of policies, focused on the creation of knowledge and learning processes, is not common in the EU innovation policy (see Chapters 1 and 3).

Concerning the recent trends on the EU innovation policy, four issues highlight. Firstly, the Smart Specialisation Strategies (S3) seem a good tool to combine innovation and regional development. In fact, all regions need to have its Smart Specialisation Strategy as ex ante conditionality to receive EU SFs to R&D&I goals in the period 2014-2020. Secondly, some demand side initiatives have increasingly being implemented mainly driven by the EU (Lead Markets Initiative, public procurement of innovation, or pre-commercial procurement of innovation). Despite this trend, the traditional predominance of supply side versus demand side instruments remains. Thirdly, the new trends for the EU innovation policy may be linked with the policy goals stated by the Commissioner Moedas in 2015: open innovation, open science and open to the world. Fourthly, the new period programme 2021-2027 is defining the funding and priorities. In this sense, the new FP (Ninth FP) will be named Horizon Europe and the proposed budget amounts to 97,6 billion euros. It will follow the path of the H2020, despite presenting some new features. The main novelties will be the establishment of the European Innovation Council, aimed at identifying, funding and scaling up breakthrough and disruptive innovations from the lab to market applications; as well as setting new mission-oriented research, focusing on societal challenges and industrial competitiveness. The mission-oriented approach “can provide the means to focus on research, innovation and investments on solving critical problems, while spurring growth, jobs and resulting in positive spillovers across many sectors” (Mazzucato, 2018, p. 4). It also adopts a bottom-up approach. The missions are co-designed with citizens, stakeholders, the European Parliament and MS and attempt to achieve better

communication and connect people to science (European Commission, 2018b; Mazzucato, 2018).

4. Linking EU innovation and regional development policies

4.1. Linking EU innovation and regional development policies: Background

The process of European integration has been driven by growth and competitiveness aims. Although these objectives could be compatible with social and territorial cohesion, it seems difficult to achieve them simultaneously (Rodil et al., 2014). Thus, the development of innovative capabilities may enhance competitiveness, but it could negatively affect to regional development and cohesion (Begg, 2008; Cornett and Sørensen, 2008; Rodríguez-Pose and Novak, 2013; Rodil et al., 2014; Foray et al., 2018a, 2018b).

Innovation is an activity dependent on spatial and social dimensions (Lundvall, 1992; Maskell and Malmberg, 1999; Gertler, 2001; Asheim and Isaksen, 2002; Rutten, 2016). Thus, it should analyse the relation between regional and innovation policies, and in particular the combination of cohesion and competitiveness goals, a challenging issue, because they seem contradictory goals (see Chapters 5, 7 and 8).

There is a two-way relationship between regional and innovation policies. On the one hand, innovation affects regional development, because it is a key factor to drive growth and competitiveness. On the other hand, innovation is determined by regional capabilities (human resources, productive structure, …), their innovative environment and absorption capacity. The regional analysis of the EU innovation policy should not be mainly focused on funds allocated to reduce disparities, but also on regional effects of the EU policies (Vence, 1998; see Chapter 8).

Some EU specific initiatives attempting to balance the two goals were STRIDE and RIS. The STRIDE initiative, set in the period 1990-1993, aimed at promoting the research and technological development of the peripheral regions (Objectives 1 and 2 regions). This initiative, funded by SFs, was focused on three priorities: increasing the capacities for research; improving and encouraging the participation of institutions, research centres and businesses in international networks and research programmes; and

developing links between research and industry. Most of these funds were not efficient concerning regional development, because they were mainly allocated to large RTD infrastructure projects, especially in the public sector. This fact is in accordance with the linear model of innovation, as well as the limited absorption capacity of these regions and the lack of organisational and institutional competences (Landabaso and Reid, 1999; Morgan and Nauwelaers, 2003).

RTP and RIS[6] projects were launched in 1994 by the EC to support the definition and implementation of regional innovation policy. They were pilot actions for two years co-funded by the region, which allows regions to test innovation actions to promote innovation, mobilising the own social capital and focusing on SMEs. RIS were complemented with RITTS, focused on improving the efficiency of innovation infrastructures and policies (European Commission, 1997; Landabaso and Reid, 1999; Reillon, 2016).

Four pilot RTP were funded during 1994-1996 (Walles[7]-United Kingdom-; Lorraine-France-; Limburg-the Netherlands-, and Saxony-Germany-, all of them Objective 2 regions). They were followed by RIS, RIS+ and RTT programmes in the period 1996-1999, accounting for a total of 66 programmes. The first four Objective 1 regions in implementing the RIS were Norte (Portugal), Castile and Leon (Spain), Central Macedonia (Greece) and Abruzzo (Italia) (Landabaso and Reid, 1999; SOCINTEC, 2005). After these pilot actions, the ERDF funded IAs in the period 2000-2006 in three strategic areas: regional economies based on knowledge and innovation; the information society for regional development (eEurope Regio); and regional identity and sustainable development (SOCINTEC, 2005; Rossi, 2005).

These initiatives aimed at involving all regional innovation actors in the definition of local priorities (Landabaso and Reid, 1999; Morgan and Nauwelaers, 2003; Zabala-Iturriagagoitia et al., 2008; Andrée, 2009). In this way, RIS could be considered the basis of the current S3. In fact, it consisted of a method for designing and implementing regional innovation strategies, based on an interactive and systemic view of innovation. The process is similar, because it is based on a strategic and bottom-up approach, interaction with regional stakeholders and assessment by the EC and experts (Landabaso and Reid, 1999; Morgan and Nauwelaers, 2003). Moreover, there were three main phases in a RIS (Landabaso and Reid, 1999; Zabala-Iturriagagoitia et al., 2008): building consensus among the regional stakeholders; diagnosis phase (internal

and external analysis of needs and capacities), as well as identification of projects according to the selected priorities and elaboration, design and implementation of a strategy and its monitoring and evaluation.

More recently, the Vanguard Initiative for New Growth through Smart Specialisation supports a broader application and visibility of smart specialisation principles, leaded by examples and aimed at enhancing EU competitiveness and growth. It also provides an evidence base to support the EC in the development of Smart Specialisation Platforms in key growth areas, such as Industrial Modernisation, Energy and Agri-food. This pioneer approach follows a bottom-up entrepreneurial discovery process on new growth and industrial renewal in European priority areas (Vanguard Initiative, 2014-2017).

Concerning the FPs, the main tool of the EU innovation policy, they have not considered the territorial dimension, the economic development or innovation level of countries or regions. In this sense, the FPs follow a top-down approach. They address directly to the beneficiaries, which are different kinds of, but no regions or countries. The selection is based on competitive calls and focused on excellence scientific criteria. However, several attempts to include some cohesion element in the FPs have been made over time, based on leveraging synergies between FPs and SFs (Corpakis, 2016; De Carli, 2017; Reillon, 2017). Thus, the Second FP introduced a criterion concerning greater cohesion, with the aim that all regions could benefit from funding and developing their research capacities. The Third and Fourth FPs attempted to include the cohesion criterion, according to the reports that evaluate the EU science and technology, which highlight the challenge of coordinating national policies and cohesion for less developed regions. The Third FP attempted to introduce a political commitment for cohesion reducing disparities between regions (Commission of the European Communities, 1988, 1989; Reillon, 2017). The Fourth FP underlined the need to strengthen research and structural policy, as well as the FP and the SFs. However, the results were unsatisfactory, because excellence stands as main criterion (Reillon, 2017).

Several studies (Vence et al., 2000; Boldrin and Canova, 2001; Vence and Rodil, 2003; Hudson, 2007; Reid, 2007; Rodil et al., 2014) highlight the spillover effects of FPs. The analysis of the participation of countries and regions in FPs and the raised funds shows a high concentration in developed areas, although it has smoothed over time (Vence, 1998). Thus, the first three regions of each country account for 80% of the raised funds (European Commission, 1993; Commission of the European Communities, 1994;

Vence, 1998). Moreover, most of these studies show a positive relationship between participation and returns with the level of R&D expenditure, at national and regional levels, as well as at agent level. This implies that the EU innovation policy has an important feedback effect on pre-existing regional disparities (see Chapters 7 and 8). Therefore, the uneven regional distribution of the EU innovation policy has not only effects in the short-term, but also in the long-term, due to innovation is cumulative. In addition, there is feedback between the participation in R&D&I activities and the building of regional innovation capacities and learning (Vence, 1998; Rodil, 2007) (see Chapters 8 and 3).

These studies refer to the challenging issue of combining two contradictory goals (excellence and cohesion). In this regard, within the context of revising the Lisbon Strategy, one recommendation was to use cohesion policy instruments (see Chapter 5). Furthermore, one of the priorities of the Innovation Union Flagship Initiative is maximising social and territorial cohesion. As a result, the S3 arise as an ex-ante condition for using funds for research and innovation in the multiannual programme period 2014-2020.

The current FP, H2020, includes an instrument aimed at spreading excellence and widening participation. It addresses the causes of low participation in FP (De Carli, 2017). Nevertheless, the resources for this action are limited, because it allocates less than 2% of H020 budget. The main actions of this programme are Teaming (Institution building), Twinning (Institutional networking), and ERA Chairs (Bringing excellence to institutions). These three actions are related with SS, mainly the first one, because the proposals should integrate in the S3.

Moreover, the EU SFs aim at developing the innovation capacities of regions (Fernández et al., 2007; Rodil, 2007; Zabala-Iturriagagoitia et al., 2008; Fernández et al., 2010, Reillon, 2015, 2017, Pontikakis et al., 2018). About 25% of SFs (roughly 86 billion euros) were spent on R&D and innovation activities (European Commission, 2014a). Nowadays, four of the European Structural and Investment Funds (ESIFs) support research and innovation activities. In fact, between 50% and 80% of these funds should be allocated to at least two of the following four objectives: strengthening research, technological development and innovation; enhancing access to ICT, use and quality; enhancing the competitiveness of SMEs; and supporting the shift towards a

low-carbon economy. Thus, the management of SFs is more decentralised than in the FPs. The SFs involves some issues of a bottom-up approach, which even increases with the implementation of the S3.

Despite the above-mentioned attempts to strengthen the links between innovation and cohesion policies, there is still much work to be done. Some previous experiences help to advance in this path, leveraging the potential of synergies between FPs and ESIFs. In this sense, the Seal of Excellence, launched in 2015, underlines as an example of synergies. It awards the projects submitted to SME instrument of H2020, which would deserve funding depending on selection criteria, but did not receive funding due to limited budget. This Seal recognises the value of the proposal, supporting the search for alternative funding. Other example is the Stairway to Excellence, launched in 2014 as a pilot project, to support regions and countries in implementing the S3, as well as developing and exploiting synergies between H2020 and ESIFs. It was renewed and will be an important way for the cohesion policy in the next programming period 2021-2027. Moreover, the complementarity between the FP and the Cohesion Fund should be improved (Reillon, 2017; European Commission, 2018a, 2018b; Pontikakis et al., 2018).

The next Horizon Europe will provide special support for MS lagging behind in research and innovation efforts. Moreover, it will attempt to leverage synergies with ESIFs and other European programmes, such as cohesion policy, industrial or sectorial policies (Corpakis, 2016; De Carli, 2017; European Commission, 2017a; 2017b; Foray et al., 2018a, 2018b). In this sense, the EU Industrial Policy Strategy, launched in 2017, aims at improving business conditions for private innovation investment. Despite their positive effects, these synergies present some risks, such as the predominance of the excellence research goal versus cohesion and regional development (Corpakis, 2016; European Commission, 2017a; Foray et al., 2018a, 2018b).

4.2. Linking EU innovation and regional development policies: The Smart Specialisation Strategies

The concept of Smart Specialisation (SS) is rooted in a report commissioned by the DG RTD to the Knowledge for Growth Expert Group in 2005, in the context of relaunching the Lisbon Strategy. It refers to “the capacity of an economic system (a region for

example) to generate new specialities through the discovery of new domains of opportunity and the local concentration and agglomeration of resources and competences in these domains" (Foray, 2014, p.1).

SS refers to structural changes in economic systems in different forms, while S3 deals with those actions and measures (policies) that promote this kind of processes. S3 policy should involve productive and institutional stakeholders that, from a bottom-up perspective, identify and develop potential domains for SS, which governments could support. S3 are committed to concentrate and prioritize resources on few initiatives.

SS was not originally a spatial concept, but a science, technology and innovation related concept. However, it was translated into regional policy soon[8] (McCann, 2015; see Chapters 1 and 2), when the EC DG for Regional and Urban Policy embraced the concept. Its rationale was used as an enabling principle for investing SFs more efficiently (Foray, 2014).

S3 rationale fitted to the EU cohesion policy due to two reasons: it provided a policy prioritisation framework aligned with the Europe 2020 Strategy; and it followed a place-based logic (see Chapters 1 and 2), like the cohesion policy. Therefore, SS became a key pillar for the EU cohesion policy in the programming period 2014-2020. Thus, the EC decided that the design and implementation of a regional innovation smart specialization strategy (RIS3) would be an ex-ante conditionality to receive SFs in the period 2014-2020.

The SS approach has become the main link, theoretical and practical, between the EU innovation and regional policies. The EC policy-making experience was important to adopt the SS concept. As indicated above, different initiatives funded by SFs, such as RIS or RITTS, have been implemented since the 90s, aiming at establishing and strengthening regional innovation systems. Therefore, these previous experiences created the right conditions for the adoption of SS approach by the EC.

The adoption of the S3 has come together with a change, at least rhetorically, in the rationale of the cohesion policy towards promoting competitiveness and the effectiveness of investments. Nevertheless, this shift has not implied the exclusion of cohesion perspective, as in practice the main beneficiaries of cohesion funds continue to be lagged regions.

5. Conclusions

The innovative capacity of the countries and regions is a main driver of their long-term welfare. Therefore, different policies aim at improving the innovation environment and capabilities.

Concerning the EU innovation policy, there is a multilevel model, showing an increasing role of regions, which is also revealed in a growing relevance of the bottom-up approach. The EU innovation policy can be considered unique, because most innovation actions are directly implemented by the EC.

The EU innovation policy has been traditionally focused on research and supply-side. However, innovation has acquired growing relevance, mainly within the Lisbon Strategy and the Innovation Union Flagship. In this sense, there is a shift from the linear model of innovation to a systemic approach. Moreover, the innovation policy is increasingly focused on social challenges and demand-side.

The FPs are the main tool of the EU innovation policy, although there are other tools, such as the SFs, which have increased the focus on research and innovation. The innovation policy, and mainly FPs, have not considered the territorial dimension or the development level. The selection is competitive and based on scientific criteria, following a top-down approach.

The relationship between the EU regional and innovation policies is challenging, due to the combination of conflicting goals, such as competitiveness and cohesion. However, several attempts to balance these two goals have been made over time, including some cohesion element in the innovation policy, such as STRIDE, RIS, ESIFs and even through the FPs. Despite the efforts, the results are still limited.

Since the 2000s the regional EU policy, also known as cohesion policy, has gradually shifted its rationale, at least rhetorically, from regional compensation and solidarity towards enhancing development and competitiveness through innovation and investments profitability. The regional policy is now conceived as an innovation-driven policy; therefore, innovation and research has become one of the key priorities of the ERFD. In this scenario, SS has emerged as a theoretical and practical basis for the EU regional policy, and as the main link between the EU regional and innovation policies.

It involves a bottom-up and place-based approach to regional and innovation policies. Moreover, there is a considerable potential for leveraging synergies between cohesion policy and innovation policy. In fact, the EC proposes the coordination of funds (FPs, ESIFs, and Cohesion Funds), but also among different policies, including industrial policies. However, the existing synergies are not enough, and they face challenges. Thus, they could involve risks to regional development, if they focus on excellence and competitiveness.

6. References

Andrée, D. (2009). *Priority-setting in the European research framework programme*. Stockholm: Vinnova.

Arrow, K. (1962). Economic welfare and the allocation of resources for innovation. In R. Nelson (Ed.), *The Rate and Direction of Inventive Activity: Economic and Social Factors* (pp. 609-625). New Jersey: University Princeton.

Asheim, B.T., & Isaksen, A. (2002). Regional Innovation Systems: The Integration of Local 'Sticky' and Global Ubiquitous Knowledge. *Journal of Technology Transfer*, 27, 77-86.

Baier, E., Kroll, H., & Zenker, A. (2013). *Regional autonomy with regard to innovation policy: A differentiated illustration of the European status quo*. Working Paper Firms and Region Nr. R3/2013, Karlsruhe: Fraunhofer ISI.

Barca, F. (2009). *An agenda for a reformed cohesion policy: A place-based approach to meeting European Union challenges and expectations*. Independent Report prepared at the request of Danuta Hübner, Commissioner for Regional Policy. Brussels: European Commission.

Begg, I. (2008). *Structural policy and economic convergence*. CESifo Forum, 9(1): 3-9.

Boldrin, L., & Canova, F. (2001). Inequality and Convergence in Europe's Regions. Reconsidering European Regional Policies. *Economic Policy*, 16: 207-253.

Borrás, S. (2003). *The innovation policy of the EU*. Cheltenham: Edward Elgar.

Commission of the European Communities. (1988). *Communication from the Commission "First report on the state of science and technology in Europe"* [COM (88) 647].

Commission of the European Communities. (1989). *Communication from the Commission "A framework for Community RTD actions in the 90's"* [SEC (89) 675 final].

Commission of the European Communities. (1994). *The European Report on Science and Technology Indicators 1994* (ERSTI): Brussels: European Commission.

Cooke, P., & Morgan, K. (1994). The Creative Milieu: A Regional Perspective on Innovation. In M.

Dodgson, & R. Rothwell (Eds.), *The Handbook of Industrial Innovation* (pp. 25-32). Aldershot: Edward Elgar.

Cornett, A.P., & Sørensen, N.K. (2008). International vs. Intra-national Convergence in Europe – an Assessment of Causes and Evidence. *Investigaciones Regionales*, 13: 35-53.

Corpakis, D. (2016). *Fostering synergies between Horizon 2020 and Cohesion policy*. 6th Meeting of Horizon 2020 National Contact Points for Legal and Financial Matters Horizon 2020 and the ESIF among Europe's most powerful tools for closing the innovation gaps and advance growth and prosperity.

Dasgupta, P., & Stoneman, P. (1987). *Economic policy and technological performance.* Cambridge: Cambridge University Press.

De Brujin, P., & Lagendijk, A. (2005). *Regional Innovation Systems in the Lisbon Strategy*. European Planning Studies, 13(8): 1153-1172.

De Carli, M. (2017). *SEWP and Seal of excellence: fostering synergies.* Workshop Aligning implementation of RIS3 and H2020 Funding across research priorities.

Edquist, C. (2004). Systems of innovation: Perspectives and challenges. In J. Fagerberg, D. Mowery, R. Nelson, J. Fagerberg, D. Mowery, & R. Nelson (Eds.), *Oxford Handbook of Innovation* (pp. 181-208). Oxford: Oxford University Press.

European Commission. (1993). *Communication from the Commission to The Council and The European Parliament "Cohesion and RTD Policy. Synergies between research and technological development policy and economic and social cohesion policy"* [COM (1993) 203 final].

European Commission. (1995). *Green paper on innovation*. Brussels: European Commission.

European Commission. (1996). *First Action Plan for Innovation in Europe*. Brussels: European Commission.

European Commission. (1997). *Guide to Regional Innovation Strategies*. Luxembourg: European Commission.

European Commission. (2008). *Communication from the Commission to the European Parliament, The Council, The European Economic and Social Committee and The Committee of the Regions* "Towards Joint Programming in Research: Working together to tackle common challenges more effectively" [COM (2008) 468 final].

European Commission. (2010). *Communication from the Commission to The European Parliament, The Council, The European Economic and Social Committee and The Committee of the Regions "Regional Policy contributing to smart growth in Europe 2020"* [COM (2010) 553 final].

European Commission. (2013). *Innovation Union. A pocket guide on a Europe 2020 initiative*. Luxembourg: Publications Office of the European Union.

European Commission. (2014a). *Investment for jobs and growth. Promoting development and good*

governance in EU regions and cities. Sixth report on economic, social and territorial cohesion. Luxembourg: Publications Office of the European Union.

European Commission. (2014b). *Mobilising regions for growth and jobs: Regions of Knowledge and Research Potential*. Luxembourg: Publications Office of the European Union.

European Commission. (2016). *The EU explained: Research and innovation.* Luxembourg: Publications Office of the European Union.

European Commission. (2017a). *LAB – FAB – APP Investing in the European future we want*. Report of the independent High Level Group on maximising the impact of EU Research & Innovation Programmes (Lamy Report). Brussels: European Commission.

European Commission. (2017b). *Synergies between Framework Programmes for Research and Innovation and European Structural and Investment Funds contributing to the Interim Evaluation of Horizon 2020.* Luxembourg: Publications Office of the European Union.

European Commission. (2018a). *Communication from the Commission to the European Parliament, The Council, The European Economic and Social Committee and The Committee of the Regions* "Horizon 2020 interim evaluation: maximising the impact of EU research and innovation*"* [COM (2018) 2 final].

European Commission. (2018b). *Communication from the Commission to the European Parliament, The European Council, The Council, The European Economic and Social Committee and The Committee of the Regions* "A renewed European Agrenda for Research and Innovation-Europe's chance to shape its future". The European Commission's contribution to the Informal EU Leaders' meeting on innovation in Sofia on 16 May 2018 [COM (2018) 306 final].

Fagerberg, J. (2017). Innovation Policy: Rationales, Lessons and Challenges. *Journal of Economic Surveys, 31*(2), 497-512.

Fernández, I., Castro, E., & Zabala, M. (2007). Estrategias regionales de innovación: el caso de regiones europeas periféricas. In X. Vence (Ed.), *Crecimiento y políticas de innovación. Nuevas tendencias y experiencias comparadas* (pp. 157-189). Madrid: Pirámide.

Fernández, I., Mas-Verdu, F., & Tortosa, E. (2010). Regional innovation policies: the persistence of the linear model in Spain. *The Service Industries Journal, 30*(5): 749-762.

Foray, D. (2009). *The new economics of technology policy*. Chentelham: Edward Elgard.

Foray, D. (2014). *Smart specialisation: Opportunities and challenges for regional innovation policy*. New York: Routledge.

Foray, D., Morgan, K., & Radosevic, S. (2018a). *The role of smart specialization in the EU research and innovation policy landscape*. DG Regio Working Paper, European Union.

Foray, D., Morgan, K., & Radosevic, S. (2018b). *From rivalry to synergy: R&I policy and cohesion policy*. Policy Paper (Regional and Urban Policy), European Commission.

Gertler, M. (2001). *Best Practice? Geography, Learning and the Institutional Limits to Strong Convergence.* Journal of Economic Geography, 1(1): 5-26.

Guzzetti, L. (1995). *A brief history of European Union research policy*. Brussels: European Commission.

Hudson, R. (2007). Regions and regional uneven development forever? Some reflective comments upon theory and practice. *Regional Studies*, 41 (9): 1149-1160.

Kaiser, R., & Prange, H. (2004). Managing diversity in a system of multi-level governance: the open method of co-ordination in innovation policy. *Journal of European Public Policy*, 11, 249-266.

Kok, W. (2004). *The High Level Group on Lisbon Strategy. Facing the challenge.* Luxembourg: European Communities.

Landabaso, M. (2000). Las nuevas políticas regionales de promoción de la innovación en la Unión Europea. *Economía Industrial*, 335-336: 51-66.

Landabaso, M., & Reid, A. (1999). Developing Regional Innovation Strategies: the European Commission as Animateur. In K. Morgan and C. Nauwelaers (Eds.), *Regional Innovation Strategies: The Challenge for Less Favoured Region (pp. 18-38)*. London: The Stationery Office.

Lundvall, B., & Borrás, S. (2005). Science, technology and innovation policy. In J. Fagerberg, D. Mowery, R. Nelson, J. Fagerberg, D. Mowery, & R. Nelson (Eds.), *Innovation handbook* (pp. 599-631). Oxford: Oxford University Press.

Lundvall, B.Å. (Ed.) (1992). *National systems of innovation: towards a theory of innovation and interactive learning*. London: Pinter.

Maskell, P., & Malmberg, A. (1999). Localised learning and industrial competitiveness. *Cambridge Journal of Economics*, 23, 167-185.

Mazzucato, M. (2018). *Mission-Oriented research and innovation in the European Union. A problem-solving approach to fuel innovation-led growth*. Brussels: European Commission.

McCann, P. (2015). *The regional and urban policy of the European Union: Cohesion, results-orientation and smart specialisation*. Cheltenham: Edward Elgar.

Morgan, K., & Nauwelaers, C. (Eds.) (2003). *Regional Innovation Strategies. The Challenge for Less-Favoured Regions*. London: Routledge.

OECD (2011). *Regions and Innovation Policy*. OECD Reviews of Regional Innovation, Paris: OECD.

Pontikakis, D., Doussineau, M., Harrap, N., & Boden, M. (2018). *Mobilising European Structural and Investment Funds and Horizon 2020 in support of innovation in less developed regions.* Seville: Joint Research Center (JRC) Technical Reports. European Commission.

Reid, A. (2007). Innovation and regional development, do European structural funds make a difference? *European Planning Studies*, 15(7): 961-983.

Reillon, V. (2015). *Overview of EU funds for research and innovation*. EPRS Briefings, September 22th. Brussels: EPRS (European Parliamentary Research Service).

Reillon, V. (2016). *EU innovation policy. Part I: Building up the EU innovation policy mix.* Brussels: EPRS (European Parliamentary Research Service).

Reillon, V. (2017). *EU framework programmes for research and innovation. Evolution and key data from FP1 to Horizon 2020 in view of FP9.* Brussels: EPRS (European Parliamentary Research Service).

Rodil, Ó. (2007). Innovación y competitividad en la Unión Europea: las nuevas políticas europeas en el período 2007-2013. In X. Vence (Ed.), *Crecimiento y políticas de innovación. Nuevas tendencias y experiencias comparadas* (pp. 101-124). Madrid: Pirámide.

Rodil, Ó.; Vence, X., & Sánchez, M.C. (2014): *Disparidades en la Eurozona: el debate de la convergencia regional a la luz de las asimetrías en la estructura productiva*. Ekonomiaz: Revista Vasca de Economía, 86: 274-305.

Rodríguez-Pose, A., & Novak, K. (2013). Learning processes and economic returns in European Cohesion policy. *Investigaciones Regionales*, 25: 7-26.

Rossi, F. (2005). *Innovation policy in the European Union: instruments and objectives.* Munich Personal Research Archive Paper 2009. https://mpra.ub.uni-muenchen.de/2009/

Rothwell, R. (1983). The difficulties of national innovation policies. In S. Macdonald, T. Mandeville, & D. Lamberton (Eds.), *The trouble with technology* (pp. 202-215). London: Frances Pinter.

Rutten, R. (2016). Beyond Proximities: The Socio-spatial Dynamics of Knowledge Creation. *Progress in Human Geography*, 41(2): 159-177.

SOCINTEC. (2005). *Ex-post evaluation of the RIS, RTTs and RISI ERDF Innovative Actions for the period 1994–1999. Final Synthesis Report.* SOCINTEC.

Tödtling, F., & Trippl, M. (2005). One size fits all? Towards a differentiated regional innovation policy approach. *Research Policy*, 34(8): 1203-1219.

Uyarra, E., Koschatzky, K., & Héraud, J.A. (2007). *Understanding the multi-level, multiactor governance of regions for developing new policy designs*. Position paper the ERASpaces/ERISP projects prepared for the PRIME Annual Conference, Pisa, 29 January-01 February. Manchester: PREST, University of Manchester.

Vanguard Initiative (2014-2017). *Vanguard Initiative Annual Report*. Vanguard Initiative. https://www.s3vanguardinitiative.eu/documents.

Vence, X. (1998). *La política tecnológica comunitaria y la cohesión regional. Los retos de los sistemas de innovación periféricos.* Madrid: Civitas.

Vence, X. (2007). Crecimiento económico, cambio estructural y economía basada en el conocimiento. In X. Vence (Ed.), *Crecimiento y políticas de innovación. Nuevas tendencias y experiencias comparadas* (pp. 19-58). Madrid: Pirámide.

Vence, X., & Rodil, O. (2003). La concentración regional de la política de I+D de la Unión Europea, *Revista de Estudios Regionales*, 65: 43-73.

Vence, X., Guntín, X., & Rodil, O. (2000). Determinants of the uneven regional participation of firms in European technology Programmes. *European Planning Studies*, 8(1): 29-41.

Zabala-Iturriagagoitia, J.M., Jiménez-Sáez, F., & Castro-Martínez, E. (2008). Evaluating European Regional Innovation Strategies. *European Planning Studies*, 16(8): 1145-1160.

[1] Countries that are not EU Member States can benefit from the FPs, whether they contribute to fund them, or they can participate, but usually do not receive funds.
[2] https://eur-lex.europa.eu/homepage.html?locale=es
[3] They are mainly the European Regional Development Fund, ERFD; but also the European Social Fund, ESF; the Cohesion Fund; the European Agricultural Fund for Rural Development, EAFRD; and the European Maritime and Fisheries Fund, EMFF.
[4] The political leaders of ten European industrial regions were gathered on November 2013 in Brussels to engage in a joint effort for the industrial future of Europe. New regions have been included in this initiative, accounting for 35 regions in July 2019. The political goal is to recognise the relevant role of regions in promoting new industry-based growth.
[5] The five pilot projects implemented are focused on Advanced Manufacturing for Energy Applications in harsh environments, Bioeconomy, Efficient and Sustainable Manufacturing, High performance production through 3D printing, New Nano-Enabled products.
[6] This initiative was initially named Regional Technology Plans in the first period 1994-1996. Afterwards, it was renamed as Regional Innovation Strategies aimed at encouraging to adopt a broad definition of innovation.
[7] It should be considered the contributions of the Welsh Development Agency in the discussions about Regional Technology Strategies launched by the Directorate General for Regional Policies in a workshop hold in Brussels in June 1991, and the Welsh academics Cooke and Morgan (Cooke & Morgan 1994; Landabaso & Reid, 1999).
[8] When translating the logic of smart specialisation into spatial and economic geography terms, McCann (2015, pp. 174-175) indicates that SS refers to concepts coming mainly from the evolutionary economic geography, like relatedness, embeddedness and connectivity.