



# Science, technology and innovation and public policy in Portugal: Trajectories towards 2020

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## ABSTRACT

Science, technology and innovation are of crucial relevance for socio-economic development. This article presents a perspective of the institutional change in Portugal in this domain, between 2000 and 2014, with the identification of policies, key actors and incentives for stimulating the emergence of innovation. It presents a chronology of policies on science, technology and innovation that changed the landscape of innovation in Portugal. The article presents the context and the policy-orientations for policy-making towards 2020, in particular the impacts of economic crisis in the Portuguese STI system and the guidelines of Europe 2020 for a smart specialisation. The article concludes with considerations in the evolution of the innovation landscape in Portugal and the relevance of these changes to public policy implementation in the period 2020.

**Keywords:** Innovation, Institutional change, Innovation system, Policy.

**JEL Classification:** L52, O31, O32, O38.

## 1. INTRODUCTION

The importance of innovation to economic performance and growth was underlined in the last decades by the emergence of a systemic vision of innovation, as a multi-dimensional, multi-scale, multi-actor phenomenon (Asheim, Smith & Oughton, 2011). Innovation systems, whatever the scale and focus, are constituted by actors that stabilize networks with the goal to innovate. Innovation is institutionally embedded, meaning that the relationships of actors do not happen in a context free of informal and formal constraints and enablers of individual action. Innovation process is institutionally embedded; depend from public policies, from supportive actors and from the socially accepted behaviours (Cooke, 2001). Particularly important to innovation are the linkages between knowledge producers, commonly seen as the universities and other public research organizations, and knowledge users, firms and other entities

applying accumulated knowledge to solve particular technical problems (Pinto & Fernández-Esquinas, 2013).

Public policies are particularly relevant for science technology and innovation because innovation processes are plagued with market, and specially, by systemic failures that create barriers for the adequate allocation of resources and effectiveness of innovation (Weber & Rohrer, 2012).

Portugal is a country that lies between the group of most developed countries and those in development process. It is usually considered a member-state of European Union in a moderate position in terms of innovation when compared with other European countries (European Commission, 2015). This situation was observed both at national level in several studies and at regional level.

The study of the Portuguese case shows that science, technology and innovation (STI) suffered huge pressures and change was happening at a very fast pace in the last decades. This article

gives attention to the innovative profile of Portugal, analysing the chronology of institutional change in terms of STI policy in Portugal. For this, the text is organized as follows. The next section presents a chronology of policies on S&T and instruments for the emergence and consolidation of innovative dynamics. A second part presents changes for the new programming period 2014-2020. The new programmes are debated with particular emphasis in the impacts of economic crisis in STI and the emergence of the smart specialisation rationale in innovation policy.

## **2. CHANGE IN THE PORTUGUESE SCIENCE, TECHNOLOGY AND INNOVATION POLICIES**

STI policies in Portugal had a late entry, a slow evolution and implementation with limited results. These are corollaries of several analyzes that focus on the evolution of government intervention in this area (e.g., Caraça, 1999; Bonfim & Viseu, 2005; Laranja, 2007). Based on these analyzes it is possible to systematize the evolution of public policies in STI that set the pace of institutional change regarding the generation and consolidation of innovation routines in Portugal.

### *First generation: grassroots of S&T policy*

STI policy in Portugal dates back to the 1970s with the participation of national teams in work promoted by the Organisation for Economic Co-operation and Development (OECD). This participation has contributed in 1967 to the creation of the National Board of Scientific and Technological Research (JNICT) with the mission of coordinating inter-sector public intervention in this field. In the 1970s, Portugal pursued a path connected to the emergence of State large laboratories with thematic scope, a logic inspired by public intervention resulting from a linear model of innovation. By the early '80s the governance of STI in Portugal was based on a highly vertical structure in which it was assumed that the benefits from scientific research came mechanically and sequentially to companies. This period was marked by the birth of several public universities in Portugal, some with regional scope, and marking the end of the concentration of higher education in Coimbra, Lisbon and Porto (Malcata, 2001).

In the '80s, back in the pre-accession period to the European Economic Community (EEC) and the instability after the change of political regime dilute, comes the first National Technology Plan which aimed to strengthen the

technological infrastructure, new and more flexible institutions, launching programs to support R&D and industrial potential. There was an obvious fragmentation between ministries, with the responsibility of JNICT, linked to science, and with the tutelage of the industry-based Plan. The beginning of this decade was marked by this disjointed and compartmentalized approach that would restrict the STI in Portugal for several years.

In the second half of the 1980s Portugal enters the EEC. There is a new momentum in this area, with a specific budget for Science and Technology and the first Mobilisation Programme for Science and Technology intending to achieve the target of 1% of GDP of expenditure on R&D, something that only came to realize after more twenty years in 2007.

### *Second generation: new actors and infrastructural investment*

The first Community Support Framework (CSF I - 1988-1992) helped to provide the country of physical infrastructure base for STI. In this context programs PEDIP (Specific Programme for the Development of Portuguese Industry) and SCIENCE (Creation of Infrastructure for Science, Research and Development) took over as central instruments but with a lesser degree of articulation.

In 1991 appears the program STRIDE Portugal, which results in an application for a Community initiative of the same name (STRIDE - Science and Technology for Regional Innovation and Development in Europe) and sought to encourage the development of S&T community in the regions. From the use of STRIDE funds stands out the creation of the Innovation Agency (AdI). AdI had the ambition to strengthen the mechanisms of interaction between the scientific and technological enterprises, valuing the results of scientific research and promoting technology transfer, diffusion and innovation. According to Laranja (2007) AdI was never able to completely fulfil this role fruit of tensions that stemmed from his dual ministerial supervision.

In parallel, there were a number of public institutes such as the Institute for Support to Small and Medium Industrial Enterprises (IAPMEI<sup>1</sup>) and the National Institute of Industrial Property (INPI), created in that period, who came to play an important role in the implementation of instruments to promote STI.

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<sup>1</sup> Today renamed as Agency for Competitiveness and Innovation.

In the context of PEDIP it is defined a set of infrastructures, technological centres, institutes of technology and new centres of technology transfer, built in the geographical areas of industrial relevance. Although, as mentioned by Laranja (2007: 143-144), the creation of these interface bodies seem appropriate, these infrastructures, many of which were coordinated by university professors, overly focused its assistance for R&D and academic international relations and less to local collaboration with business, as was the original plan.

With a new government in 1995, there were significant changes. The CSF II (1994-99) had been prepared by the previous government, maintained the same focus on human resources and infrastructure but emerged with concerns about sustainability of infrastructure created though. It appears for the first time a Ministry of Science and Technology, which divides JNICT into three bodies, the Foundation for Science and Technology (FCT), the Institute for International Scientific and Technological Cooperation (ICCTI) and the Centre for Science and Technology (OCT). At this stage, the agency *Ciência Viva* was created, concerned with communication and public understanding of science, focused mainly on younger audiences.

The FCT has become particularly relevant as the main management agency funding of S&T in the country. It consolidates itself as the entity responsible for the evaluation of science based in regular and independent panels. Associated laboratories inspired by the CNRS - *Centre National de la Recherche Scientifique* in France are created to pursue research objectives according to public science policy and meeting minimum structure, size and excellence requirements.

AdI operated as a driving force of business R&D in the Ministry with the responsibility of S&T. The PRAXIS II-PEDIP focused on consolidation, financing and implementation of projects but maintained the tradition of separation between programs on the side of science and the business side, even when complementarities were already at the time, evidenced.

### **Third generation: consolidation of STI dynamics**

The design of the National Economic and Social Development Programme (PNDES) for the implementation of the CSF III (2000-2006) was inspired by the Lisbon Strategy that stated that the transformative potential of S&T for a more cohesive and competitive European Union based on knowledge and innovation (IFDR, S/D). In

terms of operational programs, this view was not stabilized, because the Operational Programme for Science, Technology and Innovation (POCTI), which replaced the PRAXIS and the Economy Operational Programme (POE) that replaced PEDIP II, held the same logic of distance. The lack of proximity between operational programs and ministries and the influence of the Lisbon Strategy underpinned the launch of the Integrated Support Innovation, the PROINOV (Rodrigues, Neves & Godinho, 2003). This program proposed to explicitly streamline the national innovation system in Portugal, promoting business R&D, strengthening the population qualification and a more favourable environment for innovation. The program ended to be short-lived and confined to an implementation and reflection workshops early due to the resignation of the XIV Government of Portugal, in December 2001. The PROINOV had the merit of giving innovation a policy dimension that was absent, endowing an institutional and evolutionist rationale of intervention. The PROINOV also gave attention to the importance of the private sector in the dynamics of science and relevance of clusters, trying to bring together various stakeholders for the creation of innovation networks.

This phase coincides with the recovery of a regional dimension of STI policies. Influenced by Article 10 of the European Regional Development Fund (ERDF) Technical Assistance, CCDRs (regional development coordination commissions) created a regional dynamics of reflection on the STI system, with dialogue between actors, strategies and promoting regional consensus. Following these strategies, the Programme of Innovative Actions secured additional funding for the implementation process of innovative projects and a bottom-up approach of STI heavily influenced by the paradigm of regional innovation systems (Uyarra & Flanagan, 2012).

Even with short duration, the PROINOV influenced the creation of the Agency for the Knowledge Society (UMIC) with the aim of promoting the Portuguese national innovation system. However, this entity has not assumed its original role, focusing excessively measures for inclusion in the Information Society and technological modernization and management of public administration. The rationale of the new government came to show up with a more utilitarian concept of innovation focused on business (Laranja, 2007). This view is evident in the proposal for financing the R&D units based on quantitative indicators of scientific

production and in designing outreach activities focused on collaboration with industry through licensing of IPRs, contract research and spinning-off (Pereira, 2004a).

Another novelty was the promotion of a revision of the Code of Industrial Property in 2003, under the Ministry of Economy. The implementation of this new framework, followed by a revision to the decree-law n. 143/2008 of 25 July, sought to promote the use of intellectual property (IP) with simplified procedures. The reforms of 2003/2008 in the field of industrial property coincide with the implementation of a large group of incentives for effective protection of IPRs. Several STI entities, fruit of protocols with the INPI, were exempted from payments in cases of national registry, removing a major barrier to patents, its cost. IPR liaison offices spread a network of small operating units in universities, science parks and technology, the GAPIs. On the other hand, financial incentives promoted the inventive efforts, creativity and innovation of businesses, inventors, independent designers, entrepreneurs and organizations working in research through co-financing of expenditure relating to the protection of IPRs. The paradigmatic example is the creation of the Incentive Scheme for Use of Industrial Property (SIUPI) within the POE. This initiative, launched in 2001, was open until the end of 2006 and in 2005 had about eighty projects in execution (Laranja, 2007: 210), focused primarily on international patenting. Along with all these changes, INPI was introducing new price lists, simpler and less expensive. These changes were reflected in the STI system with a expansion of patent numbers, in particular, the national patent requests (Pinto, 2014).

By the end of the CSF III, the POE becomes PRIME - Incentives Programme for the Modernisation of the Economy (PRIME, 2010), emerging a wide range of initiatives managed by AdI that focused explicitly knowledge transfer activities: NITEC, IDEA, DEMTEC, among others. Under POS\_C, two specific initiatives were launched creating important seeds for structuring the transfer of knowledge in Portuguese universities, NEOTEC and OTIC, designed and accompanied by UMIC, and executed by ADI. The initiative NEOTEC - New Technology Based Companies sought to monitor the launching of business projects from the proof of concept to the first year of activity of the new firm. In this program, 220 applications were submitted with 116 business projects approved. The NEOTEC also included a line of "Valuing Entrepreneurial Potential" which

sought to stimulate activity in support of innovative ideas by funding S&T entities in promoting entrepreneurship. The initiative OTIC - Offices for Technology Transfer and Knowledge promoted a network of centres of research commercialization results and the transfer of ideas and innovative concepts to the business. These offices operated in institutions of higher education, universities and polytechnics, and strengthened cooperation between universities and firms, identifying opportunities for commercial exploitation of knowledge and technology to strengthen university-industry relations. In 2006, 22 OTICs had been approved, involving all Portuguese public universities except the University of the Azores (POS\_C, 2010).

The launch of these two initiatives, in 2005, coincided with the formation of a new socialist government, the XVII Constitutional Government of Portugal, which assumed the target of technological advancement. The Technological Plan emerged in this context as an agenda for change to meet the challenges of modernization in Portuguese society mobilizing public administration, businesses, families and other institutions in a combined effort. The Technological Plan led the implementation around three central themes: knowledge, fostering structural measures aimed at raising the educational levels of the population, technology, investing in strengthening national scientific and technological skills, and innovation, facilitating the modernization of companies and innovative capacity (UCPT, 2006). This plan, which recovered the spirit of PROINOV, was assumed to be a priority for public policy and constitutes itself as a key part of the National Action Programme for Growth and Jobs (PNACE), which reflected the implementation of Lisbon Strategy priorities in Portugal.

This period was marked by the acceleration of scientific and technological system, mainly stimulated by government spending, the change of knowledge institutions and the institutionalization of assessment practices and participation in science and internationalization of the actors of the system (Pereira, 2004b).

#### *Fourth generation: times of turbulence and austerity*

With the NSRF - National Strategic Reference Framework (CSF III Observatory, 2007) that came to structure the application of funds from the Cohesion Policy of the European Union for the period 2007-2013, some of the problems of

distance between the operational programs were mitigated. The NSRF was divided into three main strategic areas that embody the three thematic operational programs that articulate with the Technological Plan and the goals of the Lisbon Strategy: the Operational Programme for Competitiveness Factors (POFC), the Operational Programme for Human Potential (POPH) and the Operational Programme for Territorial Development (POVT). The aim of this article is not to evaluate the programs of the NSRF. However, today it is clear that its success has been conditioned by the economic turmoil (QREN Observatory, 2011).

The POFC, later baptized as COMPETE, focused on the support they sought to stimulate sustainable growth potential of the Portuguese economy (POFC, S/D). The incentive systems under this program focused the substantial portion of support related to STI as the POPH gets a role, also relevant, but restricted to issues of human resources development. Another measure to stimulate innovation in this period was the creation of UTEN - University Technology Enterprise Network. This network, launched in March 2007 by the FCT with the support of INPI, explored a five-year program based on a set of partnerships with American universities, subsequently extended to other European scientific and technological entities with which the Portuguese government decided to collaborate with view the absorption of good practices in different domains (UTEN, S/D). The program assumed that the technology transfer offices in Portugal were already in a stabilized phase and that lacked in this moment of greater professionalism. The US practices were presented as a benchmark to follow in the process of knowledge transfer. Network activities focused training of human resources, through international workshops, internships in foreign partner entities and attempts to evaluate the initial performance of national transfer activities.

Through its activities the UTEN proposed not only to equip intermediation actors in Portugal for more professional and systematic processes of knowledge transfer in university-industry relations, but also to strengthen the network of the various partner organizations (UTEN, 2010, 2011).

### **3. EMERGENCE OF ACTORS AND BEHAVIOURS IN THE PORTUGUESE STI SYSTEM**

The impacts of the CSF III policies were reflected in the emergence of new actors in brokering national public science and the technological

system. Infrastructure built in the 1980s and 1990s was added, with programs GAPI, NEOTEC and OTIC, of a number of organizations, which explicitly focused its activity on the relationship between universities and business, through the transfer of knowledge in an attempt to marketing research with economic potential. These programs have allowed the existence of such entities more evenly distributed throughout the territory, created in proximity to S&T entities.

In parallel, the Portuguese universities faced the international trend of a wider role for higher education institutions (HEIs). This change is institutionalized with Law n.º 62/2007 of 10 September which embodies the new legal regime of higher education institutions (RJIES). This law created a new framework for HEIs, its constitution, function, organization, functioning and powers, the authority and supervision of the State and the relationship with their autonomy. In addition to educational activities and scientific research that these entities should develop, this statute refers, in Article 2, paragraph 4 that HEIs have the right and duty to participate, individually or through their units, in activities in connection with the society, namely diffusion and knowledge transfer, as well as the economic value of scientific knowledge.

This trend, which had been ongoing since the beginning of the decade, was accelerated by this legal framework, creating the landscape to Portuguese HEIs reflect on their functions, reorganization of the governance system and an increased interest in connection with the society in general and firms in particular.

The implementation of RJIES originated the formalization process of knowledge transfer activity in the organic structures of many entities. In most cases, these new structures were based on a complete transition and utilization of skills and human resources involved with the installation of OTICs and GAPIs in universities. OTICs had a strong mobilizing effect and allowed some internal dynamics in universities and polytechnics, particularly in gauging the potential for commercialization of research, but the short duration of the program led to the dissolution of the network that was beginning to glimpse. The role of GAPIs was particularly important in the promotion of IPR, facilitating information and support in the process of registration. The various GAPIs structured a network that was consolidated and retained some dynamic interaction between the various members, even with the end of funding of INPI.

Even if, as reported by Laranja (2007: 209), the GAPIs installed in academia had almost insignificant results, coupled with a static view of the valorisation of IPRs, its operating logic was crucial to give visibility on the issue of patents and trademarks, that had limited attention by potential users in Portugal (Pereira et al., 2004).

The set of policy changes and the emergence of new actors have resulted in a change of behaviours in university-industry behaviours. The second half of the 2000s is marked by an increase in attempts at commercialization of science in the Portuguese university. These changes are evidenced in reports by UTEN (2010, 2011) particularly with regard to the growing number of registered patents and the creation of spin-offs. These areas are the channels that Portuguese technology transfer offices regarded as essential to their evaluation.

Despite the merits of the various programs, the lack of continuity and dependence of the European structural funds of GAPIs and OTICs, and the focus of UTEN on experiences difficult to adapt to the Portuguese context, limited the impact of these initiatives. Notwithstanding substantial improvements of technology transfer offices in Portugal, they continue to lack critical mass and resources (Teixeira, 2011). The behaviour of actors has changed substantially by

paying greater attention to technology transfer outputs, which not only sets up a change of behaviour towards the use of these interaction channels as an instrument of transfer, but that seems to include a change in the shared meaning of innovation.

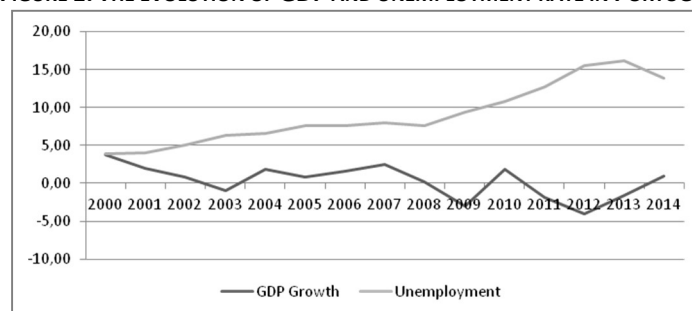
#### 4. STI CHANGE FOR THE PERIOD 2014-2020

The preparation and launching of the programmes for 2014-2020 is clearly marked by two contradictory tensions. One is the economic crisis that had strong impacts in the Portuguese STI system. The other is the discourse that was consolidated about the centrality of innovation to economic growth.

##### *The economic crisis and impacts in the STI system*

Following the external intervention by the Troika (European Commission, International Monetary Fund and European Central Bank) started in 2011, several austerity measures to control public expenditures, and public debt, and to restructure labour laws, with the reduction of wages and employment costs, were implemented. These policies led to a strong economic recession and rise of unemployment (EC, 2014) (Figure 1).

FIGURE 1. THE EVOLUTION OF GDP AND UNEMPLOYMENT RATE IN PORTUGAL



Source: Pordata (INE | BP - Contas Nacionais Anuais (Base 2011) & INE - Inquérito ao Emprego)

The impact of the economic crisis rapidly has contaminated to the STI system. Below we can see Table 1 with the evolution of numbers regarding R&D total expenditures, R&D public expenditures, and the number of researchers. It can be noticed that in the peak of the crisis the R&D investment followed a pro-cyclical pattern, following the path defined by the economic downturn.

The impact of the economic crisis in the research system has also been reflected more intensively in the number of innovative enterprises in Portugal when compared to the average of EU

(with 28 member-states). Community Innovation Survey (CIS) data reported a decreased of 9.45% of innovative companies between 2010 and 2012 in Portugal, higher than the average variation in European countries (-7.39%) (Table 2).

**TABLE 1. THE EVOLUTION OF R&D IN PORTUGAL (M€)**

	2007	2008	2009	2010	2011	2012	2013
Expenditures for research and development (R&D) as % of GDP	1,1	1,4	1,6	1,5	1,5	1,4	1,4
R&D Expenditures (Total)	1.973	2.585	2.772	2.758	2.567	2.320	2.322
Government budget expenditures for research and development (R&D)	1.272	1.572	1.753	1.768	1.754	1.555	1.579
R&D executed by Companies	1.011	1.295	1.311	1.266	1.216	1.153	1.104
R&D executed by State	184	188	202	196	189	124	135
R&D executed by Higher Education	587	891	1.014	1.017	934	846	879
R&D executed by Non profit private organisations	191	210	244	278	227	197	204
Total staff and researchers in R&D: full-time equivalent by 1000 active population	6,4	8,7	8,6	8,7	9,1	8,8	9,1

Source: Pordata (INE | BP - Contas Nacionais Anuais (Base 2011) & INE - Inquérito ao Emprego)

**TABLE 2. INNOVATIVE FIRMS (CIS DATA) [% FROM TOTAL NUMBER OF FIRMS]**

Member-States	2006-08	2008-10	2010-12
EU28	51.5	52.8	48.9
Belgium	58.1	60.9	55.6
Bulgaria	30.8	27.1	27.4
Czech Republic	56.0	51.7	43.9
Denmark	51.9	54.7	51.1
Germany	79.9	79.3	66.9
Estonia	56.4	56.8	47.6
Ireland	56.5	59.5	58.7
Greece	:	:	52.3
Spain	43.5	41.4	33.6
France	50.2	53.5	53.4
Croatia	44.2	42.4	37.9
Italy	53.2	56.3	56.1
Cyprus	56.1	46.2	42.1
Latvia	24.3	29.9	30.4
Lithuania	30.3	34.5	32.9
Luxembourg	64.7	68.1	66.1
Hungary	28.9	31.1	32.5
Malta	37.4	41.5	51.4
Netherlands	44.9	56.7	51.4
Austria	56.2	56.5	54.4
Poland	27.9	28.1	23.0
Portugal	57.8	60.3	54.6
Romania	33.3	30.8	20.7
Slovenia	50.3	49.4	46.5
Slovakia	36.1	35.6	34.0
Finland	52.2	56.2	52.6
Sweden	53.7	59.6	55.9
United Kingdom	45.6	44.3	50.3
Iceland	74.8	63.8	:
Norway	49.2	43.5	44.7
Serbia	:	51.7	47.5
Turkey	:	51.4	48.5

Source: Eurostat newsrelease 15/2015

This period was also characterized by a massive emigration, with a higher relative weight of qualified human resources when compared with the traditional emigration profile in Portugal

(Diogo, 2014). At the same time, several controversies regarding the STI system entered the public attention. Examples regard the constraints to the daily routines of public research originated by new laws (namely the

“*Lei dos Compromissos*”<sup>1</sup>), the reduction of the number of fellowships by the FCT, the difficulties in the evaluation of the research units, and the financing of public universities.

### ***A fifth generation of innovation policies? Re-igniting the economy 2020***

On the other hand, the new policy agenda for 2020 is clearly supportive of the design of new instruments oriented towards innovation. The European Union strategic documents underline the determination to overcome the economic turmoil and create conditions for a more competitive economy with higher employment in 2014-2020. After a broad-spectrum Lisbon Strategy, and its re-launching, that failed the ambition to transform EU in “the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion” (Presidency conclusions, Lisbon European Council, 23 and 24 March 2000), the EU gave extraordinary emphasis to selectiveness and focus of policy objectives. Europe 2020 strategy (European Commission, 2010) is thus a strategy to achieve smart, sustainable and inclusive growth. Smart growth means improving the EU’s performance in education, encouraging people to learn, to study and to update skills, in research and innovation, by creating new products and services that generate growth and jobs and help address social challenges, and with a full integration in digital society, using information and communication technologies. Sustainable growth regards moving towards a low-carbon economy, while Inclusive growth emphasises job creation and poverty reduction.

The Partnership Agreement for the new framework Portugal 2020 was signed in July 2014 between Portugal and the European Commission. Portugal 2020 brings together the support of five structural and investment European funds - ERDF, Cohesion Fund, European Social Fund (ESF), European Agricultural Fund for Rural Development (EAFRD) and European Maritime and Fisheries Fund (EMFF) - which define the programming principles for the economic development policy, social and territorial cohesion to promote in Portugal. The programming principles are in line with smart, sustainable and inclusive growth

principles, indicated by the Europe 2020. Portugal will receive 25 billion Euros by 2020 to support the achievement of the defined priorities:

- production of tradable goods and services and increasing exports,
- transfer STI system results to the industrial fabric,
- participation in education and reduction of early school leavers,
- integration of people at risk of poverty and combating social exclusion,
- promotion of sustainable development, with a focus in the efficient use of resources, strengthening territorial cohesion, particularly in cities and low density areas, and;
- rationalization, modernization and capacity building of public administration.

Portugal 2020 is organised in four thematic operational programmes on the Continent: competitiveness and internationalization, social inclusion and employment, human capital, and sustainability and efficiency use of resources.

During the preparation of the framework it was evident the need of new actors. In particular AdI was renamed for a new strategic repositioning as ANI – National Agency for Innovation. The general coordination of regional policy and management of European structural and investment funds (ESIF) were centralised in a new entity, the AD\_Coesao – Agency for Development and Cohesion. The creation of this entity results from the fusion of three other public entities: IFDR – Financial Institute for Regional Development, IGFSE – European Social Fund Management Institute, and the NSRF mission structure and observatory.

Another noteworthy characteristic of Portugal 2020 is the inclusion of ‘smart specialisation’ rationale (Foray, David, & Hall, 2011) in the strategy for Research and Innovation at national and regional levels, The regional OPs (Norte, Centro, Lisboa, Alentejo, Algarve, Açores, and Madeira) identified the major strategic goals, which are themes where the regions have scientific, technological and economic expertise, in which Portugal and its regions hold comparative and competitive advantages or latent potential.

‘Smart specialisation’ concept is built on academic contributions from the evolutionary economic geography and institutional economics that underline the importance of innovation systems and networks to the regional

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<sup>1</sup> A national law created a series of restrictions for the acquisition of goods and services in the sub-sectors of the State.



development (Foray, 2015). As a policy notion it emerged from the knowledge accumulated by several European Commission bodies, namely the DG Research and Innovation, DG Enterprise & Industry, and DG Regional and Urban Policy, especially with the programmes related with the regional innovation strategies (RIS) and the regional innovation and technology transfer strategies and infrastructures (RITTS) (Sörvik & Kleibrink, 2015). It results directly from the verification that STI investments in Europe were fragmented, with lack of critical mass, and that regions adopted mimetic policies towards fashionable S&T areas, such as ICT or biotechnology, without consideration for their specific capacities. The report “An agenda for a reformed cohesion policy: a place-based approach to meeting European Union challenges and expectations”, known as the Barca report (Barca, 2009), is often considered a key milestone to the development of the concept by adding to this notion a place-based dimension focused in the need of priority-setting capable of generation relevant economies of agglomeration and knowledge spillovers. Because smart specialisation is a new policy concept, the ESIF, DG Regio and Joint Research Centre created a Smart Specialisation Platform (S3) at Seville to help the member-states and their regions in the development of their Research and innovation strategies for smart specialisation (RIS3).

RIS3 are evidence-based strategies on what regions can realistically achieve building on their strengths and existing assets. They should focus and concentrate resources on certain domains of expertise, where R&D and innovation will complement other regional productive assets, avoiding fragmentation and duplication. A ‘smart specialisation’ approach should promote the generation of regional ideas, maximising both intra-regional and inter-regional spillovers benefiting from embeddedness and relatedness (Foray, 2015). Smart specialisation requires developing a vision, identifying the competitive advantages, setting strategic priorities and making use of policies to maximise the knowledge-based development potential of a region, whether strong or weak, high-tech or low-tech.

RIS3 are integrated, place-based economic transformation agendas developed at the national and regional levels that address five domains (Foray et al., 2011):

- Provide focus for policy support and investments on selected key national and regional priorities, challenges and needs for knowledge-based development;

- Build on each territory’s strengths, competitive advantages and potential for excellence;
- Support technological as well as practice-based innovation and aim to stimulate private sector investment;
- Involve stakeholders encouraging innovation and experimentation;
- Evidence-based, including monitoring and evaluation mechanisms.

The preparation of a national RIS3 (ENEI – Estratégia Nacional de Especialização Inteligente) was instigated by IAPMEI, FCT, AdI and COMPETE (Competitiveness Factors OP structure). But simultaneously all Portuguese regions were engaged in developing specific regional RIS3. It was not an easy task with a process involving several actors with different types of tensions. The strategic design was in general much more participatory that it is common in Portugal and in this way several problems were present during public interventions and even between the national and regional levels. The alignment of the OPs with these strategies is mandatory in achieving the 2020 Portugal’s investments in Research, Technological Development and Innovation (Thematic Objective 1) and other priority cases, such as in the context of support for the competitiveness of SMEs (Thematic Objective 3). In the end of the design process, the ANI guaranteed the supervision of the ENEI, assuming the presidency of the Coordination Council and responsible for the technical secretariat. The CCDRs also obtained new relevance in the selection of STI proposals aligned with the regional development plans and regional RIS3 priorities.

RIS3 were not absent from criticisms from the scientific community and economic actors. One of the most audible criticisms came from Social Sciences and Humanities that referred that these RIS3 strategies focused a limited group of priorities, directly connected to market valorisation of knowledge, and would have a negative impact in basic research, particularly in SSH. Contrary to expected, Social Sciences are not emerging in these conditions as the relevant mediators. The new transversal role of SSH is seen as a subaltern position to other fashionable areas, endangering the knowledge production. The public position from several relevant members of the scientific community, for example, the FCT Scientific Council for the Social Sciences and the Humanities (cf. the review of February 2015), showed disapproval regarding the reduction of support to SSH research but

also demonstrates limited attention to emerging concerns such as responsible research and innovation, interdisciplinarity or thematic works.

At the present moment it is yet very difficult to comprehend to true impact of the RIS3. Nonetheless it is clear that RIS3 helped to define a more limited number of policy intervention priorities and a larger consensus among the national and regional stakeholders in the pathway to innovation. But the challenge is huge to implement such an ambitious agenda articulating conveniently the different national and regional capabilities, the selected priorities, and the interests and agenda of specific innovation actors.

## 5. CONCLUSIVE REMARKS

This article summarized the chronology of events of policy change, identifying some consequences in terms of the emergence of new actors and modifications of behaviours that impacted in the STI system in Portugal.

The institutional change in Portugal was evidenced by the emergence of different policies and instruments to support the strategic direction of policy-makers for a more integrated view of innovation. The implementation of these policies provided stimulus for the emergence of several players brokering the connection between science and business. Technology transfer offices in Portuguese universities emerged in the last decade, benefiting from the initial stimulus of GAPI and OTIC programmes, and secondly, with attempts to professionalize this type of activity involving the UTEN. University-industry relations are in an intermediate phase, when habituation and legitimacy, new practices, routines, professions emerge but in a limited threshold.

A central question in this debate is how to take a decisive step towards the institutionalization of cooperative innovation relations in Portugal and the consolidation of innovation routines. At the same time that the policy design focus was gaining emphasis on innovation, Portugal was one of the countries that suffered deeper impacts with the economic downturn generated by the financial crisis. Institutional change is not always abrupt (Streeck & Thelen, 2005), it is important to ensure that, after all the efforts and improvements in the last decades, because of short term constraints like the ones resulting from the economic slowdown and the austerity measures, the Portuguese STI system is not affected by an institutional drift, or even exhaustion, with unpredictable results.

While new topics are emerging in the new international policy agenda as ‘societal challenges’ and ‘responsible research and innovation’, as noticeable in EU Programmes such as Horizon 2020, in Portugal the recent debates remain centred in “old” topics such as science funding, excellence, the industrial application of knowledge, and the strengthening of firm innovation and entrepreneurship. Some emphasis is given to communication and popularisation of science, seeing science as a cultural pre-condition for modernity, a necessary step (but often too expensive) for innovation. Nonetheless a worrying lack of engagement and collaborative initiatives persists in the Portuguese STI system today. Can in this context RIS3 be an opportunity for the development and consolidation of national and regional STI systems?

## ACKNOWLEDGMENTS

Hugo Pinto gratefully acknowledges the financial support from FCT - *Fundação para a Ciência e a Tecnologia* to his post-doctoral research (SFRH/BPD/84038/2012). This article updates a chapter previously published in the book “Innovation for Sustainability and Networking” edited in 2013 by Teresa de Noronha and Jorge Gomes (University of Algarve). The article benefits from the comments of Tiago Santos Pereira (CES-UC) and participants in the Conference “Problems of early-stage science-based firms” (Kavala, Greece) and the Seminar “Fostering an Entrepreneurship and Innovation Ecosystem in Tunisia through the Effective Use of TTOs” (Faro, Portugal) both held in June 2015.

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