



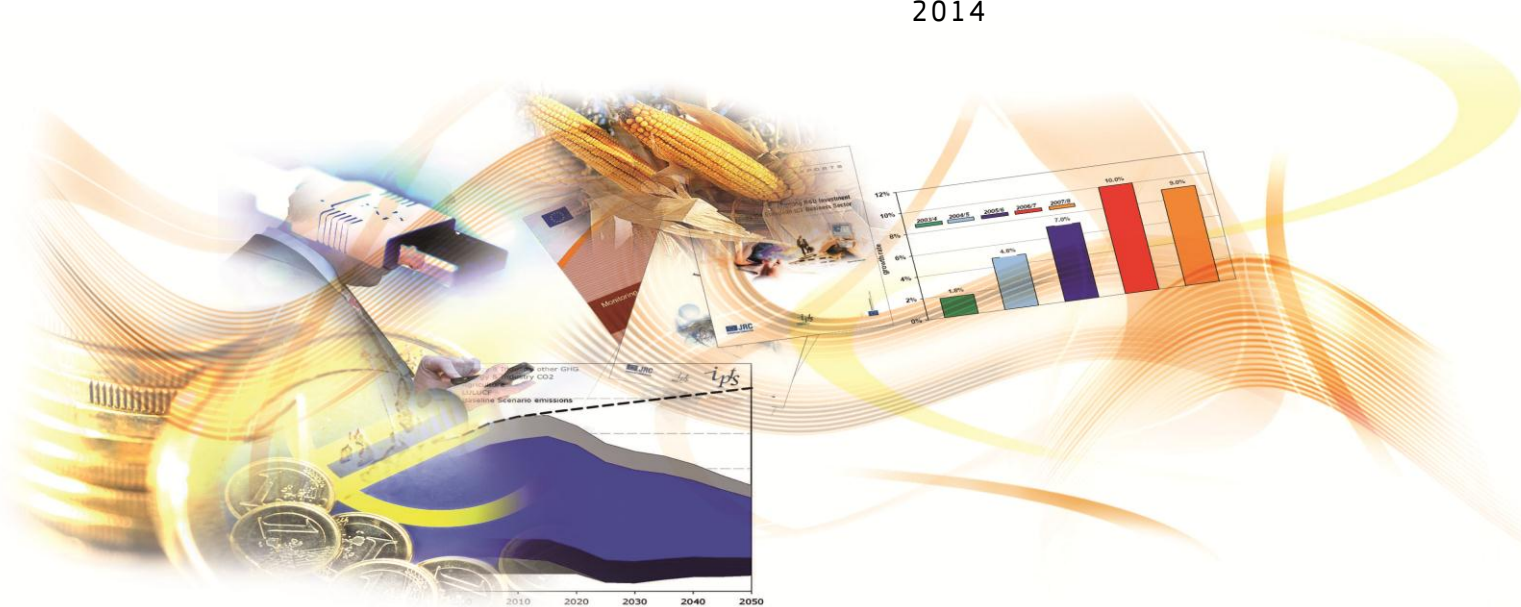
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Abstract

The Analytical Country Reports analyse and assess in a structured manner the evolution of the national policy research and innovation in the perspective of the wider EU strategy and goals, with a particular focus on the performance of the national research and innovation (R&I) system, their broader policy mix and governance. The 2013 edition of the Country Reports highlight national policy and system developments occurring since late 2012 and assess, through dedicated sections:

- national progress in addressing Research and Innovation system challenges;
- national progress in addressing the 5 ERA priorities;
- the progress at Member State level towards achieving the Innovation Union;
- the status and relevant features of Regional and/or National Research and Innovation Strategies on Smart Specialisation (RIS3);
- as far relevant, country Specific Research and Innovation (R&I) Recommendations.

Detailed annexes in tabular form provide access to country information in a concise and synthetic manner.

The reports were originally produced in December 2013, focusing on policy developments occurring over the preceding twelve months.

ACKNOWLEDGEMENTS AND FURTHER INFORMATION

This analytical country report is one of a series of annual ERWATCH reports produced for EU Member States and Countries Associated to the Seventh Framework Programme for Research of the European Union (FP7). [ERWATCH](#) is a joint initiative of the European Commission's [Directorate General for Research and Innovation](#) and [Joint Research Centre](#).

The Country Report 2013 builds on and updates the 2012 edition. The report identifies the structural challenges of the national research and innovation system and assesses the match between the national priorities and the structural challenges, highlighting the latest developments, their dynamics and impact in the overall national context.

The first draft of this report was produced in December 2013 and was focused on developments taking place in the previous twelve months. In particular, it has benefited from comments and suggestions of Fernando Hervás from JRC-IPTS who reviewed the draft report. The contributions and comments from DG-RTD and the ERWATCH and JRC National Contact Point (Marta March, Cecilia Cabello Valdés) and Xavier Roland Eekhout are also gratefully acknowledged.

The report is currently only published in electronic format and is available on the [ERWATCH website](#). Comments on this report are welcome and should be addressed to jrc-ipts-erawatch-helpdesk@ec.europa.eu.

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EXECUTIVE SUMMARY

Spain has considerably reduced its Research and Development (R&D) and innovation investments during the last years, threatening to set back the progress made before during the previous period. Spain made considerable efforts in the period 2002-2008 duplicating its Gross Expenditures on R&D (GERD) in absolute terms. However, the financial crisis cut short the positive trend. After 2008, the R&D intensity (GERD as a percentage of Gross Domestic Product -GDP) practically stagnated (around 1.4%) and decreased to 1.36% in 2011. In 2012, R&D intensity decreased to 1.3%, reaching a figure similar to the one in 2007 (1.27%). The Government Budget Appropriations or Outlays on R&D (GBAORD) has been decreasing importantly over the last three years, by -4.5% in 2010 by -12.7% in 2011 and by -13.1% in 2012, reaching a budget of €6,300m. Data on the general government budget for R&D and innovation (PGE) showed that, after decreasing in 2012 by -25.6%, public investments in R&D and innovation decreased in 2013 by -7.2% leading to a budget of €5,932m (Molero and de No, 2012b, Molero and de No, 2013a). This means that public R&D investments went back to the levels of 2005-2006. In relative terms, the total funds per R&D personnel in Full Time Equivalent (FTE) have changed from €31.9k in 2002 to €41.1k per head in 2009. For 2013, this figure will represent €22.6k per head, which is much lower than the one in 2002 (Molero and de No, 2012c; Molero and de No, 2013a). In addition, the non-execution of an important part of the budgets has worsened the situation. In the period 2009-2011, between 21% and 45% of the yearly public government budgets were not executed (FECYT, 2013). These severe cuts in R&D and innovation investments have raised important concerns among research-related organisations¹ about the financial sustainability of the Spanish R&D and innovation system. They also indicate that it will be very difficult for Spain to reach the targets of 3% GERD per GDP set by the Europe 2020 strategy. In fact, the new Spanish Strategy for Science, Technology and Innovation (EESTI) (2013-2020) has set a new lower target of 2% GERD per GDP for 2020. This new lower target, the cancellation and delays in launching important R&D calls (e.g. Promotion of R&D and innovation towards societal challenges) appear to contradict the formal policy discourse that supports R&D and innovation as a mechanism to change its economic structure and to overcome the current economic crisis

Spain has a quasi-federal decentralised R&D and innovation system. Some recent developments might improve the coordination of national and regional R&D and innovation policies. For example, the new Law of Science, Technology and Innovation (LCTI 2011) is aimed at improving national and regional coordination through the Council of Science, Technology and Innovation (CPCTI). Four regions accounted in 2012 for 69.7% of all R&D expenditures: Madrid (25.6%), Catalonia (22.3%), Andalusia (11.1%) and the Basque Country (10.7%). In relative terms, the leading regions are the Basque Country, Navarre, Madrid and Catalonia with a GERD by GDP of 2.2%; 1.9%, 1.8% and 1.5% respectively. The Basque Country is the only region that has increased its yearly R&D Intensity over the last three years (2%, 2.1% and 2.2%). All Regional authorities “Comunidades Autónomas” have registered to the Smart Specialisation Platform (S³P), which “assists Member States and regions to develop, implement and review Research and Innovation Strategies for Smart Specialisation (RIS³)” (RIS³: [on-line](#)). Currently, all

¹ These organisations include: the Spanish Confederation of Scientific Societies ([COSCE](#)), the Spanish Conference of University Rectors ([CRUE](#)), the Platform for Dignifying Research ([PDI](#)), the Spanish Federation of Young Researchers ([EIJ](#)) and the National Association of Ramón y Cajal Researchers ([ANIRC](#)). These organisations have jointly signed different manifestos (see section 2.5). They are diverse and have different levels of relevance to the research system.

the Spanish regions are developing their RIS3 strategies, which have to be finished by the end of 2013 (NRP, 2013) The new Spanish Strategy for Science, Technology and Innovation (EESTI) (2013-2020) includes the concept of “smart specialisation” in one of its 6 priority axes (Priority 5).

Important efforts have been made in improving the R&D and innovation policy mix over the past years. Successive strategies and plans have tried to address the challenges of the Spanish R&D system and to follow the suggestions of some comprehensive evaluations on this system (e.g. OECD, 2006) in order to address the challenges of the Spanish R&D and innovation system. The Spanish R&D and innovation system have challenges related to the country's industrial structure, to its science and technology base and to its governance structures (OECD, 2006; EW, 2009 and 2011; EC, 2011a and 2011b). The industrial structure in Spain is characterised by the significant weight of low-tech Small and Medium-sized Enterprises (SMEs) that leads to low levels of R&D and innovation spending and patenting activity. Its science and technology base is a rigid and closed system with low levels of mobility between institutions, territories and sectors. Its governance structure demands higher levels of institutional coordination (regional and ministerial); complementarities between research and innovation policies; and synergies between policy design and implementation. The new Spanish R&D and innovation strategy EESTI (2013-2020) and the new Plan of Scientific and Technical Research and Innovation (PECTI) (2013-2016) also follow this trend and try to respond to the challenges of the system and the shortcomings of previous plans. The changes in the strategies and plans indicate an increasing emphasis on innovation, public-private R&D collaboration, research excellence and other emerging topics, such as the promotion of R&D and innovation on societal challenges or the role of public procurement to promote R&D and innovation. The increasing importance of competitive funding, the implementation of a more diversified set of instruments (e.g. tax incentives, venture capital), and the increasing alignment with European objectives are also important changes in the Spanish policy mix. The new law (LCTI 2011) has also tried to address these challenges. However, as these very documents recognise, the structural and governance challenges of the Spanish research system remain.

Currently the most important challenge of the Spanish R&D and innovation system is to reverse the decreasing trend of public R&D and innovation investments and to assure an effective implementation of the policy framework for R&D. The evolution of the Spanish policy mix during the last decade was quite satisfactory, including a including a diversified set of instruments that tried to tackle the identified barriers and weaknesses of the R&D system. This evolution is currently threatened by the important public budget cuts in R&D and innovation. There are also some indications that point that policy implementation could have been improved. The increasing proportion of non-executed public budget for R&D and innovation (Molero and de No, 2012a; Fecyt, 2013) indicates that there is a need for analysing what instruments and measures are not being sufficiently demanded or used. Similarly, the increasing proportion of public budgets allocated through loans (MINECO, 2013) points that budget cuts have been applied without considering one of the strengths of the R&D and innovation system, namely its basic research (which primarily needs grant financing). During the last two years, many important policy programmes have been delayed or cancelled. The delay suffered in launching the main programme for basic R&D (“Promotion of R&D and innovation towards societal challenges”) reveals that policy implementation has been unreliable. It also indicates that the strengths of the system (basic research) have not been considered when implementing the R&D plan. The budget crisis suffered by the [Spanish National Research Council](#) (CSIC) during Summer 2013 points to the need of a more stable budgetary framework for public research institutions. In addition, no specific measures appeared to be taken to address the consequences of the crisis in the R&D system. The combination of the lack of measures for addressing systematic failures of the R&D system (ERAWATCH report 2010; EW, 2011; EW, 2012) with

the lack of measures for addressing the negative consequences of the crisis will probably exacerbate some of the long-term challenges of the R&D system. For example, the limited character of the measures to make the public labour market for researchers more flexible combined with the lack of specific measures to support researchers under temporary contracts, have concentrated the negative effects of budget cuts on the young and mobile researchers. The precarious situation of young and mobile excellent researchers diminishes the research base of the country and does not encourage future generations to enter into a research career.

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1 BASIC CHARACTERISATION OF THE RESEARCH AND INNOVATION SYSTEM

Spain has 46.7 million inhabitants (9.2% of the whole population of Europe) and produces around 8.7% of the GDP of the European Union (EU-28). The GDP per capita in 2012 was €22,300, below the EU-28 average of €25,500. The crisis in Spain particularly affected the unemployment rate, which rose to the highest in Europe (25.0% in 2012). GDP decreased significantly (by -3.8%) in 2009 and stabilised during 2010 and 2011 in values around 0%. In 2012, GDP again decreased importantly (by -1.7%) while in the Eurozone this percentage was -0.4%. With regard to the input side of the innovation and science system, Spain made great efforts in the period 2002-2008 when its Gross Expenditure on R&D (GERD) in absolute terms doubled, while in relative terms the GERD by GDP increased from 0.99% in 2002 to 1.39% in 2009. However, the financial crisis hindered this positive trend. In 2010 the R&D intensity (GERD as a percentage of GDP) practically stagnated (1.4%) and decreased to 1.36% in 2011. In 2012, R&D intensity decreased to 1.3%, reaching a figure similar to the one in 2007 (1.27%). The Government Budget Appropriations or Outlays on R&D (GBAORD) in Spain and its regions has been decreasing importantly over the last four years, by -4.5% in 2010 and by -12.7% in 2011 and by -13.1%, reaching a budget of €6,300m. R&D funded by Business Enterprise Sector as a percentage of GDP is stagnated in 0.6%, far from the EU average of 1.12%. After 2012, only some data are available on the budget for public expenditure by the central government on R&D and innovation (PGE).² This state level budget increased from €4,000m in 2003 to €9,673m in 2009. After 2009, the budget began decreasing, by -4.1% in 2010, -7.4% in 2011 and by -25.6 in 2012. For 2013 another -7.2% reduction was applied, leading to a budget of €5,932m. The PGE for 2013 returned the public R&D investments to the levels of 2005-06 (Molero and de No, 2013a). The foreseen budget for 2014 envisages an increase of €213,9m (3,61%), a quantity lower than the reduction applied in 2013 (€461m). It must be pointed out that the state budgets include not only direct expenditures and subsidies for R&D but also loans. In fact, in the last few years the role of loans has increased while the budget for subsidies has decreased, which implies, de facto, a greater decrease. Considering the growth of the Spanish R&D system, the total funds per R&D personnel (FTE) have changed from €31.9k in 2002 to €41.1k per head in 2009. For 2013, this figure will represent €22.6k per head (€16.2k non-financial) (Molero and de No, 2012c, Molero and de No, 2013a). In addition, the non-execution of an important part of the public budgets has worsened the situation. In the period 2009-2011, between 21% and 45% of the yearly public government budgets were not executed (FECYT, 2013). This is a clear step backwards for the Spanish R&D system which sets back the opportunities for Spain to change its economic structure and to overcome the current economic crisis. In addition, the new Spanish Strategy for Science, Technology and Innovation (EESTI) (2013-2020) has recently set a new lower target of 2% GERD per GDP for 2020.³

³ A 3% target was set by the National Reform Programme (NRP) in 2011 and ratified in the NRP of 2012, translating the EU-level targets of the Europe 2020 strategy into national targets.

³ These organisations include: the Spanish Confederation of Scientific Societies ([COSCE](#)), the Spanish Conference of University Rectors ([CRUE](#)), the Platform for Dignifying Research ([PDI](#)), the Spanish Federation of Young Researchers ([EJI](#)) and the National Association of Ramón y Cajal Researchers ([ANIRC](#)). These organisations have jointly signed different manifestos (see section 2.5). They are diverse and have different levels of relevance to the research system.

³ A 3% target was set by the National Reform Programme (NRP) in 2011 and ratified in the NRP of 2012, translating the EU-level targets of the Europe 2020 strategy into national targets.

Spain is a “moderate innovator”⁴ (EC, 2012a and EC, 2013a) and its strengths lie in tertiary education, international scientific co-publications and medium and high tech exports, while its weaknesses are in private investments, public-private linkages, innovation outputs and knowledge-intensive activities. To illustrate its strengths: with increasing levels between 2008 and 2011 (data from the Innovation Union Scoreboard IUSB dashboard), and above the EU-27 average (shown in brackets), Spain is outstanding firstly in its percentage of population aged 30-34 who have completed tertiary education, which changed from 39.8% to 40.6% (34.6%); secondly, in the level of international co-publications per million, which changed from 454 to 599 (300)⁵; and thirdly in the contribution of medium and high-tech product exports of trade balance total, which changed from 101.97 to 103.05 (101.28). In contrast, the weak figures show that at levels below the EU-27 average, Spain underperformed in the percentage of GDP of private R&D expenditures, by 0.67% in 2011 against the UE-27 level (1.27%); in the number of public-private co-publications per million population, 22.5 against 52.8; in patent applications per billion GDP (in PPS€), 1.43 against 3.9; in patent applications in societal challenges per billion GDP (in PPS€), 0.39 against 0.96; in the percentage of GDP coming from licence and patent revenues from abroad, 0.06% against 0.51%; and in the percentage of knowledge-intensive services exports of total service exports, 21.6% against 45.1%.

The number of people employed in R&D activities in 2012 was 208,831 (FTE). After increasing more than 65% from 2002 to 2010, this number decreased in 2011 by -3.1 and in 2012 by -2.9, coming back to total figures lower than the ones of 2008. Based on the FTE data for 2012, 42.8% are working in the private sector, 37% in Higher Education Institutions (HEIs), 20% in Public Research Organisations (PROs) and 0.2% in Private Non for Profit Sector. Taking into account the research performance, universities showed the highest research performance level in the total number of international articles published in 2003-2011 (ICONO-Scimago, 2013). In 2011, Universities published around 70.2% of total publications, followed by the health sector (26.1%), Public Research Bodies (OPIs) (22.9%), others (2.5%) and firms (1.6%). However, taking into account the quality of publications (“normalised impact”) OPIs showed the highest impact with 1.6, followed by the health sector (1.4), Universities (1.3) and firms (1.3).

The main responsibilities for research and innovation policy design and operational management are concentrated in the Ministry of Economics and Competitiveness (MINECO) – before December 2011 the Ministry of Science and Innovation (MICINN) – which distributed (in 2013) 76.7% of the Spanish State Budget⁶ on R&D and innovation, increasing considerable its share (68.9% in 2012) (ICONO-Ministerio de Hacienda, 2013). The Ministry of Industry, Energy and Tourism (MINETUR) – accounted for 18.6% of the budget. Other R&D players are the Ministry of Defence (2.4%) and the Ministry of Education, Culture and Sports – with 1.6% of the total R&D-related funds of the Spanish State Budget (ICONO, 2013).

The MINECO, assisted by the State Secretary for Research, Development and Innovation (SSRDI), is responsible for drafting and managing the main R&D and innovation instruments: the multiannual “strategies” and “plans”. The Spanish Strategy for Science, Technology and Innovation (EESTI) (2013-2020) is the strategy that sets the rationale, objectives and indicators of the Spanish R&D and innovation policy. The Spanish State Plan for Scientific and Technical

⁴ Together with the Czech Republic, Greece, Hungary, Italy, Lithuania, Malta, Portugal and Slovakia (EC, 2013).

⁵ The important increase in production of publications in Spain is ratified with other sources (Scopus). For the period of 2000-2011, Spain has increased its share of world production of publication from 2.3% to 3% and its share of the European production from 7.5% to 11.1% in the same period (COTEC, 2013: 33).

⁶ In contrast to the case of the GBAORD data this budget includes not only subsidies and direct or indirect R&D and innovation expenditures but also loans and credits.

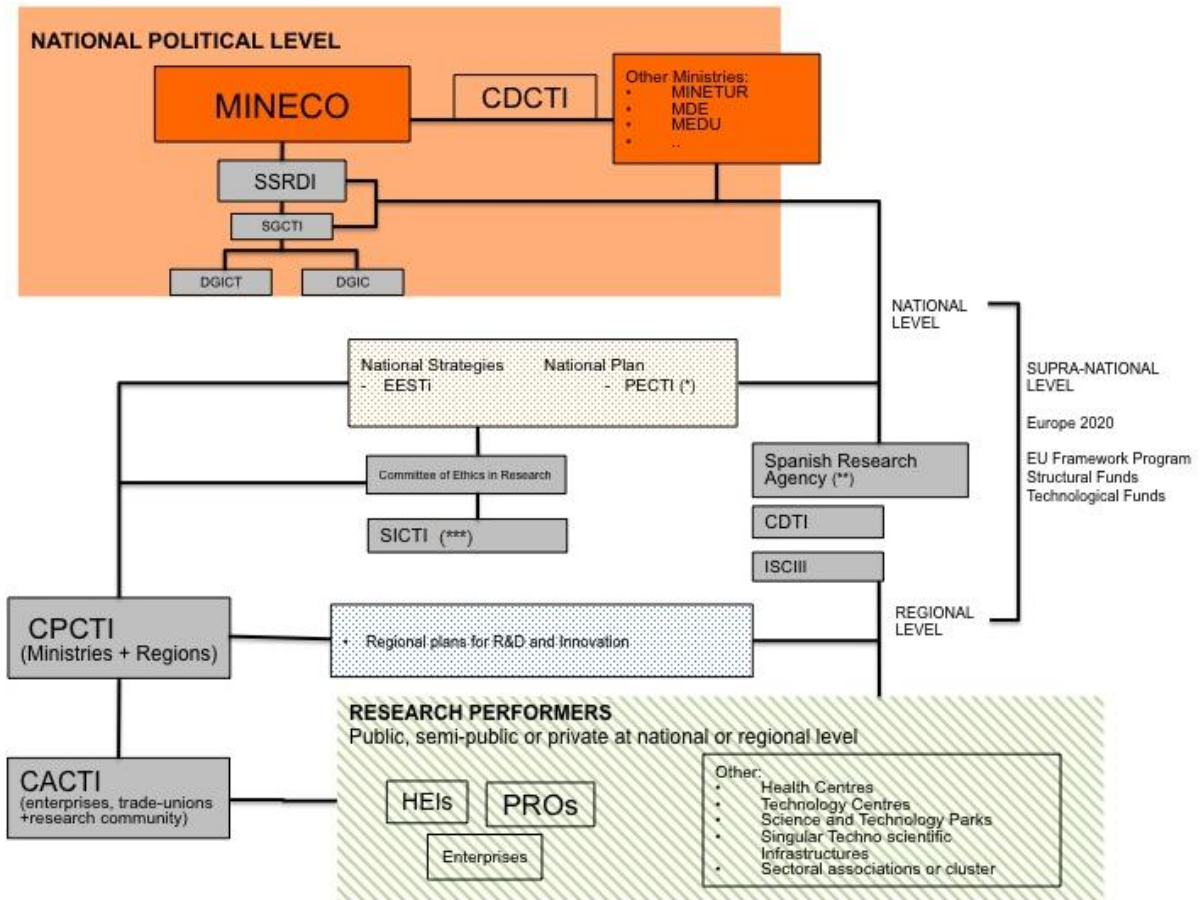
Research and Innovation (PECTI) (2013-2016) is a multiannual plan that implements the EESTI by setting its priorities, programmes, coordination mechanisms, costs and sources of funding. The new EESTI and PECTI were approved on 1st February 2013. The proposals have merged the two strategies and plans originally envisaged by the new Law of Science, Technology and Innovation (LCTI 2011). The PECTI replaced the National Plan for R&D and Innovation (2008-2011), extended to the end of 2012. Details on these important policy framework changes are provided in chapter 2. The MINECO is supported by the Executive Committee for Science, Technology and Innovation policy (CDCTI) and two main advisory bodies, which are the Council of Science, Technology and Innovation (CPCTI) (in charge of the coordination with regional governments and other actors of the R&D system) and the Advisory Council of Science, technology and Innovation (CACTI) (which gathers representatives of the research community, enterprises and trade-unions). The main funding bodies involved in the implementation of R&D and innovation policies are: The Spanish Research Agency (to be created), which aims to be an autonomous entity that will assign R&D funds on scientific merit grounds and the Centre for Industrial Technological Development (CDTI), which is a public corporate entity engaged mainly in the promotion of innovation and technological development for companies. Other institutions, such as the Carlos III Health Institute (ISCIII) also fund research. The Information System of Science, Technology and Innovation (SICTI) is responsible for the data collection and analysis for the monitoring of all policy programmes and instruments of the R&D and innovation policy (see Figure 1).

Spain has a quasi-federal decentralised political system with different degrees of competence devolution from the central government to the regions, depending on the policy area. As far as R&D and innovation-related policies are concerned, this allocation of competences were not clearly assigned to the different administrative levels which led most regions to develop similar R&D plans and to launch similar and often overlapping instruments, programmes and agencies at both regional and national administrative levels⁷ (Erawatch Country Report 2010 and 2011). Some recent developments might improve the coordination of national and regional R&D and innovation policies. For example, the new Law of Science, Technology and Innovation (LCTI 2011) is aimed at improving national and regional coordination through the Council of Science, Technology and Innovation (CPCTI). Some specific policies are more often carried out on a regional level, such as cluster policies and SME-oriented measures. Moreover the regional governments are also in charge of the universities. Four regions accounted in 2012 for 69.7% of all R&D expenditures: Madrid (25.6%), Catalonia (22.3%), Andalusia (11.1%) and the Basque Country (10.7%). In relative terms, the leading regions are the Basque Country, Navarre, Madrid and Catalonia with a GERD by GDP of 2.2%; 1.9%, 1.8% and 1.5% respectively. The Basque Country is the only region that has increased its yearly R&D Intensity over the last three years (2%, 2.1% and 2.2%). All Regional authorities “Comunidades Autónomas” have registered to the Smart Specialisation Platform (S³P), which “assists Member States and regions to develop, implement and review Research and Innovation Strategies for Smart Specialisation (RIS³)” (RIS³: [on-line](#)). Currently, all the Spanish regions are developing their RIS3 strategies, which have to be finished by the end of 2013 (NRP, 2013) The new Spanish Strategy for Science, Technology and Innovation (EESTI) (2013-2020) includes the concept of “smart specialisation” in one of its 6 priority axe (Priority 5). This could help to overcome some fragmentation by prioritising research areas, based on the needs and resources of the regions.

⁷ Such as the case of scholarships for PhD students; R&D project support for firms, PRO or HEI; National and regional “accreditation” agencies – grant researchers with a declaration that allows them to access to a certain job positions. Moreover, several regional R&D policy plans are similar to the national “plan”. See Gómez (2007) and Díez-Bueso (2013) for more details on the R&D and innovation national and regional allocation of competences.

The implementation of the new policy framework is suffering from delays in important policy R&D programmes (e.g. call for proposals of the R&D plan on fundamental research projects “Promotion of R&D and Innovation towards societal challenges and Research Training (FPI)), significant reductions (e.g. Research Training – FPI and University Personnel Training ([FPU](#)) – with a reduction of 200 grants) and cancellations (e.g. the [Jae programme, aiming to reinforce human resources](#)). In addition, the [Spanish National Research Council](#) (CSIC) went under one of its largest budget crisis during Summer 2013. The largest scientific organisation, with about 15,000 employees, and one of the most important research performers of the country, with about the 20 per cent of the national scientific production, has suffered large budget cuts from the government, with approximately 500 million Euros of total reduction (see section 2.3).

Figure 1: The structure of the Spanish research and innovation system



SOURCE: Own elaboration. Key: in orange: State oriented institutions and instruments. In blue: regional oriented institutions and mechanisms. In green: research performers

CACTI	Advisory Council of Science, technology and Innovation
CDTI	Centre for Industrial Technological Development
CDCTI	Executive Committee for Science, Technology and Innovation policy
CPCTI	Council of Science, Technology and Innovation
DGICT	Directorate-General of Scientific and Technological Research
DGIC	Directorate-General of Innovation and Competitiveness
EESTI	Spanish Strategy for Science and Technology and Innovation.
ISCIII	Carlos III Health Institute
MINECO	Ministry of Economy and Competitiveness)
MINETUR	Ministry of Industry, Energy and Tourism
MEDU	Ministry of Education, Culture and Sports
MDE	Ministry of Defence
SGCTI	General Secretariat of Science, Technology and Innovation
SICTI	Information System of Science, Technology and Innovation
SSRDI	State Secretary of Research Development and Innovation
PECTI	Spanish State Plan of Scientific and Technical Research and Innovation (2013-2016)
	(*) The PECTI merges the envisaged Spanish National Plan for Scientific and Technical Research (PECT) and the Spanish National Plan for Innovation (PEI) .
	The EESTI merges the planned Spanish Strategy for Science and Technology (EESTI) and the Spanish Strategy for Innovation (EEI)
	(**) Not yet implemented.
	(***) The Spanish Foundation for Science and Technology (FECYT) facilitates the integration and following of the Spanish R&D and innovation system.

2 RECENT DEVELOPMENTS OF THE RESEARCH AND INNOVATION POLICY AND SYSTEM

2.1 National economic and political

The crisis in Spain has particularly affected the unemployment rate, which is the highest in Europe since 2010 (25.0% in 2012).⁸ Spanish GDP decreased by -0.3% in 2010 and increased slightly by 0.4% in 2011 while in the Eurozone these percentages were respectively 2.1 and 1.5%. The debt crisis obliged Spain to apply severe cuts to its public budget, which have specially affected the budgets for R&D and Innovation. GBAORD decreased by -12.2% in 2011. In 2012, GDP again decreased importantly (by -1.7%) while in the Eurozone this percentage was -0.4%. The budget for public expenditures by the central government on R&D and innovation (PGE) decreased in 2012 by -25.6% and in 2013 by -7.2%. In addition, the period 2009-2012, between 21% and 45% of the yearly public government budgets were not executed (Fecyt, 2013: 31)⁹ (see section 2.2). During 2012 and 2013, several national and regional calls have been delayed (e.g. Ramón y Cajal, Promotion of R&D and innovation towards societal challenges) or cancel (e.g. JAE-doc). Due to larger budget cuts from the government suffered since 2010, the Spanish National Research Council (CSIC) went under a major budget crisis during the summer of 2013. Concerns about the sustainability of the Spanish R&D system raised by research-related organisation and institutional and grassroots action in support of science in 2012 remained during 2013 (see section 2.3).

Regulatory changes to comply with public deficit targets also affected the R&D and innovation system. For example, in order to be able to create the new Spanish Research Agency envisaged by the new Law LCTI it was necessary to include an amendment to the draft of the General State Budget of 2012 as this forbade the creation of any public agency. The Agency is still to be created. In the same way, some regulatory measures to correct the public deficit (e.g. Royal Decree-Law 20/2011) have limited staff recruitment and the filling of positions left vacant by retirees.

The Spanish Strategy for Science, Technology and Innovation (EESTI) (2013-2020) and the Spanish State Plan for Scientific and Technical Research and Innovation (PECTI) (2013-2016) were approved in on 1st February 2013. These documents set and implement the rationale and objectives of the Spanish R&D and innovation system. They have introduced important changes in the system (see section 2.4). In addition, the basic principles of the Spanish Research System and R&D policy framework have suffered also important changes in previous years due to the approval of new Law of Science, Technology and Innovation (LCTI 2011) (1st June 2011) and the arrival of a new government (21st December 2011) (see Annex and Country Report for Spain 2012 (ERAWATCH, 2013) for more details). In addition, the Entrepreneurship and Internationalisation Support Act (Law 14/2013) was published on the 27th September 2013 and

⁸ Data come from Eurostat. Data for 2013 (INE), confirms this increasing trend with higher levels of unemployment (26.6%, second trimester).

⁹ Provisional data for 2013 (November) facilitated by the FECYT with data of [IGAE](#) shows percentages of execution of the of the PGE – 46 of the MINECO (main programmes) around 47% in 2012 and 30% in 2013.

includes measures to promote entrepreneurship and facilitate finance to the creation of new business.

2.2 Funding trends

2.2.1 Funding flows

As mentioned, the national R&D investment target for 2020 has been downgraded to 2% GERD per GDP for 2020 from a 3% target. This new target has been set by the new strategy EESTI (2013-2020) and ratified by the National Reform Programme 2013 (NRP, 2013). It has to be noted that this R&D intensity target for 2020 is lower to the current European average (EU-28, 2.06) and falls short to the 3% target fixed for the EU as a whole in the Europe 2020 strategy. Spain translated this EU-level target into a 3% national target in the [National Reform Programme 2011](#) and ratified it in the [National Reform Programme 2012](#). The previous national strategy for innovation (Ingenio 2010) established as goals to commit with the Lisbon Strategy a 2% R&D investment by GDP for 2010 and to increase the R&D contribution of the private sector up to 55% and to reach the EU-15 average in the percentage of GDP allocated to ICT.¹⁰ The new strategy and Plan (EESTI and PECTI) recognised the importance of increasing the role of private investments in R&D they include a target of 0.73% BERD/GDP for 2016 and the strategy a 1.2% for 2020.

Progresses towards reaching this target are negative due to the decreasing investments in R&D. After a period of increasing economic growth, which ended in 2008, Spanish GDP has been showing negative or close to zero values. GDP decreased significantly (by -3.8%) in 2009 and stabilises during 2010 and 2011 with values around 0% (see Table 1). In 2012, GDP again decreased importantly (by -1.7%) while in the Eurozone this percentage was -0.4%. With regard to the input side of the innovation and science system, Spain made great efforts in the period 2002-2008 when its Gross Expenditure on R&D (GERD) in absolute terms doubled and increased well above the EU-average, while in relative terms the GERD by GDP increased from 0.99% in 2002 to 1.35% in 2008, reaching in 2009 a 1.39%. However, the financial crisis stopped this positive trend. In 2010 the R&D intensity (GERD as a percentage of GDP) practically stagnated (1.4%) and decreased to 1.36% in 2011. In 2012, R&D intensity decreased to 1.3%, reaching a figure similar to the one in 2007 (1.27%). The Government Budget Appropriations or Outlays on R&D (GBAORD) in Spain and its regions has been decreasing importantly over the last four years, by -4.5% in 2010 and by -12.7% in 2011 and by 13.1%, reaching a budget of €6,300m. R&D funded by Business Enterprise Sector as a percentage of GDP is stagnated in 0.6%, far from the EU average of 1.12%. Regarding the distribution of GERD by sectors of performance, the business enterprise sector increased its share from 51.9% in 2009 to 53.0% in 2012. This increase went mainly against the decline in shares of Government Sector. These figures on R&D expenditures indicate that it will be very difficult for Spain to reach the targets either of 3% GERD per GDP set by the Europe 2020 strategy or of 2% set by the new Spanish Strategy EESTI (2013-2020).

¹⁰ See AEVAL (2008) for an evaluation of Ingenio 2010.

Table 1. Basic indicators for R&D investments

	2009	2010	2011	2012	EU28 (2012)
GDP growth rate	-3.8	-0.2	0.1	-1.6	-0.4
GERD (% of GDP)	1.39	1.4	1.36	1.3	2.06 (e)
GERD (euro per capita)	315.4	313.8	303.9	286	525.8 (e)
GBAORD - Total R&D appropriations (€ million)	8,700	8,308	7,252	6,300	86,309
R&D funded by Business Enterprise Sector (% of GDP)	0.60	0.60	0.60	:	1.12 (e)
R&D performed by HEIs (% of GERD)	27.8	28.3	28.2	27.7	24
R&D performed by Government Sector (% of GERD)	20.1	20.1	19.5	19.1	12
R&D performed by Business Enterprise Sector (% of GERD)	51.9	51.5	52.1	53.0	63
Share of competitive vs. institutional public funding for R&D	:	:	:	:	:
Venture Capital as % of GDP)	0.013	0.01	0.012	0.009	:
Employment in high- and medium-high-technology manufacturing sectors as share of total employment	3.7	3.87	3.8	:	5.6 (*)
Employment in knowledge-intensive service sectors as share of total employment)	30.3	31.4	32.1	:	38.9
Turnover from Innovation as % of total turnover	17,02	17,74	16,93	12,37	:

Data Source: EUROSTAT, December 2013. Last three indicator ICONO-Eurostat
e - EUROSTAT estimate

(:) Non-available

(*) EU-27

After 2012, only data on the central government's budget for public expenditures (PGE) to R&D and innovation is available.¹¹ This state level budget increased from €4,000m in 2003 to €9,673m in 2009. After 2009, the budget began decreasing, by -4.1% in 2010, -7.4% in 2011 and by -25.6 in 2012. For 2013 another -7.2% reduction was applied, leading to a budget of €5,932m. The PGE for 2013 returned the public R&D investments to the levels of 2005-06 (Molero and de No, 2013a). The foreseen budget for 2014 envisages an increase of €213,9m (3,61%), a quantity that is much lower than the one reduced last year (€461m) (Molero and de No, 2013b). The state budgets include not only direct expenditures and subsidies on R&D but also loans. In fact, in the last few years the share of loans has been increasing, in contrast to that of subsidies, which implies, de facto, an even greater decrease. Considering the growth of the Spanish R&D system, the total funds per R&D personnel (FTE) have changed from €31.9k in 2002 to €41.1k per head in 2009. For 2013, this figure will represent €22.6k per head (€16.2k non-financial) (Molero and de No, 2012c, Molero and de No, 2013a). This is a clear step backwards for the Spanish R&D system. In addition, the non-execution of an important part of the budgets has worsened the situation. In the period of 2009-2012, between 21% and 45% of the yearly budgets were not executed (Fecyt, 2013). Since 2008, the total budget not executed is equivalent to €8,661m, which is higher than the total budget for 2011 (Molero and de No, 2012a). COSCE, in

¹¹ Data from FECYT (2013) and COSCE reports (expenditure heading 46) .

its analysis of the PGE on R&D for 2013 (Molero and de No, 2012c and 2013a), warns that the envisaged 80% of the total reduction lies in non-financial funds, and this will have a devastating impact on public research and, especially, in basic research (see section 2.3 for the reaction of some research organisations on R&D funding cuts). Therefore, it can be considered that the impact of the crisis in R&D and innovation investment has been severe, and might have been exacerbated by government's reductions in public investments for R&D and innovation.

2.2.2 Funding mechanisms

2.2.2.1 Competitive vs. institutional public funding

Competitive project-based funding has gained importance within the Spanish R&D and innovation system.¹² On this regard the law of 2011 simplifies the allocation of competitive funding for research and innovation by giving the responsibility for the allocation of funds to two main bodies, the new research agency (to be created) and the existing Center for Industrial Technological Development.¹³ The provisional budget for R&D and Innovation distributed by the State Secretary of Research Development and Innovation for 2013 was €3,864.2m, of which 72.3% was distributed through low interest credits and 27.7% was subsidies (MINECO, 2013).¹⁴ The new plan PECCI (2013-2016) clearly states that most of the funds will be distributed through competitive funding mechanisms.

The distribution of block funding is different between PROs and universities. This funding is more important for the public research organisations than for the universities. In the case of universities, funding for teaching and operational costs is the responsibility of the regions, which offer institutional funding to universities based mainly on the number of students and teachers and other related criteria. It is supposed that university academic personnel devote 66% of their time to teaching and 33% to research activities. So two-thirds of their salaries can be considered as institutional R&D funding. In fact this part of their salaries is considered as R&D expenditure in the official statistics. The state and regions provide little or no institutional funding for research (block grants) so the rest of their research funds come mainly from regional, national and international programmes based on competitive project funding. This project funding is generally distributed through public tendering oriented to broad thematic fields. The finance of R&D activities of OPIs is mainly channelled through the state budget (PGE)) through MINECO, although other ministries also distributed R&D funds for PROs. Institutional funding in 2013 for PROs was €1,234.7m (-7.73% lower than 2012), which is 19.6% of GBAORD (Molero and de No, 2013a; Molero et al., 2011). A substantial part of their funds (based on data for 2007) goes to salaries (40%), operational costs (10%) and investments (17%) while the

¹² In 1989 this form of support accounted for 30% of the R&D-related state budget, while at the beginning of this century this percentage was around 23% of all funds (Sanz, 2005).

¹³ Several policy measures have tried to increase the competitiveness of the R&D system. For example, the Severo Ochoa Centres of excellence that promote excellence in scientific research through performance-based funding for research institutions.

¹⁴ This budget is only part of the Central Government share (PGE- budget line 46) (€5,932m). This provisional budget data has to be taken with caution as it has been taken from the working plan of the new plan PECCI (2013-2016) and percentages are own calculation. This makes these figures non-comparable with last publically available data on the national plan expenditures on R&D for 2011 (FECYT, 2012). Thus, references to figures of the previous plan will be included in footnote for illustrating purposes. The budget for R&D and innovation distributed by the National State Administration (AGE) for 2011 was €3,323.7m, of which 63.4% was distributed through low interest credits and 36.6% was subsidies (FECYT, 2012). See Table ii in the Annex for the equivalences of programmes between previous and current plan.

“operational transfers” - mainly used for research - counts for less than 7% of the received block funding (León et al., 2006).¹⁵

To finance their research activities the OPIs obtain funds from the regional, national and European public tenders for R&D (competitive project funding, participation in large European R&D facilities, etc.) and industrial contract research.

2.2.2.2 Government direct vs indirect R&D funding

Spain boasts a broad set of policy instruments, mostly based on low interest credits (government direct funding), to stimulate greater R&D and innovation. In addition, the Spanish system of tax incentives¹⁶ (indirect government funding) for R&D and innovation has been one of the most generous among OECD countries for the past few years. However, despite the fact that tax incentives are very generous, the bureaucratic procedure for benefitting from these deductions was until recently complex and uncertain. This diminished the incentive effects of the support programme. The Ministry of Treasury has indicated that the average annual cost of tax income forgone by the state was €200-300m in 2002-03 and over €300-400m in 2004-08, decreasing to around €200m in the last few years (PGE, 2013). This represents around 3-5% of private R&D expenditure in this period, while support in the form of subventions since 2007 has been around 16-18 % (see country Fiche).

Public procurement (government direct funding) of innovative good and services has been increasingly encouraged in Spain (see section 4.2). The Plan PECTI (2013-2016) includes public procurement of innovative goods and services within the Strategic Action of Economy and Digital Society, Programme of business leadership (AEESD 3). In addition, The Council of Ministries (8/07/2011) agreed on setting a 3% target of new investments of the general public administration to be devoted to innovative public procurement. Five tenders are listed in the CDTI web but it is not clear if the 3% objective has been met.¹⁷

The investments in risk capital including seed capital, start-up funds and funding for other stages of the business creation was in 2012 €1,470.2m and represents 0.009% of the Spanish GDP (see Table 1). This has decrease significantly since 2010 (€2,479.7m) by -20.4% in 2011 and by -25.5 in 2012 (ICONO-Eurostat, 2013). In Spain there were about 54 networks and groups of Business Angels in 2009 (OECD, STI Scoreboard 2011, from FECYT). Although Spain has recently designed a large number of support schemes to foster public-private cooperation in R&D and innovation (see section 4.2) and funding streams can be found to cover the entire

¹⁵ Based on data for 2007.

¹⁶ The current Spanish regulation includes three types of R&D tax incentives for firms (Ministry of Science and Innovation, 2011: 12): (1) Tax deduction for R&D and Innovation activities (ex-ante and ex-post); (2) Income reduction for transferring intangible assets (“Patent Box”) and (3) Social security benefits for full-time R&D personnel. The Spanish system of tax incentives for R&D and Innovation has been one of the most generous among OECD countries for the past few years. The deductions are based on the Royal Decree - Law 4/2004 and are further developed in Law 35/2006; Law 4/2008; the Royal Decree - Law 3/2009 and the Law 2/2011). The tax reform approved in November 2006 brought important changes. First, it enabled up to a 40% reduction in social security taxes of R&D staff working for firm. Second, following a trend of reducing corporate taxes, R&D and Innovation corporate tax credits were also reduced. In 2009, the deduction procedure was simplified; cancelling the time limit of 2 years to deduce taxes for R&D investments. Moreover in 2011 the deduction for innovation was increased from 8% to 12%, but this increase has been cancelled for 2012 and 2013.

¹⁷ No specific information on public procurement is found in the provisional Budget published of the working plan of the PECTI for 2013.

value creation chain from fundamental research through market innovation, they are not included in one single programme.

2.2.3 Thematic versus generic funding

The distribution of the Spanish GBAOD by thematic social economic objectives¹⁸ shows that in 2012 over 49.6% of the funds could be considered as generic while 50.4 % could be directly assigned to specific technological or scientific areas. Generic funds increased its weight in the last few years from 34.4 in 2007 to 49.6 in 2012. Regarding thematic R&D priorities, the most important ones are health, with participation of 8.9%, and Industrial production and technology (IPT - 8.9%), followed by Agriculture (6.1%) and Exploration and exploitation of space (5.6%). Comparing the distribution of the last two years, it can be mentioned that Spain has increase its participation in Industrial production and technology, but decrease importantly its participation in Health. Compared to the EU-average, Spain has a higher participation in Agriculture, Environment, Exploration and exploitation of space and Health, while lower mainly in Political and social systems, structures and processes and energy. In addition, the percentage of the defence-related GBOARD is lower than the EU average, representing in 2012 a 1.6% of GBAORD compared to the 4.8% of the EU-28 average.

According to provisional budget for R&D and Innovation distributed by the State Secretary of Research Development and Innovation for 2013, the State programme “Promotion of R&D and innovation towards societal challenges” will distribute €2183.3m (MINECO, 2013). This programme represents approximately 56.5% of the total budget (see section 4.3).

2.2.4 Innovation funding

One of the most important trends in the Spanish policy mix in the last few years has been the clear shift towards innovation policies and knowledge transfer from the research sector to the productive one - together with the increasing importance of competitive funding; the implementation of a more diversified set of instruments; the solution of societal challenges and public procurement. This change can be seen through the changes in the objectives of the strategies and plans, new initiatives, instruments and budget allocation. Spanish national authorities implemented specific strategies to promote innovation and knowledge challenges. For example, the Spanish Strategy for Innovation (e2i) set the goals for innovation policies at national level during the period 2010-2015. In addition, a specific strategy and plan for innovation was originally envisaged by the Law of Science, Technology and Innovation (LCTI 2011), but finally merged in the current strategy EESTI (2013-2020). The CDTI is the entity that usually manages the national programmes for the promotion of innovation and technological development for companies. In addition, regional authorities implement regional strategies for innovation. As mentioned, Spain implements a large set of instruments for funding R&D and Innovation for business organisations: Low interest credits; tax incentives (including: tax deductions for R&D and Innovation activities; income reduction for transferring intangible asset – Patent Box; and social security benefits for full-time R&D personnel); public procurement and

¹⁸ GBAORD is probably the most comprehensive approach to analyse the thematic priority setting of the Spanish policies for R&D and innovation. See EW (2011) for different alternatives to analyse the thematic focus and its advantages and disadvantages.

risk capital (see section 2.2.2.2). It is usually difficult to disentangle the funds that go for R&D from the ones that go to innovation. In the provisional budget for R&D and Innovation distributed by the State Secretary of Research Development and Innovation for 2013, Public funds for innovation and knowledge Transference are mainly included in the “Business leadership programme” that includes three sub-programmes: (1) private R&D and innovation; (2) Enabling technologies; and (3) Collaborative R&D and innovation. In 2013, it is estimated that this programme will distribute €831.9m (approximately 21.5% of total funds), distributing €81.4m, €10.8m and €333.5m through the sub-programmes mentioned above (MINECO, 2013).¹⁹ Main indicators for innovation come from the Community Innovation Survey. Funding for innovation represented in 2012 €13,410m (ICONO-INE, 2013).

2.3 Research and innovation system changes

The Spanish Strategy for Science, Technology and Innovation (EESTI) (2013-2020) sets the rationale, objectives and indicators of the Spanish R&D and innovation policy. The Spanish State Plan for Scientific and Technical Research and Innovation (PECTI) (2013-2016) is a multiannual plan that implements the EESTI by setting its priorities, programmes, coordination mechanisms, costs and sources of funding. The new EESTI and PECTI were approved on 1st February 2013. The proposals have merged the two strategies and plans originally envisaged by the new Law of Science, Technology and Innovation (LCTI 2011). The changes in the strategies and plans indicates an increasing emphasis on innovation, public-private R&D collaboration, research excellence and other emerging topics, such as the promotion of R&D and innovation on societal challenges or the role of public procurement²⁰ to promote R&D and innovation. They have introduced the concept of Smart Specialisation. One of the most significant changes of the EESTI (2013-2020) is that it has set a new lower target of 2% GERD per GDP for 2020, instead of the 3% target (see section 2.4 for more details).

The LCTI brought about some important changes in the Spanish research and innovation system. The emphasis in improving national and regional coordination through the Council of Science, Technology and Innovation (CPCTI) and Information System of Science, Technology and Innovation SICTI and the creation of the new Spanish Research Agency (still pending) are probably the most important changes in the governance structure introduced by this law. Some bodies were re-organised (e.g. the CPCTI) or re-named. The new government (December 2011) closed down the Ministry of Science and Innovation (MICINN) and reallocated the main R&D and innovation responsibilities to the Ministry of Economy and Competitiveness (MINECO). Other Ministries with R&D responsibilities were reorganised or renamed (See Figure I for the structure of the system and Table i in the Annex for a summary of some of the main organisational changes and equivalences between the new and previous Spanish R&D and innovation system and Country Report for Spain 2012 (ERAWATCH, 2013) for more details).

¹⁹ See footnote 14.

²⁰ The Law on Sustainable Economy (2011) introduced public procurement of innovative goods and services as a policy instrument, especially in some specific fields such as environmental protection and digitalisation of public services, in collaboration with regional and local authorities (For details, see the Mini Country Report of Spain 2011; COTEC, 2011b). The new Law of Science, Technology and Innovation (2011) reinforced the objectives of these policy initiatives and instruments. INNODMANDA and INNOCOMPRA are instruments designed to implement these policy goals.

The [Spanish National Research Council](#) (CSIC) went under one of its largest budget crisis in years during summer 2013. Since 2010, the CSIC has suffered large budget cuts from the government, with approximately 500 million Euros of total reduction. The council needed 100 million Euros to make it to the end of the year. The government injected 25 million Euros during summer and 70 millions in October 2013. During this period, the CSIC absorbed the savings of its institutes to deal with the cash shortages, which caused important concerns among the directors of its institutes about the sustainability of the centres (see below mobilisations regarding the CSIC situation). The CSIC is the Spain's largest scientific organisation with about 15,000 employees and one of the most important research performers of the country, with about the 20 per cent of the national scientific production. It appears that the crisis is having an significant impact reducing importantly its young and temporary contracts (see section 4.1)

The institutional and grassroots public demonstrations in support of science that started in 2012 continued during 2013. The campaign for “A tick box in the tax declaration” (“Casilla en apoyo de la ciencia en la declaración de la Renta”), the “Open letter for Science in Spain”, followed by the communication “No future without R&D and Innovation” and the simultaneous support actions of 19th December 2012 were probably the most significant ones (see Country Report for Spain 2012 (EW, 2013) for more details). In 2013, public mobilisations continued due to the delay in launching important R&D calls and the budget crises suffered by the CSIC. These actions denounced the severe public budget cuts on R&D and innovation as making R&D and innovation unsustainable and reducing the opportunities to improve the Spanish economy.

On the 21st May 2013 the Group Open Letter for Science (“Colectivo carta abierta por la ciencia”) launched an open call for signatures in support for the second letter for the science “[Let's save the Spanish R&D and innovation](#)”. The group is composed by different research-related organisations – the Spanish Confederation of Scientific Societies ([COSCE](#)), the Spanish Conference of University Rectors ([CRUE](#)), the Platform for Dignifying Research ([PDI](#)), the Spanish Federation of Young Researchers ([FJI](#)) and the National Association of Ramón y Cajal Researchers ([ANIRC](#)) – and the trade unions Confederation of Worker's Commissions ([CCOO](#)) and General Union for Workers ([UGT](#)). The letter denounced the worsening situation of the Spanish R&D and innovation system and proposed a list of nine demands to the government. This letter gathered more than 80,000 signatures through an [on-line petition](#).

On the 14th June 2013 there was a new call for simultaneous public demonstrations in support of research and innovation (“[Convocatoria 14J](#)”). The call managed to gather the biggest demonstration of scientist in Spain and was followed in different cities of Spain and in foreign countries and had an important media impact.

On the 30th July 2013 there was a [new call for signatures](#) in support of increasing funding for the CSIC that suffered a major budget crisis. The call gathered about 280,000 signatures. With the same purpose, more than 100 institute directors signed a [letter](#) addressed to the State Secretary of Research Development and Innovation.

On the 27th of September 2013 coinciding with the “[Researchers' Night](#)” and the debate on the Spanish Congress of the PGE there was another call for [public demonstration](#) in support of science.

As a result of the meetings of the groups with different political parties, on the 19th December 2013, all political parties with representatives in the Congress, with the exception of the Popular Party, currently in the government, [signed an agreement in support of the R&D and Innovation](#). This agreement denounces the decreasing public investments in R&D and states the following four points to guarantee an stable policy support for R&D and Innovation: (1) to ensure a sustained levels funding on R&D similar to the Eurozone average; (2) to remove the regulatory measures that limit the recruitment of researchers in the public sector (Royal Decree-Law

20/2011) and to increase the levels R&D personnel per inhabitant; (3) to ensure the adequate implementation of the policy objectives and measures envisaged in the PECCI, by guarantying a predictable time-line; and (4) to create the Spanish Research Agency envisaged in the LCTI (2011).

During the last two years, some programmes suffered important delays (e.g. call for proposals of the R&D plan on fundamental research projects -“Promotion of R&D and Innovation towards societal challenges”- and Research Training (FPI)) or significant reductions (e.g. Research Training – FPI and [FPU](#) – with a reduction of 200 grants), or were cancelled entirely (e.g. the [Jae programme](#)). Also, many regions reduced their budgets for R&D and innovation and cancelled research training grants (e.g. Madrid, Castile and Leon and the Canary Islands).

2.4 Recent policy developments

The new Law of Science, Technology and Innovation (LCTI) (1st June 2011) introduced important changes in the Spanish R&D and innovation system. The main new policy developments which followed in 2013 were: the approval of the new Spanish Strategy for Science and Technology and Innovation (EESTI) (2013-2020) and the Spanish State Plan of Scientific and Technical Research and Innovation (PECCI) (2013-2016); and the publication of the Entrepreneurship and Internationalisation Support Act (Law 14/2013) on the 27th September 2013.

The new **Law of Science, Technology and Innovation (LCTI)** (1st June 2011) replaced the so-called Law of Science of 1986. The new law aims to improve coordination with regional and European authorities, to take into account the growth of the Spanish R&D and innovation system, to improve research careers and to help the transition to an economy based on knowledge and innovation. It also mentions gender issues and ethics. The emphasis on innovation, which was missing in the Law of 1986, the design of several mechanisms aimed at improving national and regional coordination (e.g. the Council of Science, Technology and Innovation (CPCTI) and the new information system (SICTI)), and the project of the Spanish Research Agency are the main relevant aspects of the new Law. It modifies the governance and human resources for R&D (e.g. new labour contracts and unified professional career to facilitate mobility between public research centres and universities) and improves the mechanisms for the transference of knowledge (e.g. by improving granting property rights to researchers and reducing the incompatibility for researchers employed at public institutions to work in private firms) (See Annex and Country Report for Spain 2012 (EW, 2013) for more details on the changes brought by the LCTI).

THE SPANISH STRATEGY FOR SCIENCE AND TECHNOLOGY AND INNOVATION (EESTI)

The **Spanish Strategy for Science and Technology and Innovation (EESTI) (2013-2020)** establishes the rationale, objectives and indicators of the Spanish R&D and innovation policy. The EESTI merges the two strategies envisaged by the LCTI –the Spanish Strategy for Science and Technology (EESTI) and Spanish Strategy for Innovation (EEI) – and replaces to the previous National Science and Technology Strategy (ENCYT) and Spanish Strategy for Innovation (e2i).

The new strategy, EESTI, is based on: 5 basic principles; 4 general objectives disaggregated into 18 specific objectives; 6 Priority Axes; and 6 articulation mechanisms. It also sets out indicators

to measure the impact of the R&D and innovation policy.

Its 5 principles are: (1) Coordination of R&D and innovation policies; (2) Stable framework; (3) Quality and social impact; (4) Efficiency and accountability; (5) Gender issues (See section 4.1 for the general and specific objectives).

The EESTI is in line with the Europe 2020 strategy. It is also based on an analysis that identifies 14 challenges²¹ that are quite similar to the ones identified by the OECD report (2006).

THE SPANISH STATE PLAN FOR SCIENTIFIC AND TECHNICAL RESEARCH AND INNOVATION (PECTI) (2013-2016)

The **Spanish State Plan for Scientific and Technical Research and Innovation (PECTI) (2013-2016)** implements the EESTI by establishing its priorities, programmes, coordination mechanisms, costs and sources of funding. The PECTI merges the two strategies envisaged by the LCTI – the Spanish National Plan for Scientific and Technical Research (PECT) and the Spanish National Plan for Innovation (PEI) – and replaces the National Plan for R&D and Innovation 2008-2011, extended to the end of 2012, as well as Ingenio 2010.

The new PECTI gives special emphasis on its integration into the European Research Area and to the promotion of: “(a) excellent basic research; (b) technological, industrial and firm leadership; and (c) scientific and technical research and innovation capabilities on grand challenges” (PECTI: 5).

Following the EESTI format, it is structured into 4 programmes and 18 sub-programmes (see Box ii in the Annex).²² In addition, it includes 2 strategic actions – first Health and secondly Digital economy and society. It establishes 6 modes of participation²³ and 4 funding instruments – subsidies, loans, venture capital and tax incentives. As in previous plans, it is operationalised through annual programmes. It envisages indicators to evaluate the management and the result of the programmes.

The PECTI is based on an analysis of the previous plan that identified 8 main problems.²⁴

The new strategy and plan were approved on 1st February 2013, to follow on the previous National Plan on R&D that finished in 2011 and was extended to the end of 2012. Two public consultation processes on the strategy and plan were carried out in October 2012 and December 2012 (see section 2.6).

²¹ (1) Low intensity of R&D effort; (2) Low private R&D investments; (3) Lack of instruments for financing private R&D; (4) Lack of venture capital; (5) Regional disparity in R&D; (6) Fragmentation of R&D groups; (7) Lack of public-private collaboration; (8) Inefficient mechanisms for Knowledge transfer; (9) Low R&D activity in traditional sectors and SMEs; (10) Small size and number of enterprises doing R&D activities; (11) Inter-sectorial mobility barriers for scientists; (12) Small survival business rates; (13) Low internationalisation of R&D actors (specially firms); (14) Low rate of firms in medium high sectors.

²² The programmes and sub-programmes are similar to the general and specific objectives of the EESTI.

²³ (1) R&D and innovation programmes; (2) Human Resources actions; (3) Research infrastructures and equipment; (4) complementary actions; (5) dynamic actions; and (6) collaborative actions.

²⁴ (1) Administrative burden; (2) lack of coordination (inter-institutional; inter-departmental and inter-regional); (3) excessive number of instrument; (4) fragmentation of funding; (5) unrealistic time framework; (6) lack of adequate indicator to follow evaluate the development and impact; (7) lack of dissemination of the results of funded projects; and (8) ministerial organisational changes that created problems in the development of programmes.

THE ENTREPRENEURSHIP AND INTERNATIONALISATION SUPPORT ACT - LAW 14/2013 OF THE 27TH SEPTEMBER 2013

The Entrepreneurship and Internationalisation Support Act (Law 14/2013) was published on the 27th September 2013, which includes measures:

- Aimed at boosting entrepreneurship. These include: training; the implementation of a legal status of “Limited Liability Entrepreneur” (Emprendedor de Responsabilidad Limitada) and “Progressively Formed Limited Liability Company” (Sociedad Limitada de Formación Sucesiva); reducing to 24 hours the time for creating a limited liability company; the creation of Entrepreneur Service Points; and provision of a second chance for entrepreneurs through an extra-judicial payment mechanism.
- Fiscal measures: changing the timing of VAT obligation to actual cash payments; introducing tax allowances for reinvestment of profits; R&D allowances; and tax incentives for investments in entrepreneurs.
- To boost finance for entrepreneurs: eliminating the charges to create incentives for issuing securities on Alternative Fixed-Income Market; making more flexible the regulation for refinancing agreements; and booting new instruments for financing projects for internationalisation.
- To promote business growth: extending the list of activities not subject to municipal licenses and reducing obstacles for entrepreneurs to access to public contracts.
- To boost the internationalisation of the Spanish economy: planning a new system of visas and residence permits to attract talent and investment from abroad; and envisaging a Spanish strategy for internationalisation.

2.5 National Reform Programme 2013

The [National Reform Programme 2013](#) (NRP) follows the agenda of reforms stated in the [previous NRP](#) with a greater emphasis on the elements aimed to tackle the biggest restriction of growth. Therefore, it aims to sort out the difficulties for companies to access to finance; to create a favourable environment for entrepreneurs and to tackle the social consequences of the economic crisis. It includes eight main reforms.²⁵ The document recognises the importance of R&D “in promoting the competitiveness of competitiveness of the economy and favouring a high-quality model for economic recovery” (p. 30). It states that the spending priorities have been revised minimising the budget cuts for R&D and innovation. However, the overall level of ambition in terms of R&D spending efforts has diminished by setting a lower R&D intensity target of 2% (instead of the previous 3% one). The reason pointed in the Strategy for Science and Innovation is to establish a more realistic target. Similarly to previous NRP, it mentions the approval of the new Strategy EESTI (2013-2020) and new plan PECTI (2013-2016) as important measures to improve the research system and to create growth. It also includes the Support Act of Entrepreneurship and its internationalisation that includes fiscal incentives for business innovation and employment and some R&D tax incentives.

²⁵ These highlighted reforms are: (1) Fiscal consolidation of the public accounts: fiscal consolidation and Social Security measures; (2) Monitoring the labour market reform; (3) Law on the De-indexing of the Spanish Economy; (4) Law on Market Unity Guarantee and the Regulatory Streamlining Plan; (5) Entrepreneurial Support Act and its Internationalization; (6) Modernise and streamline public administration services: Law on Rationalisation and Sustainability of Local Authorities; (7) Law on Professional Associations and Services; (8) Reform of corporate governance.

The NRP 2013 highlights the approval of the new Strategy EESTI (2013-2020) and new plan PECTI (2013-2016) to achieve a more efficient allocation of stable resources to R&D activities; to increase business investments in R&D and innovation (the future law supporting entrepreneurs) and to improve coordination between central and regional government (e.g. Information System of Science, Technology and Innovation (SICTI), harmonising criteria and evaluation practices and implementation of instruments for joint programming and co-finance). These documents and measures are referred in the Axis 4 “Boost to innovation and new technologies” included in the third priority area (AGS 3) ²⁶ “Promoting growth and competitiveness for today and tomorrow”. It is highlighted the alignment of the strategy and plan with the Europe 2020 Strategy and its contribution to the Research and Innovation for Intelligent Specialisation Strategies (RIS3). It mentions that Spanish regions are developing their RIS3 strategies, which have to be finished by the end of 2013. It is also emphasised the aim of increasing the Spanish participation in the EU Framework Programme from the current 8.3% to a 9% and the returns from public research bodies by 20% and the percentage of projects headed by Spanish entities to reach a 10%. In addition, the creation of the Spanish Research Agency is also mentioned.

The Support Act to promote entrepreneurship and its internationalisation includes the changes in the payment of tax reduction for R&D, “allowing for tax credits for R&D and innovation that were not applied in one year to be recovered, provided that employment is created or maintained” (p.30). “Under certain conditions, the fiscal credits for research and development may be paid in, with a maximum total limit of 3 million euros per year, without the need to generate a positive result which allows for its compensation” (p. 60). It is included in Axis 2 “Guarantee a favourable environment for entrepreneurs, providing aid for the start and development of business projects and supporting their internationalisation ” also included in priority AGS 3.

“Boost research, technological development and innovation” is also strategic line of action for Spain and a thematic objective of the European Regional Development Funds (ERDF). It focuses on four main lines: infrastructure investment; support for investment in public projects; support for investment in private projects; and a financial instrument dedicated to innovation. Spain aims at making greater use of innovative financial instruments favouring finance of R&D and innovation in Small and Medium Enterprises (SMEs)

In summary, the NRP 2013 with regard of R&D emphasises the new strategy and the new plan as important measures. These were also mentioned in the previous NRP. Some measures, such as, the creation of the National Research Agency are again mentioned but not implemented. The Support Act to encouraging entrepreneurship and its internationalisation is a novelty. However, to set a new lower target for R&D (2% of the GDP for 2020) raises concerns about the real commitment in making R&D an important factor of economic competitiveness. Nevertheless the government has underlined the 2% as a more realistic target. In addition, given the trends in public and private R&D spending observed over the last 4 years, it even might be difficult for Spain to reach the 2% target in time.

²⁶ These correspond to the priority areas identify in the Annual Growth Survey 2013 (AGS). These are: fiscal consolidation; restoring lending to the economy; structural reforms; tackling unemployment and the social consequences of the crisis; and modernising public administration.

2.6 Recent evaluations, consultations, foresight exercises

Under the mandate of the MINECO, the Spanish Foundation for Science and Technology (FECYT) carried out yearly evaluations of the R&D public calls for proposals from 2006-2010. Currently, the Ministry has decided to carry out evaluations with a longer time frame. The CDTI evaluates most of the business-oriented instruments, but there were not reports available to the public at the time of writing this report. Therefore, it could be said that the most important recent public consultations were carried out in relation to the [Draft of the Spanish Strategy for Science and Technology and Innovation \(2013-2020\)](#) (EESTI) and the [Draft of the Spanish State Plan for Scientific and Technical Research and Innovation \(2013-2016\)](#) (PECTI), in October and December 2012. As mentioned, the final versions of the [EESTI \(2013-2020\)](#) and [PECTI \(2013-2016\)](#) were approved on 1st February 2013.

The consultation on the draft of the **Spanish Strategy for Science, Technology and Innovation (EESTI) (2013-2020)** was carried out between 9th and 25th October 2012. The document received more than 1,400 comments and suggestions (EESTI: 3). For example, the COSCE (Modrego et al., 2012a) recognised the efforts of the EESTI to improve coordination but identified several main weaknesses in the document: it did not take real actions to address the current situation of the Spanish R&D and innovation system (e.g. it uses data of 2010); it did not include a realistic time framework; it did not have a clear assignation of responsibilities for genuinely changing the governance system and for improving the efficiency of the system. Some of these comments were partially addressed in the final version of the document. For example, the principles have been reduced from 7 to 5 and the articulation principles from 10 to 6.

The consultation on the draft of the **Spanish State Plan for Scientific and Technical Research and Innovation (PECTI) (2013-2016)** was carried out between 22nd and 8th December 2012. The document received more than 800 comments and recommendations (PECTI: 5). For example, the COSCE (Modrego et al., 2012b) recognised the efforts of the plan to establish its main aim as improving coordination between design and implementation. However, it clearly stated that the plan “has high expectations that are impossible to reach. This generates a feeling of frustration” (p. 2). The report was quite negative, as it considered, among other issues²⁷, that the design of the plan did not take into account the current situation of the Spanish R&D and innovation system. The main criticisms were the lack of priority-setting in an environment of decreasing public budgets; the lack of precision in establishing the funding methods; the fact that it does not take into account previous failures (e.g. by using instruments for promoting innovation that have not been used or evaluated); the low importance of the ex-post evaluation mechanisms and vague distribution of responsibilities between funding bodies (the Spanish Research Agency and the CDTI). Some of these comments were partially addressed in the final version of the document. For example, it includes references to the ex-post evaluation, it is more detailed when describing the competences of the funding bodies and includes more detailed, but still general, indicators.

²⁷ More specifically, it considers that the PECTI lacks realistic analysis; clarity and coherence between objectives; design of effective instruments; priority setting; stability; budget allocation and real change in the governance system towards efficiency, evaluation and cooperation among all the stakeholders.

2.7 Regional and/or National Research and Innovation Strategies on Smart Specialisation (RIS3)

The concept of “smart specialisation” is gaining importance in the Spanish R&D and innovation system. Smart specialization entails the necessity to prioritise specific areas of research and innovation based on the needs and resources of regions. It is worth mentioning that the new Spanish Strategy for Science, Technology and Innovation (EESTI) (2013-2020) includes the concept in one of its 6 priority axe (Priority 5) as the tool for increasing the competitiveness of the regional systems of Innovation. The Spanish State Plan for Scientific and Technical Research and Innovation (PECTI) (2013-2016) also mentions this concept. However, these documents do not clearly specify if it will be a national, regional or a shared competence.

Many other regional authorities are using the concept of “smart specialisation” to design or develop their regional strategies. One piece of evidence of the success of the concept is that all Regional authorities or “Comunidades Autónomas” (CAs) have registered for the Smart Specialisation Platform (S³P), which “assists Member States and regions to develop, implement and review Research and Innovation Strategies for Smart Specialisation (RIS³)” (RIS³: on-line). Three CAs have been peer reviewed in this context (Aragon, Castile and Leon and the Basque Country). In addition, Navarre and the Balearic Islands have been subject of case studies on smart specialisation (Ortega-Argilés, 2012).

It is also worth mentioning the case of the Basque Country as a region in which this rational was applied a long time ago. In the early 1980s, this region started a series of policies that were designed and implemented in collaboration with the main political, economic and social stakeholders, and it has managed to transform its economic structure and become one of the main R&D regional actors with the highest R&D investment per GDP in Spain (2.2⁰% in 2012), as well as being the region with the lowest level of unemployment (14.9% in 2012).²⁸ Aranguren-Querejeta et al. (2012) analyses the smart specialisation case for the Basque Country.

Priorities for future areas of specialisation appear not to be identified yet at national level. The national Strategy (EESTI) does not specify them. The national strategies and plans are defined through instrumental priorities rather than through thematic priorities. This could make the prioritising process more difficult (Zabala, 2012; Heijs and di Anselmo, 2013). It is also difficult to assess the process of identification of priorities as RIS³ strategies at regional level are in the process of being developed. The National Reform Programme 2013 states that this process will be finished by the end of the year 2013.

It is also difficult to determine if a comprehensive analysis of the innovation landscape - including a Strengths Weaknesses Opportunities and Threats (SWOT) analysis - has been taken into consideration when designing the national and regional RIS³ strategies. Some sort of analysis appears to be carried out to design the new EESTI strategy (2013-2020).²⁹ However, these are not publicly available making it difficult to assess the extent of the analysis. Some regions appear to have carried out this type of analysis to develop their RIS³ strategies (see regional presentations in RIS³ platform).

The Network of Public Policies for R&D and Innovation ([REDIDI](#)) has a role in disseminating and coordinating national and regional RIS³ strategies. This network has a specific section devoted to RIS³ dissemination and organises working groups on RIS³ to improve coordination at

²⁸ Source INE.

²⁹ See Footnote 18.

national, regional and European level. In addition, the [RedIRIS](#), an academic and research network, aimed at improving communication could also help to apply strategies of smart specialization.

The Information System of Science, Technology and Innovation (SICTI) introduced by the new Law LCTI (2011) aimed at improving national and regional coordination in gathering data. This system could offer a mechanism to adequately monitoring and evaluating RIS³ strategies. At the time of writing this report, the SICTI was still in a development phase. Therefore, it is difficult to evaluate the new changes and indicators implemented by this institution. However, the Spanish Foundation for Science and Technology has implemented the Spanish Observatory of R&D (ICONO), a web platform of indicators with increasing number of indicators available at international, national and regional. **ICONO** provides objective data about more than 120 R&I indicators and analyses science, technology and innovation policies and strategies. The Observatory contributes to the better understanding of the Spanish R&I system improving its accountability and transparency. This represents a positive trend and could help to improve the number of indicators available at regional level. Under the mandate of the MINECO, the Spanish Foundation for Science and Technology (FECYT) have collected since 2009 data from regional and national programs in order to foster a better coordination for R&D policy between the different administrations. Heijts and di Anselmo (2013) indicated that some indicators were not available at regional level, which made the designing, monitoring and evaluation process of RIS³ strategies more complicated. REDIDI has created a document with [examples of RIS³ indicators](#) and data sources.

3 STRUCTURAL CHALLENGES FACING THE NATIONAL SYSTEM

3.1 National Research and Innovation policy

Spain is a “moderate innovator”³⁰ (EC, 2012a and EC, 2013a) and its strengths lie in tertiary education, international scientific co-publications and medium and high tech exports, while its weaknesses are in private investments, public-private linkages, innovation outputs and knowledge intensive activities. To illustrate its strengths: with increasing levels between 2008 and 2010 (data from the IUS dashboard- Table 2) and above the EU-27 average (shown in brackets), Spain is outstanding firstly in its percentage of population aged 30-34 who have completed tertiary education, which changed from 39.8% to 40.6% (34.6%); secondly in the level of international co-publications per million, which changed from 454 to 599 (300); and thirdly in the contribution of medium and high-tech product exports to trade balance, which changed from 101.97 to 103.05 (101.28). In contrast, the weak area figures show that at levels below the EU-27 average, Spain underperformed in the percentage of GDP of private R&D expenditures, by 0.67% in 2011 against the EU-27 level (1.27%); in the number of public-private co-publications per million population, 22.5 against 52.8; in patents application per billion GDP (in PPS€), 1.43 against 3.9; in patents applications in societal challenges per billion GDP (in PPS€), 0.39 against 0.96; in the percentage of GDP coming from license and patent revenues from abroad, 0.07% against 0.58%; and in the percentage of knowledge-intensive services exports of total service exports 21.6% against 45.1%.

Table 2: Innovation Union Scoreboard Indicators for Spain (2008-2011)

	2008	2009	2010	2011	EU-27
ENABLERS					
Human Resources					
New doctorate graduates (ISCED 6) per 1000 population aged 25-34	0.9	1	1.2		1.5(10)
Percentage population aged 30-34 having completed tertiary education	39.8	39.4	40.6	40.6	34.6
Open, excellent and attractive research systems					
International scientific co-publications per million population	454	493	546	599	300
Scientific publications among the top 10% most cited publications worldwide as a % of total scientific publications of the country	10.2				10.9 (08)
Finance and support					
R&D expenditure in the public sector as % of GDP	0.61	0.7	0.67	0.64	0.75
FIRM ACTIVITIES					
R&D expenditure in the business sector as % of GDP	0.74	0.72	0.72	0.67	1.27
Linkages & entrepreneurship					
Public-private co-publications per million population	22.5	23.9	26.5	28.7	52.8
Intellectual assets					

³⁰ Together with the Czech Republic, Greece, Hungary, Italy, Lithuania, Malta, Portugal and Slovakia (EC, 2013)

PCT patents applications per billion of GDP (in PPS€)	1.38	1.43			3.9 (09)
PCT patents applications in societal challenges per billion of GDP (in PPS€) (climate change mitigation; health)	0.34	0.39			0.96(09)
OUTPUTS					
Economic effects					
Contribution of Medium and high-tech product exports to trade balance	101.97	101.92	102.56	103.05	101.28
Knowledge-intensive services exports as % of total service exports	22.7	22.5	21.6		45.1 (10)
License and patent revenues from abroad as % of GDP	0.05	0.05	0.06	0.07	0.58

Data sources: Eurostat and Innovation Union Scoreboard (2013)

The Spanish research and innovation system relies heavily on public funds, and recent severe public budget cuts are threatening to create new structural challenges and to intensify the existing ones. As mentioned, in 2012 and 2013, public investments in R&D have reverted to the levels of 2005-2006 (Molero and de No, 2012b; Molero and de No, 2013a). In relative terms (the total funds per R&D personnel (FTE)), investments went back to levels much lower than in 2002 (Molero and de No, 2012c; Molero and de No, 2013a). Important research organisation condemned these severe cuts, as they could destroy the achievements of several years of R&D investments (see section 2.2 and 2.3). Spain, like all developed countries, needs to invest heavily in R&D and innovation if it is to gain and maintain its economic competitive advantage. It has to compete nowadays with industrialised low wage countries and global players such as China or India or the Eastern European EU countries (such as Poland or Romania). The Spanish public authorities and firms appeared to understand that to build a stronger R&D and innovation system was the only way to become competitive and meet the challenges of a globalised world. In fact, Spain made strong efforts in the period 2002-2008 when its GERD in absolute terms doubled while in relative terms the GERD by GDP increased from 0.99% in 2002 to 1.35% in 2008. There was also a restructuring of the country's policy mix on R&D and innovation, including new instruments aimed at tackling the main challenges and overcoming bottlenecks in the Spanish R&D and innovation system (see next section and EW, 2011). However, the severe public budget cuts to R&D in recent years appear to contradict the rationale of increasing R&D investments, the formal political discourse in support of R&D and innovation expenses, and the Council's Country-Specific suggestions (see section 2.8).

3.2 Structural challenges of the national R&I system

The Spanish R&D and innovation system faces challenges in its industrial structure, science and technology base, and governance structure. These main challenges were identified several years ago (OECD, 2006; EW 2009; EC, 2011a) and, despite the efforts, they still remain. For example, the new strategy EESTI (2013-2020) identifies 14 challenges³¹ that are quite similar to the ones signalled by the OECD report (2006). Recent studies (Heijs, 2012 and Buesa, 2012) also indicate the persistence of these challenges.

Industrial structure challenges. The Spanish industrial structure is characterised by its significant weight of small and medium-sized firms in low-tech traditional sectors (OECD, 2006; EW, 2010, 2009; EC, 2011a) and the lack of sufficient Spanish multinational enterprises with a leading role in creating R&D-related networks (EW, 2012; EC, 2012b; EC, 2013d). Thus, it is

³¹ See Footnote 18.

not surprising to find low levels of Spanish patenting activity (EC, 2012a and 2010b) and a low innovative culture (COTEC, 2011a).

Science and technology base challenges. The Spanish public R&D system has increased its performance considerably in the recent years and positively enabled its human resources capacity (see the above-mentioned levels of international publications and tertiary education). However, the system is challenged by its fragmentation and lack of flexibility, with low levels of mobility between institutions, countries and sectors (OECD, 2006; EW, 2012), which act as barriers to improving its efficiency. This fragmentation, and lack flexibility and mobility, create inefficiencies and negatively affect the creation of the necessary “critical mass” to keep on improving the level of quality of research outputs³² and reducing the distance between research and social and economic needs. The fragmentation of the system was mainly caused by the rapid creation and growth of universities without considering the demand (Hernández & Pérez, 2010) and by the dispersion of funding (OECD, 2006). The lack of mobility makes it necessary to improve inter-institutional mobility and reduce the high levels of “endogamy” (Cruz-Castro and Sanz-Menendez, 2011; Cruz-Castro et al., 2006); to facilitate access by foreign researchers and the return of nationals with foreign experience; and to improve public-private collaborations.

Governance challenges. The main policy challenges have been identified as the lack of coordination (regional and ministerial) between research and innovation policies and insufficient synergies between policy design and implementation (OECD, 2006).

As mentioned, despite the efforts, the main challenges of the Spanish R&D and innovation system remain. However, if we consider the evolution of the Spanish R&D and innovation system during the last two years, the most remarkable challenges are the unstable budgetary framework and erratic policy implementation of R&D and innovation measures (e.g. disinvestments and important delays) and the lack of policy measures to address the consequences of the crisis in the R&D system. These recent challenges have exacerbated the effects of some of the long-term challenges (see next section and Table).

3.3 Meeting structural challenges

The Spanish policy mix in the last decade has experienced important changes, including a diversified set of instruments that have tried to tackle the identified barriers and weaknesses of the R&D system. Most of these changes were based on several analyses of the obstacles and problems of the Spanish innovation system (OECD, 2006; COSCE, 2005; COTEC, 2005). Although these studies are not so recent their impact has been very important and, in some way, still notable. In addition, new studies appear to have influenced the structure of the new strategy EESTI (2013-2020) and plan PECTI (2013-2016), both of which follow the efforts of previous plans. In particular, following the INGENIO 2010 initiative –approved at the end of 2005 – and then integrated in the National Plan for R&D (2008-2011) and the e2i the creation of NTBFs and university spin-offs, the promotion of R&D projects in general and more specifically public-private cooperation in long term strategic projects have all been reinforced³³; and policies to foster human capital, such as the incorporation of PhD holders into the private sector and the

³² Although the levels of research performance (international scientific co-publications per million population) are above the EU-27 average, the impact of research is below this average (for the latest data available of 2008 the scientific publication among the top 10% most cited publications worldwide as a percentage of total scientific publications was 10.2 against 10.9).

³³ [The CENIT programme now called INNPRONTA](#)

creation of the S&T infrastructure, have been heavily reinforced. In addition, the e2i strategy has reinforced several of those instruments offering extra financial support for R&D and innovation in general and specifically for risk capital, paying attention to societal challenges and, for the first time, has included public procurement as an instrument associated with the acquisition of innovative goods and services (see Country Report of Spain 2012 for more details on the evolution of the policy mix, EW, 2013). As mentioned, all these instruments for the promotion of innovation and knowledge and technology transfer have been included and reinforced in the new strategy EESTI (2013-2020) and plan PECTI (2013-2016). In addition, the new Entrepreneurship and Internationalisation Support Act (Law 14/2013) also aims at improving finance for entrepreneurs and reducing the administrative burden for starting a new business (see section 2.4).

However, the overall impact of these new instruments, its efficiency, and effectiveness in addressing structural challenges is not clear. The research policy evaluation culture could be considered as moderately developed and R&D policy evaluations are still not a systematic activity (CIA4OPM, 2011; Heijs and Martinez, 2011; Eparvier, 2009). As mentioned, strategies and plans are increasingly based on some of evaluation analysis, but they are not always publicly available³⁴. There is nonetheless a range of evaluation studies carried out by different stakeholders (e.g. CDTI, FECYT³⁵, AEVAL³⁶, Institute for Fiscal Studies or COSCE). Most of them analyse specific instruments or programmes at national level. Additionally, PhD students or researcher conduct other studies using the publicly available databases (see Valadéz et al., 2011; Herrera, 2008; Herrera and Heijs 2007). Most of these studies offer a positive view on the impact and indicate the existence of financial additionalities (Heijs, 2001; Heijs and Buesa, 2007; Barajas et al., 2009; Huergo et al., 2009; Magro, 2011; Saiz-Briones 2009),³⁷ but some offer a more critical view (e.g. Vega-Jurado et al., 2009 and Heijs and Buesa, 2007)³⁸ The CDTI, which is in charge of most of the business-oriented instruments, seems to function well and several internal and external evaluations of their activities have been carried out that prove this (Heijs, 2001, Heijs and Buesa, 2007; Barajas et al., 2009; Huergo et al., 2009). The impact assessment of the European Framework Programme “Evaluation of the impact of the FP6 in the RTD Public System in Spain” (MICINN, 2010) shows a positive, important impact on the participants in terms of an increase in R&D funds, cooperation and internationalisation. However, most studies analyse specific isolated aspects or programmes. There is a lack of updated studies that carry out a broad overall assessment, that offer a cost benefit analysis or evaluate whether the implementation was efficiently carried out.³⁹

³⁴ The PECTI mentions the weaknesses of previous National Plan (p. 6), but it does not refer to the analysis from which these weaknesses were identified. It could be probably based on the SISE reports that evaluate the implementation of the National Plans. These reports were carried out in a yearly basis from 2006 to 2010.

³⁵ For example, they elaborate the SISE reports that report and evaluate the implementation of the National Plans. The report for 2010 is the last year available)

³⁶ The Spanish Agency for Evaluation (AEVAL) carried out the evaluation of Ingenio 2010 (AEVAL, 2008), but no other evaluation on R&D appeared to be carried out.

³⁷ The study by Saiz-Briones (2009) showed a non-linear relationship between the support intensity (amount of support by sales) and the effect on the R&D expenditures in Spanish firms. Here the effect decreases in the case of very high support intensities.

³⁸ Vega-Jurado et al. (2009) underpins the idea that firms frequently use the support for public-private cooperation in Spain to obtain additional financial support. Heijs and Buesa (2007) showed that the regional public support does promote public-private cooperation and the national and European support schemes promote horizontal cooperation. However, in the case of vertical cooperation, the support schemes do not affect the intensity in cooperation in R&D.

³⁹ Currently, [a group of experts from the European Commission is carrying out an evaluation of the Spanish R&D and innovation system.](#)

Similarly, it is difficult to judge if current budget cuts have been based on any sort of evaluation. There is a lack of recent data regarding R&D implementation at national-level (neither working plans nor final programmes expenditures were published for 2012). The evaluations that have guided the new EESTI and PECTI are also not publicly available.⁴⁰ However, several questions could be raised. The increasing proportion of non-executed public budget for R&D and innovation (Molero and de No, 2012a; Fecyt, 2013) indicates that there is a need for analysing what instruments and measures are not being sufficiently demanded or used. Similarly, the increasing proportion of public budgets allocated through loans (MINECO, 2013) points that budget cuts have been applied without considering the strengths of the R&D and innovation system. The high level of international scientific co-publications (EC, 2013a) clearly indicates that basic research is one of the strengths of the Spanish R&D system. Basic research is usually financed through subsidies. Therefore, the concentration of the reductions in non-financial funds (Molero and de No, 2012c and 2013a) could negatively affect basic research. The high number of objectives was one of the main criticisms to the draft of the new plan PECTI (2013-2016) (see section 2.6). Although the number of objectives has been reduced, it could be considered that recent budget restrictions would have required a more limited set of objectives, focused on the strengths of the system. The mobilisation of important research organisations in support of R&D (see section 2.3) indicates the lack of coordination with other stakeholders in the implementation of policy measures. As mentioned, during the last two years, many important policy programmes have been delayed or cancelled. The delay suffered in launching the main programme for basic R&D (“Promotion of R&D and innovation towards societal challenges”) reveals that policy implementation has been unreliable. This delay has been so important that any single new project will be implemented in 2013 through this call. It also indicates that the strengths of the system (basic research) have not been considered when implementing the R&D plan. The measures taken by the Spanish government are quite limited with regard to allowing the institutional modernisation of the public research system towards excellence and specialisation (ERAWATCH report 2010; EW, 2011; EW, 2012). In addition, no specific measures appeared to be taken to address the consequences of the crisis in the R&D system. The combination of the lack of measures for addressing systematic failures of the R&D system with the lack of measures for addressing the negative consequences of the crisis will probably exacerbate some of the long-term challenges of the R&D system. For example, the limited character of the measures to make the public labour market for researchers more flexible combined with the lack of specific measures to support researchers under temporary contracts⁴¹, have concentrated the negative effects of budget cuts on the young and mobile researchers. As an illustration, the CSIC has reduced in the last years its employees by a -10.4% (17.9% non-public functionaries and 1.4% functionaries), its training contracts by -85% (JAE) and their grant holders by -29.6% (see section 4.1). There is also some indication that excellent researchers that came into Spain with a Ramón y Cajal contract have difficulties to enter into a permanent position. The precarious situation of young and mobile excellent researchers diminishes the research base of the country and does not encourage future generations to enter into a research career.

⁴⁰ See footnote 13.

⁴¹ Barriers to support young researchers under temporary contracts have not either eliminated. For example, programme for basic R&D (“Promotion of R&D and innovation towards societal challenges”) required researchers to have a contract for the entire duration of the project, making very difficult young researchers to applied for funds under this programme.

Table 3. Assessment of the effectiveness of the specific policies to address the structural challenges

Challenges	Policy measures/actions addressing the challenge ⁴²	Assessment in terms of appropriateness, efficiency and effectiveness
1. GOVERNANCE. Disinvestments in R&D and erratic implementation of R&D and innovation policies.	Challenge created by political decisions	Public Budget cuts in R&D and innovation threaten to aggravate existing structural challenges and to set back the progresses achieved in previous years. The high levels of non-executed budget and the increasing role of loans diminish the strengths of the R&D system (e.g. international publications). The implementation of the national plan PECTI (2013-2016) can be considered as erratic. As important delays have been applied to core programmes (e.g. “Promotion of R&D and innovation towards societal challenges”), considering the strengths of the R&D system.
2. INDUSTRIAL STRUCTURE. Lack for demand innovation and new technology	The role of innovation in policy mix has been increasing (see section 4.2). Creation of a specific programme for Innovation-based public procurement.	The results appear to be positive although more studies on the efficiency of these programmes seem necessary. Programmes to foster innovation through public procurement are not still evaluated.
3. Lack of technology transfer between research system and productive system	There is growing orientation to Public-Private Cooperation (see section 4.2). The new law LCTI (2011), the new EESTI (2013-2020), and PECTI (2013-2016) also address these challenges. The new Entrepreneurship and Internationalisation Support Act (Law 14/2013 aims at improving finance for entrepreneurs and reducing the administrative burden for starting a new business.	The results appear to be positive although more studies on the efficiency of these programmes seem necessary. There are some criticisms of how this new law, strategy and plan will address these challenges (see section 2.3).
4. SCIENCE AND TECHNOLOGY. Lack of inter-institutional, international and sectoral mobility	In addition to the specific policy measures (section 4.2), the new law LCTI (2011), the new EESTI (2013-2020), and PECTI (2013-2016) also address these challenges.	The levels of internationalisation appear to be increasing (More reports). However, more efforts could be made <ul style="list-style-type: none"> - To simplify the accreditation process to help foreign academics - To change the reward system encouraging excellence and innovation - To reduce endogamy The new law appears to be limited to address

⁴² Changes in the legislation and other initiatives not necessarily related with funding are also included.

		the increasing precarious situation of young researchers
5. Lack of entrepreneurial and innovative culture	<p>Support schemes of the CDTI and the national Plan addressed this challenge. (IWL “Program of Science and Innovation Culture”).</p> <p>The new Entrepreneurship and Internationalisation Support Act (Law 14/2013 aims at improving finance for entrepreneurs and reducing the administrative burden for starting a new business.</p>	<p>COTEC reports appear to indicate an increase in the innovative culture of universities and research centres. However, improvement in the curricula of universities and evaluation of innovative activities of researchers appear to be necessary. The new entrepreneurial Support Act. are might help to overcome these limitation.</p>

4 NATIONAL PROGRESS IN INNOVATION UNION KEY POLICY ACTIONS

4.1 Strengthening the knowledge base and reducing fragmentation

4.1.1 Promoting excellence in education and skills development

The number of people employed in R&D activities in 2011 was 342,901 Head Count (HC)(208,831 persons in Full Time Equivalent - FTE - INE data 2012). This figure was yearly increasing till 2010 (55.3% from 2002 to 2010), when it started decreasing by -1.8% in 2011 and by 3.1% in 2012. Based on the FTE data in 2012, 42.8% were working in the private sector, 37% in Higher Education Institutions (HEIs), 20% in Public Research Organisations (PROs) and 0.2% in Private Non for Profit Sector. Human resources in science and technology (HRST) as a share of labour force in 2012 was 40.6%, which is below the EU-27 average of 42.9% (Eurostat, 2013). Spanish researchers from the public research system appear to show similar levels of mobility to the European average (more than 3 months post-PhD mobility in last ten years) (around 30%), but they show lower levels of employer mobility (8% against 12% of the European average) (MORE-report, 2013). In the academic year 2010-2011, Spain had over 68,865 PhD students (30.9% in health and sciences (HES) and 17% in engineering and technology (E&T). In the academic year 8,915 PhD candidates graduated (41.5% were in HES and 16.4% in E&T, INE data). There is some indication that the economic crisis and decreasing public investments in R&D and innovation are reducing the labour market for researcher in Spain. For example, the CSIC has reduced its training contracts (JAE) from 2,045 in 2008 to 300 in 2013. The employees decrease from 12,928 in 2011 to 11,582 in 2013 and grant holders from 618 to 435.⁴³

Spain has a large number of instruments to foster Human Resources in science and innovation, including the mobility of such resources. Research mobility (inwards and outwards) and the training of researchers is encouraged through a wide range of national and regional programmes. The current state-level programme PECTI (2013-2016) includes “specific programmes” for human resources with three overall “sub-programmes”: (1) training; (2) mobility and (3) employability. The programme for human resources will receive a €350.7m (approximately a 9.1% of the total budget), according to the provisional budget for R&D and Innovation distributed by the State Secretary of Research Development and Innovation for 2013 (MINECO, 2013). The distribution of this budget across the three programmes is estimated be as follows: (1) €150.4m (3.9%); (2) €17.8m (0.5%); and €182.5m (4.7%).⁴⁴ Moreover, the regional

⁴³ According to the institution declarations to the press (18.10.2013): http://sociedad.elpais.com/sociedad/2013/10/18/actualidad/1382111759_201200.html

⁴⁴ In 2011, the Instrumental Working Line (IWL) for Human Resources of the R&D Spanish National Plan received €271.4m, 8.2% of the total R&D activities fund by the AGE (FECYT, 2012). Three overall programmes are included in this IWL: (1) the programme for the training of researchers (with a funding of €94m – 34.7% of total funds for Human Resources in R&D) offers support for PhD students (a two year scholarship and a two-year contract); (2) the programme for the mobility of Human Resources for lecturers and doctorate students (€15.4m - 5.67%) and; (3) the programme to increase the demand for researchers in the Spanish R&D system (€161.9m –

governments also offer a large number of schemes geared to R&D human resources. However, budget cuts have led several regional and national governments to cancel or suspend some of these programmes.

Effective policy measures to address the lack of transparent, open and merit-based recruitment are much needed, as there is a high level of “endogamy” (Cruz-Castro and Sanz-Menendez, 2011; Cruz-Castro et al., 2006). In addition, budget cuts result especially harmful for young mobile researchers. In a research market with high levels of endogamy prominent young researchers with international experience find it difficult to access to research positions.⁴⁵ Preparing a career as a researcher in Spain is a difficult, time-consuming process with low salaries and unstable short-term contracts. The researchers working on a permanent basis at Universities and Public Research Bodies have the status of civil servants. Therefore, there is a dual-market for researchers (civil servants vs. non-civil servants) in the public sector. The level of mobility and employability for researchers (PhDs) in the private sector appears to be low. The average annual salaries of researchers in Spain (34,908€) are almost 10% below the EU-25 average (37,948€) and very low in comparison with the most advanced countries (EC, 2007). The salaries of public researchers are very homogeneous without extra payments for highly qualified and prestigious researchers. Productivity and quality of researchers is only rewarded marginally, 5-15% of the salary.

The LCTI (1st June 2011) has introduced some important changes in the human resources for R&D, to improve mobility between sectors and to improve access to a research career. The new Law LCTI (1st June 2011) replaced the so-called Law of Science of 1986 and modifies the governance and human resources for R&D. The LCTI includes four types of private (non-civil servant) labour contracts: (1) to carry out a PhD degree (four years maximum with minimum wages) (Art. 21); (2) of access (five years and maximum of 80 hours of teaching) (Art. 22);(3) for researchers working on research projects (D.a 23a); and (4) for distinguished researchers or scientists, “of great prestige” who will be able to occupy key positions in management or in “important” programmes (which can be permanent) (Art.23). The pre-PhD contract will be delayed till 2014 and the access ones could be conditioned by the State budget and public employment supply. Moreover, it has created a unified professional career. The different official professional scales for scientists with a civil servant status in public research organisations (PROs) will be unified in three, comparable to those of the Spanish National Scientific Research Council (CSIC): (1) research professor, (2) scientific researcher and (3) permanent scientist. This unification facilitates staff mobility between the PROs. The LCTI also improves several aspects in the career of the researchers. The replacement of the 2+2 system (two years scholarship and then a two year contract) by a four-year employment contract implies the full recognition of certain rights such as unemployment benefits and maternity leave. In addition, the LCTI improves mobility between private and public organisations by allowing an extended leave for a maximum of 5 years and reducing partially the incompatibility for working in private firms.⁴⁶ However, some criticism exists regarding the scope of these measures. The research community was expecting the law to implement a “tenure-track” contract to facilitate access by young researchers to a permanent research position. However, it appears that the “access contract”

59.7%), which supports post-doctoral contracts and facilitates access by PhDs to a permanent position and into firms (FECYT, 2012).

⁴⁵ In addition, some regulatory measures to correct the public deficit (e.g. Royal Decree-Law 20/2011) have limited staff recruitment and the filling of positions left vacant by retirees.

⁴⁶ It allows researchers to work part-time in private firms created by the organisations in which they are working and by eliminating restrictions on the maximum share ownership of a private company (10%) and the restrictions on being a board member in private companies. It modifies the previous Law of Sustainable Economy (Law 2/2011) to allow researchers to profit from their patent earnings

does not meet this requirement, being another type of contract that does not improve the precarious situation of young researchers in Spain. A flexible and competitive system for the management of human resources is a constant demand of the research community (see section 2.3).

Some language barriers exist. Sometimes, positions required an advanced knowledge of Spanish or other regional languages (such as Catalan or the Basque language). The importance of these regional languages in the evaluation criteria to select researchers or to obtain promotion affects the foreign researchers and also makes internal mobility of Spanish researchers more difficult.

It is also important to mention the role of the “Ramón y Cajal programme” that aims at increasing job opportunities for prominent researchers in the National Research System (foreigners and Spaniards with international experience). This programme has facilitated the return of national prominent researchers; has “opened”⁴⁷ the system; and encourage similar programmes at national (e.g. Juan de la Cierva for young researchers), regional and institutional (e.g. Jae-doc in the CSIC). However, budget cuts have also affected to these programmes as some of them have been delayed (e.g. Ramón y Cajal 2012, Juan de la Cierva 2012, PTA 2012 and Torres Quevedo 2012), or cancelled (e.g. Jae-doc 2012 and other regional programmes).

Spain joined ERA-MORE Network in 2004, which was rebranded into EURAXESS in 2008, Spain joined Euraxess in 2004 in order to provide better information and support to researchers regarding administrative procedures, funding, job offers and other relevant issues for mobile researchers (e.g. visas and social security). The FECYT coordinates this network at national level. It has more than 80 centres in different regions, 18 of which signed the Declaration of Commitment along 2013. In 2012, the network included 68 centres organised in regional nodes. . FECYT publishes a guide for foreign researchers coming to Spain and also manages the web [Euraxess Spain](#) that provides information and support for foreign researchers coming to Spain. In 2012, the Spanish Euraxess Spanish network handled 28,848 requests, representing the 18.26% of the total requests of the European network. A total of 31.83% of these were about permits and working conditions for non-European citizens, 17.06% about funding and grants, followed by other questions regarding permits and working conditions and housing. It is important to mention that most of the requests come from Cataluña (63.11%), followed by Andalusia (15.03%) and Madrid (6.96%). The use of the Spanish network has increased during the last two years (about 20,000 requests in 2010) (FECYT, 2013). EURAXESS Spain also promotes the Charter and Code and the EURAXESS Jobs portal among Spanish research performing organizations. By the end of 2013 76 Spanish organizations have endorsed the Charter and Code, 4 of them obtained the “HR Excellence in Research” logo, and 166 published at least one job offer in the EURAXESS Jobs portal along 2013.

Recent policy measures aimed at implementing some elements of the Innovative Doctoral Training. The programme “[Campus of International Excellence](#)” promotes research excellence by encouraging university campuses to establish collaborations with other institutions, to specialise and to internationalise. Committees of national and international experts evaluate university strategic plans. The programme was launched in 2008 in the framework of the [University Strategy 2015](#). Since then, twelve national campuses have received this recognition, additionally eight regional university campuses have also received this recognition. The “Severo Ochoa” sub-programme could also be mentioned as it supports excellent research centres and groups, including training. This sub-programme was launched in 2011 within the framework of

⁴⁷ Most of the programmes targeting researchers require stays abroad or in a different institution. This encourages researchers to go abroad and has helped researchers with international experience to comeback to a Spanish research institution.

the NP (2008-2011). It is estimated that this action will distribute €20.0m in 2013 (MINECO, 2013). Only a few doctoral programmes exist in collaboration with foreign universities and the introduction of English as a spoken language in PhD courses is still in an early stage. Interdisciplinary research options are recognised by the LCTI and the EESTI, but they mainly refer to the mobility of researchers. Education curricula did not frequently include transferable skills training. However, the Bologna Process is helping to include this aspect, at least formally, in the educational plans of universities. The National Agency for the Evaluation and Accreditation (ANECA) evaluates and recognises the quality of PhD programmes. It grants PhD programmes with a “[Mention of Excellence](#)” when they comply with certain criteria of quality.

The new strategy EESTI (2013-2020) aims to promote “Industrial Phd programmes” involving universities and firms. This could help to improve the match between education and training supply and employment needs (EW, 2012; OECD, 2011a and 2011b). In addition, it aims at encouraging the intersectoral job mobility. The “Torres Quevedo” sub-programme also aims at promoting the intersectoral mobility of researchers (€15m estimated in 2013-MINECO).

New strategy EESTI (2013-2020) and Law LCTI follow the Charter & Code. More than 70 research institutions have endorsed the Charter & Code (Euraxess access 15.10.2013). The Spanish government requires all universities that present applications to obtain public support from tenders for Human Resources to accept and comply with the Charter. Where all universities obtained public support, it could be said that implicitly all universities subscribed to the charter. Four institutions have acknowledged the HRS4R (Euraxess access 15.10.2013).

4.1.2 Research Infrastructures

The new Law LCTI (2011) includes several elements for a partial solution to the legal barriers for joint programming and access to research infrastructures (Art. 44 and additional provision 17). The new strategy EESTI (2013-2020) considers the “sustainability and use of scientific and technological infrastructures” as one of its specific objectives (sub-objective 2). And the new Plan PECTI (2013-2016) follows the strategy and devotes to research infrastructures one of its sub-programmes (number 4). Spain contributes significantly to a broad range of pan-European research infrastructures.

The European Strategic Forum for Research Infrastructures ([ESFRI](#)) was established in April 2002 to support a coherent approach to policy-making on RIs in Europe and to act as an incubator for international negotiations on concrete initiatives. Spain considers the ESFRI, to be an important initiative and plays an active role in its design. Spain contributes significantly to a broad range of these facilities and tries to participate in 25 of the 44 European RIs to enhance its percentage of return on that participation. It also promotes the role of Spanish industry in building and maintaining those infrastructures. In Spain at least three large ESFRI installations will be located. The first one is the construction in Catalonia of one of the five supercomputers in Europe of the Partnership for Advanced Computing. The second one is the solar research infrastructure (EU-SOLARIS) at the Advanced Technological Centre for Renewable Energy in Almeria. And thirdly, the European Spallation Source (ESS) in the Basque Country is an advanced centre for researching the atomic and molecular arrangement for materials

In recent years the Spanish government reinforced the domestic policy for research infrastructures (RI), which is reflected in a substantial increase in the annual budgets, devoted to these policies and some new initiatives. The Spanish National R&D&I Plan (2008-2011) promoted the effective use of such infrastructures by the use of specific outward mobility schemes among others. The ESFRI also boosted design and interregional coordination of the

national road map of infrastructural needs and in 2007 the “Conference of Presidents” of the Spanish Autonomous Communities came to an agreement to create 24 new singular scientific infrastructural installations in the period 2007-2015 which are added to the 37 existing ones. The investments for the period 2004-2010 were €774 million. As far as the Spanish RI roadmap is concerned, the NP (2008-2011) included the National Programme on Scientific and Technological Infrastructure, which devoted to the creation and improvement of the RI a 16% of the total budget in the period 2008-2010 (See EW network, 2011). The investments granted for the period 2004-2010 on research infrastructures were 2,822 million € regarding the NP (FECYT, 2012). As mentioned, the LCTI includes several elements for a partial solution to the legal barriers to access to research infrastructures (additional provision 17). The EESTI considers the “sustainability and use of scientific and technological infrastructures” as one of its specific objectives (sub-objective 2). And the PECTI follows the strategy and devotes to research infrastructures one of its sub-programmes (number 4). It is estimated that this sub-programme will distribute €170m. Spain contributes significantly to a broad range of pan-European research infrastructures. However, budget cuts for R&D are causing a delay in the payment of the country’s financial contribution to some international research infrastructures (e.g. CERN, European Science Foundation (ESF)). Spain has reduced its voluntary participation in the ESA by 75% and it is not clear its participation in the European Extremely Large Telescope (E-ELT).

4.2 Getting good ideas to market

4.2.1 Improving access to finance

The role of innovation is gaining importance in the Spanish Policy mix over the last years. The new strategy EESTI (2013-2020) and plan PECTI (2013-2016) follow previous efforts in this direction (e.g. INGENIO 2010, National Plan for R&D (2008-2011) and e2i) encouraging the creation of NTBFs and university spin-offs; the promotion of R&D projects in general and more specifically public-private cooperation in long term strategic projects (e.g. Subprogramme of collaborative R&D and Innovation – INNPRONTA in the previous plan); policies to foster human capital, such as the incorporation of PhD holders into the private sector; offering extra financial support for R&D and innovation in general and specifically for risk capital, paying attention to societal challenges and public procurement for the acquisition of innovative goods and services. The new Entrepreneurship and Internationalisation Support Act (Law 14/2013) also aims at improving finance for entrepreneurs and reducing the administrative burden for starting a new business (see 2.4).

The investments in risk capital including seed capital, start-up funds and funding for other stages of the business creation was in 2012 €1,470.2m and represented 0.009% of the Spanish GDP. This has decreased significantly since 2010 (€2,479.7m) by -20.4% in 2011 and by -25.5 in 2012 (ICONO-Eurostat, 2013). In Spain, there were about 54 networks and groups of Business Angels in 2009 (OECD, STI Scoreboard 2011, from FECYT). Public funds for innovation and knowledge Transference are mainly included in the “Business leadership programme” that includes three sub-programmes: (1) private R&D and innovation; (2) Enabling technologies; and (3) Collaborative R&D and innovation. In 2013, it is estimated that this programme will

distribute €831.9m (approximately 21.5% of total funds), distributing €81.4m, €10.8m and €333.5m through the sub-programmes mentioned above (MINECO, 2013).⁴⁸

Spain has recently designed a large number of support schemes to foster public-private cooperation in R&D and innovation. These programmes aim to improve a level of public-private collaboration that has been considered low (OECD, 2006; COTEC, 2012). The National Programme (Np) on public-private cooperation has been designed to increase this cooperation. This programme is included in the Instrumental Working Line (IWL) “Articulation and internationalisation of the system” of the Spanish National Plan for R&D and innovation (NP). In 2011, the Np on “Public-private Cooperation” had two instruments: INNFACTO and INNPRONTA (FECYT, 2012). Some relevant sub-programmes in this action are: INNCORPORA (including Torres Quevedo programme); INNPLANTA (Technology parks); INNCIDE (Knowledge Transfer Offices); NEOTEC (New Technology Based firms); Innovative Companies Associations and Clusters (AEI) Programme; INNFLUYE (Technology platforms); INPRONTA (before CENIT); INNFACTO (public-private partnerships). Two mentioned national sub-programmes provided specific state aid support for promoting clusters of innovation: Innovative Companies Associations and Clusters (AEI) and sub programme of technology platforms INNFLUYE. These programmes distributed €7,536k and €6,050k in 2011 respectively (FECYT, 2012). Due to data availability it is difficult to judge the evolution of these programmes or similar ones in 2012 and 2013.

The LCTI (2011) has introduced several changes to improve the mechanisms of knowledge transfer: (1) increasing the value of transfer activities (e.g. by detecting research groups whose knowledge could be applied or by increasing the role of OTRIs) (2) promoting the “units of excellence” (art. 33.1) or (3) developing an open-access archive with research results. It encourages the creation of Technology Based Enterprises (EBTs) by allowing researchers to work part-time in private firms created by the organisations in which they are working and by eliminating restrictions on the maximum share ownership of a private company (10%) and the restrictions on being a board member in private companies.

4.2.2 Protect and enhance the value of intellectual property and boosting creativity

The new Law LCTI (2011) has changed the regulation of the ownership of Intellectual Property Right (IPRs) produced by the staff of university of public research bodies. It modifies the previous Law of Sustainable Economy (Law 2/2011) to allow researchers to profit from their patent earnings.

The Entrepreneurship and Internationalisation Support Act (Law 14/2013) published on the 27th September 2013 aims at improving the training for entrepreneurs by encouraging creativity at different educational levels (Chapter 1; articles 4, 5 and 6).

The new Strategy EESTI (2013-2016) includes as an articulation mechanism (number 5) the harmonisation of criteria and practices of ex-ante and ex-post evaluations and aims to improve collaboration between the administration and the private sector to eliminate regulatory barriers.

⁴⁸ In the previous National Plan (2008-2011, extended to 2012): Public-private cooperation, human resources, boosting and value added. In 2011, knowledge transfer activities funded total €856.74m less than in 2010 (€935.28m in 2010), distributing across the different objectives the following total funds: €555.7m; €72.68m; €222.17m and €8.18m (FECYT, 2012).

However, it does not specify a screening process of new or existing regulations regarding their impact on innovation.

The National Reform Programme 2013 aims at improving the protection of intellectual property rights through a reform of the Codified Text on the Law on Intellectual Property. This aims, among others, at increasing transparency in the entities that manage IPRs by promoting competition and allowing new operators to enter in this market and to transpose to the Spanish legal system some EU directives (Directive 2011/77/EU, amending Directive 2006/116/EC on the term of protection of copyright and certain related rights).

Due to objections to the translation requirements to be only in English, German and French, Spain has neither signed nor ratified the European Agreement on Unified Patent Court. Not publicly available specific policy measures appear to be applied to support the use of the Guidelines on Horizontal Cooperation Agreements regarding standard-settings. However, legislation appears to be applied as judged by the court ruling decisions based on the agreement.

The promotion of open access is gaining importance in the Spanish research system. The new Law LCTI (2011), the new Strategy EESTI (2013-2020) and the new Plan PECTI (2013-2016) try to promote open access. The LCTI (2011) art. 37 states that: Public agents of the Spanish Science, Technology and Innovation will drive the development of repositories, own or shared, open access to the publications of its research staff, and establish systems to connect with similar initiatives nationally and internationally; The research staff whose research activity is financed largely with funds from the State Budget will issue a digital version of the final version of the contents which have been accepted for publication in research journals or periodicals serial as soon as possible but not later than 12 months after the official date of publication; The electronic version will be published in open access repositories recognized in the field of knowledge in which research has developed, or open access institutional repositories; Public electronic version may be used by public administrations in their evaluation processes; The Ministry will provide centralized access to repositories, and its connection with similar national and international initiatives; All this without prejudice to agreements under which they have attributed or transfer to third parties the rights to publications, and does not apply when the rights to the results of the activity of research, development and innovation are likely protection. The New Strategy EESTI (2013-2020) includes as an “Articulation mechanism” (number 2) the promotion of open access to data, publications and research results financed by public funds, including guidelines to create shared archives. The new Plan PECTI (2013-2016) includes a sub-programme for the development of new technologies (AEESD2.2). This programme includes the promotion of “Open Access” through technological forums and platforms. The PECTI has implemented the LCTI by requiring researchers to make publicly available their databases for the first time in its calls for 2013 (e.g. Promotion of R&D and innovation towards societal challenges).

There are also some regional regulations that promote the access to open repositories with peer-reviewed scientific articles. For example, the Autonomous Region of Asturias — it calls for deposit in its institutional repository with an embargo of no more than six months — and the Autonomous Region of Madrid — it includes papers, working papers and data and a field dependent embargo no longer than 6 months (EC, 2011c).

[RECOLECTA](#) is a national joint programme of the Spanish Foundation for Science and Technology (FECYT) and the [Spanish Public Universities and Research Libraries Network](#) (REBIUN) to create a nationwide infrastructure of Open Access scientific repositories in Spain. It is currently working in a statistics module to enable the measurement of visits and document downloads from the national open science repositories compliant with the Knowledge Exchange Statistics guidelines.

At institutional level, 21 Spanish research institutions have signed the Berlin Declaration ([OpenAire](#): Spain). Open institutional repositories are becoming frequent in Public Universities, especially open access to PhD dissertations. Some of them include “Creative Commons” licenses. Some universities, like the University of Alicante, give direct financial help to departments or research groups according to the number of documents they deposit in the institutional repository (Open Aire; EC, 2011c). The [Alhambra Declaration](#) was signed on May 2010 by a group of open access’ stakeholders (e.g. editors, librarians, funding agencies, university rectors and authors) from the South European countries (Spain, Portugal, France, Italy, Greece and Turkey), whose main languages are different from English, to promote open access to scientific productions

[Latindex](#) and [Dialnet](#) aim at collecting and facilitating access to research publications done in Spanish and Portuguese speaking countries.

The FECYT facilitates access to researchers working at national research organisations to bibliographic research information (Web of Knowledge and Scopus). At regional and institutional level, purchases by consortia of university libraries are common. RECOLECTA provides access to search for documents stored in the 58 institutional repositories.

[Eduroam ES project](#), coordinated by [IRIS Network](#), supports a common roaming environment between Spanish research organisations, allowing individual researchers to access network services in other research public organisations. At national and regional level, there are several initiatives to collect information of researchers (CVs) through the “Normalized Curriculum Vitae” (CVN) CVN is a format to exchange research information among systems. . It is implemented in 90 Spanish institutions (50 universities) and nearly 60,000 researchers have created their CV in the CVN format. Also, FECYT is working on the standardization of CVN with the European standard CERIF (Common European Research Information Format).

4.2.3 Public procurement

Public procurement of innovative good and services has been increasingly encouraged in Spain. The Law on Sustainable Economy (2011) introduced public procurement of innovative good and service as a policy instrument to promote innovation, especially in some specific fields such as environmental protection and digitalisation of public services (For details, see the Mini Country Report of Spain 2011). The new Law LCTI (2011) reinforced the objectives of these policy initiatives and instruments. INNODEMANDA and INNOCOMPRA were instruments designed to implement these policy goals in previous National Plan (NP (2008-2011)). The current Plan PECTI (2013-2016) includes public procurement of innovative goods and services within the Strategic Action of Economy and Digital Society, Programme of business leadership (AEESD 3), Sub programme of business R&D and innovation (3.1). In addition, The Council of Ministries (8/07/2011) agreed on setting a 3% target of new investments of the general public administration to be devoted to innovative public procurement and a guide to disseminate the procedures. Five tenders are listed in the CDTI web but it is not clear if the 3% objective has been met.

The European Public Sector Innovation Scoreboard (EPIS) 2013 (EC, 2013b) shows that Spain is above the EU-27 average in most of the indicators (13 out of 22). Although the government effectiveness in Spain has felt form 1.82 in 2000 to 0.98 in 2010, it shows one of the highest improvements in E-government development Index (EgdI), in providing public services through the use of ICT in the period of 2003-2012. The share of in-house service innovators is high

(89%) and the perception of the importance of innovation for winning procurement tenders from public administration organisation is higher than the importance of low cost. (EC: 2013b)

4.3 Working in partnership to address societal challenges

The solution to the major societal challenges is receiving growing attention in Spanish R&D and innovation policies. The EESTI (2013-2020) and PECTI (2013-16) follow the efforts of previous measures⁴⁹ and increase their focus on the promotion of R&D and innovation on societal challenges. The EESTI includes the “promotion of R&D and innovation towards societal challenges” as one of its four general objectives.⁵⁰ The new PECTI gives special emphasis on its integration into the European Research Area and to the promotion of: “(a) excellent basic research; (b) technological, industrial and firm leadership; and (c) scientific and technical research and innovation capabilities on grand challenges” (PECTI: 5). Similarly, in recent years Spain has launched broad institutional measures to facilitate public private cooperation (see previous section 4.2). For example, the creation of a large number of Science and Technology parks in cooperation with universities and other research organisation. The INNPRONTA programme required Public Private partnerships. These follow efforts of previous programmes, such as, the National Strategic Consortia for Technical Research (CENIT) that funded large long-term projects based on public private cooperation. The [Spanish European Office](#) disseminates Public Private Initiatives. According to provisional budget for R&D and Innovation distributed by the State Secretary of Research Development and Innovation for 2013, the State programme “Promotion of R&D and innovation towards societal challenges” will distribute €2183.3m (MINECO, 2013). This programme represents approximately 56.5% of the total budget. The sub-programme “Collaborative R&D and innovation”, included in the “Business leadership programme” will distribute €333.5m (MINECO, 2013).

Spain participates very actively in all kinds of ERA initiatives such as the ERA-nets, Joint Technology Initiatives, etc. Some ERA-nets execute, in an experimental manner, joint calls for collaborative R&D projects, calls with specific objectives and restricted financing in which each participating country finances its own centres’ participation. In these cases, the Spanish projects are granted by a Complementary Actions call for proposals. The information on ERA-nets is sparse and much dispersed because the Spanish participation is spread amongst all kinds of research organisations and governmental institutions on a national and regional level and no information is systematically gathered on a central level. Spain gives intensive support to the Joint Programming and in several fields –such as health science- Spanish Researchers are collaborating. The new LCTI includes several elements for a partial solution to the legal barriers for joint programming and access to research infrastructures (Art. 44 and additional provision 17). Spain considers the Joint Technology Initiatives as an important EU policy and participates in all JTIs. Spain also has an active role in the article 169 initiatives; also in this case they

⁴⁹ The previous strategy E2i-Strategy (2009) - and the [new Law on Sustainable Economy](#) (March 2011) included a focus on sustainable development and societal challenges such as clean energy and biotechnology.

⁵⁰ It includes 8 specific objectives: (1) Health, demographic change and welfare; (2) Bio economy; security and food quality, sustainable agriculture production and natural resources sustainability; (3) Energy, security and green energy efficiency; (4) Smart, sustainable and integrated transport; (5) Climate change, efficiency in the use of resources and raw materials; (6) Innovation and social change; (7) Digital economy and society; (8) Security, liberty and rights protection.

participate in all initiatives (Based on a statement by the Ministry of Science and Innovation in 2009).

4.4 Maximising social and territorial cohesion

The smart specialisation strategy is gaining importance in the Spanish R&D and innovation system. The new Spanish Strategy for Science, Technology and Innovation (EESTI) (2013-2020) includes the concept in one of its 6-priority axes (Priority 5) as the tool for increasing the competitiveness of the regional systems of Innovation. The Spanish State Plan for Scientific and Technical Research and Innovation (PECTI) (2013-2016) also mentions this concept. However, these documents do not clearly specify if it will be a national, regional or a shared competence. The [Network of Public Policies for R&D and Innovation \(REDIDI\)](#) aims to create synergies between R & D policy at regional and national level ensuring their connectedness to the European Regional Policy and the "Europe 2020" Strategy. This articulation process will foster a stronger coordination between national and regional R&D policies a crucial element for improving the overall system performance

Regions are currently developing their strategies for smart specialization. The National Reform Programme 2013 indicates that these will be finished by the end of the year. All regions "Comunidades Autónomas" (CAs) have registered for the Smart Specialisation Platform (S³P). Three of them have peer review S³P (Aragon, Castile and Leon and the Basque Country).

Priorities for future areas of specialisation appear not to be identified yet at national level. The national Strategy (EESTI) does not specify them. The national strategies and plans are defined through instrumental priorities rather than through thematic priorities. This could make the prioritising process more difficult (Heijs and di Anselmo, 2013). It is also difficult to assess the process of identification of priorities as RIS³ strategies at regional level are in the process of being developed. It is also difficult to determine if a comprehensive analysis of the innovation landscape - including a Strengths Weaknesses Opportunities and Threats (SWOT) analysis - has been taken into consideration when designing the national and regional RIS³ strategies. Some regions appear to have carried out this type of analysis to develop their RIS³ strategies (see regional presentations in RIS³ platform) (see section 2.7).

The Information System of Science, Technology and Innovation (SICTI) introduced by the new Law LCTI (2011) aimed at improving national and regional coordination in gathering data. This system could offer a mechanism to adequately monitoring and evaluating RIS³ strategies. However, as Heijs and di Anselmo (2013) indicates some indicators are not available at regional level, which makes the designing, monitoring and evaluation process of RIS³ strategies more complicated. The Network of Public Policies for R&D and Innovation ([REDIDI](#)) has a role in disseminating and coordinating national and regional RIS³ strategies. REDIDI has created a document with [examples of RIS³ indicators](#) and data sources.

4.5 International Scientific Cooperation

The new Plan EESTI (2013-2016) follows previous efforts⁵¹ and encourages the internationalisation of the research system. It recognises that the lack of international mobility

⁵¹ The National Plan included a IWL devoted to the "Articulation and Internationalisation of the system" where projects directed towards the creation of networks and linkages are included. This IWL represents the 21.5% of the total funds. This IWL includes the Redes and Public-private Cooperation Np: Redes aims to help technological

and the reduced capacity of to attract researchers with foreign experience to Spanish research centres are still important challenges of the Spanish research system (PECTI: 8). The new strategy EESTI (2013-2020) identified as one of the challenges of the system the “Low internationalisation of R&D actors (specially firms) (n° 13). The 2013 working plan of the PECTI includes internationalisation objectives in the “Promotion of excellence” programme – Sub-programme of Institutional empowerment (€206.8m) and in the “Promotion of R&D and innovation towards societal challenges” Programme (e.g. Europe Networks -€2.5m) for research and in the sub-programme “Private R&D and Innovation” (e.g. “CDTI INTERNACIONALIZA” projects - €2m) for the internationalisation of firms (MINECO, 2013). In addition, the new calls for “Europe Managers”, “Europe Researchers” and “EMPLEA” all devoted to promote R&D management (MINECO, 2013) might increase the Spanish participation in international calls.

Spain appears to have a quite open strategy regarding cross-border access to policy programmes, especially the ones regarding human resources. The programmes for human resources are open to all EU nationals. In addition, tenders for R&D projects are accessible to foreign firms operating in Spain. Portability of grants is more limited. Most of the grants targeting researchers require an agreement between the researcher and the host institution. If the researcher wants to perform the research in a different institution, the host institution has to allow it. Committees can mediate if there is a disagreement between the researcher and the host institution. One of the main components of the international scope of the Spanish PN (2008-2011) was the opening up of the programmes to R&D groups from other countries (EW, 2011). However, in most cases research grants are not portable and a researcher awarded with a research grant is not normally allowed to transfer it to another foreign institution.

The Entrepreneurship and Internationalisation Support Act (Law 14/2013) was published on the 27th September 2013. The measures to boost internationalisation include a new system of visas and residence permits to attract talent and investment from abroad and a Spanish strategy for internationalisation. Permits will be granted to investors in public debt (higher than 2 million Euros) and Spanish firms and banks, housing investment (higher than 5000,000) and to the ones that start business in Spain. There is not information yet regarding the type of investment that these residence permits is really boosting.

The economic crisis has worsened the funding (see section 2.2) for R&D and Innovation and labour market for researchers (see 4.1). Therefore, the attractiveness of the country as a destination for research and innovation appears to have declined over the last years.

platforms and clusters to improve cooperation with two main instruments: AEI and INNFLUYE focused respectively on clusters and technologic platforms. The Np of “Public-private Cooperation” distributed in 2011 €654m 91% of the IWL (FECYT, 2012). It had two main instruments: INNFACTO aims at facilitate knowledge transfer and innovative R&D. Projects are aim towards creating innovative firm, encourage innovation in existing firms and improve the technological balance of the country. It distributed the 84.2% of the funds programme (21.3% subsidies). INNPRONTA focused on big projects of strategic industrial research (32.2% of subsidies) (FECYT, 2012).

5 NATIONAL PROGRESS TOWARDS REALISATION OF ERA

Spanish policy framework was generally moving towards a better alignment with the ERA communication objectives. However, the severe public budget cuts for R&D and innovation appear to have negatively affected this positive trend.

5.1 More effective national research systems

Spain has increased research competition (e.g. funds are increasingly allocated through competitive mechanisms), but at the same time has significantly decreased its investment in research. Competitive project-based funding has gained importance within the Spanish R&D and innovation system (see section 2.2). However, research institutions have a low level of autonomy to allocate funds, which discourages organisational change. The assessment of the quality of research-performing organisations and teams and their outputs is not the basis for institutional funding decisions. In addition, budget cuts appear to be applied without considering the efficiency of policy initiatives and research institutions (see section 2.3 and 3.3). Due to the low level of institutional funding autonomy, it could be said that EU policy has had a positive role in this changing trend towards an increasing competitive funding. However, it has to be noted that the need of a more flexible and competitive system for the management of funds and human resources is a constant demand of the research community (see section 2.3).

As mentioned and recognising that it has improved, the research policy evaluation culture could be considered as moderately developed. Some authors consider that the R&D policy evaluations are still not a systematic activity (Heijs and Martinez, 2011; Eparvier, 2009). Strategies and plans are increasingly based on some evaluation analysis. Under the mandate of the MINECO, the FECYT carried out yearly evaluations of the R&D public calls for proposals from 2006-2010 (see section 2.6 and 3.3). Currently, the Ministry has decided to carry out evaluations with a longer time frame and decision about methodology and scope are ongoing.⁵² The CDTI evaluates most of the business-oriented instruments, but there were not publicly available reports on 2012 at the time of writing this report. Allocation of competitive funds usually follows a peer evaluation process of the proposal, but domestic experts usually do these. International peer evaluation is less frequent and budget cuts could also affect this making international peer evaluation less frequent. The new strategy EESTI (2013-2020) includes international evaluation of competitive funding as one of its 5 basic principles (number 3). In addition, one of its 6 articulation mechanisms (number 5) considers the “harmonisation of criteria and practices of evaluation –ex ante and ex post–”, including international peer review. The new PECTI (2013-2016), as it implements the Strategy, also aims at increasing the role of competitive funding and “international peer review”. Most of the funds will be allocated through competitive mechanisms. The role of “international peer review” is specifically mentioned in several programmes (e.g. Basic R&D, Human Resources for R&D and Research Infrastructures).

⁵² Currently, [a group of experts from the European Commission is carrying out an evaluation of the Spanish R&D and innovation system.](#)

On this regard, the “Severo Ochoa” sub-programme could also be mentioned as it supports excellent research centres and groups. This sub-programme was launched in 2011 within the framework of the NP (2008-2011). It is aimed at existing centres and units that perform cutting-edge basic research and are among the world's best in their respective areas. The impact and international scientific leadership of these centers and units is essential for their recognition. Accreditation as a “Severo Ochoa Centre or Unit of Excellence” is valid for four years and includes a grant of one million Euros per year during this period.

5.2 Optimal transnational co-operation and competition

The solution to major societal challenges is receiving growing attention in the Spanish R&D and innovation policies. The EESTI (2013-2020) and new Plan of Scientific and Technical Research and Innovation (PECTI) (2013-2016) follow the efforts of previous measures (see section 4.3). Considerable efforts have been made to facilitate the convergence of national and regional research agendas (e.g. smart specialisation and EESTI). These could facilitate future synergies between national and international programmes. However, ex-post evaluation is not a common practice and the portability of grants is limited — either institutionally or internationally (see section 2.6 and 4.5).

Spain considers the European Strategic Forum for Research Infrastructures (ESFRI) to be an important initiative and contributes significantly to a broad range of pan-European research infrastructures (see section 4.1). Spain contributes significantly to a broad range of these facilities and tries to participate in 25 of the 44 European RIs to enhance its percentage of return on that participation. It also promotes the role of Spanish industry in building and maintaining those infrastructures. In Spain at least three large ESFRI installations will be located.⁵³ Due to its traditional relationship with Latin America Spain has several cooperation programmes with this region. One of the most outstanding ones is the “Iber-American Programme of Science and Technology for Development”. Moreover the Spanish government has several general bilateral cooperation agreements with countries outside Europe (such as Canada, China, India Korea, USA and Japan). As mentioned, the LCTI includes several elements for a partial solution to the legal barriers to access to research infrastructures (additional provision 17). The EESTI considers the “sustainability and use of scientific and technological infrastructures” as one of its specific objectives (sub-objective 2). And the PECTI follows the strategy and devotes to research infrastructures one of its sub-programmes (number 4). However, budget cuts for R&D are causing a delay in the payment of the country’s financial contribution to some international research infrastructures (e.g. CERN and ESF). Spain has reduced its voluntary participation in the ESA by 75% and it is not clear if its participation in the European Extremely Large Telescope (E-ELT).

⁵³ The first one is the construction in Catalonia of one of the five supercomputers in Europe of the Partnership for Advanced Computing. The second one is the solar research infrastructure (EU-SOLARIS) at the Advanced Technological Centre for Renewable Energy in Almeria. And thirdly, the European Spallation Source (ESS) in the Basque Country is an advanced centre for researching the atomic and molecular arrangement for materials.

5.3 An open labour market for researchers

Policy measures to address the lack of transparent, open and merit-based recruitment are much needed (see section 3 and 4.1). Budget cuts result especially harmful for young mobile researchers. In a research market with high levels of endogamy, prominent young researchers with international experience find it difficult to access to research positions. Although some policy measures have been implemented to encourage intersectoral mobility, mobility between industry and academia appears to be very low. Previous job experience in industry or abroad is generally not recognised when accessing to a research position.

Spain has a large number of instruments to foster Human Resources in science and innovation, including the mobility of such resources. Research mobility (inwards and outwards) and the training of researchers are encouraged through a wide range of national and regional programmes. However, effective policy measures to address the lack of transparent, open and merit-based recruitment are much needed, as there is a high level of “endogamy” (Cruz-Castro and Sanz-Menendez, 2011; Cruz-Castro et al., 2006). Preparing a career as a researcher in Spain is a difficult, time-consuming process with low salaries and unstable short-term contracts (see section 4.1). The recruitment process for researchers in the Spanish R&D system is formally open, but tacit mechanisms favour “insiders” (students or researchers from the same university, faculty, or even the same department). The increasing competition of the research system and some measures (e.g. accreditation) appears to have formally and informally opened the system. The LCTI (1st June 2011) has introduced some important changes in the human resources for R&D, to improve mobility between sectors and to improve access to a research career (see section 4.1 and Annex 4). However, some criticism exists regarding the scope of these measures. The research community was expecting the law to implement a “tenure-track” contract to facilitate access by young researchers to a permanent research position. However, it appears that the “access contract” does not meet this requirement, being another type of contract that does not improve the precarious situation of young researchers in Spain. A flexible and competitive system for the management of human resources is a constant demand of the research community (see section 2.5). Budget cuts result especially harmful for young mobile researchers. In a research market with high levels of endogamy prominent young researchers with international experience find it difficult to access to research positions (see section 4.1).⁵⁴

Spain appears to have a quite open strategy regarding cross-border access to policy programmes, especially the ones regarding human resources. The programmes for human resources are open to all EU nationals (see section 4.5). In addition, tenders for R&D projects are accessible to foreign firms operating in Spain. Portability of grants is more limited. Most of the grants targeting researchers require an agreement between the researcher and the host institution. If the researcher wants to perform the research in a different institution, the host institution has to allow it. The new Plan EESTI (2013-2016) follows the previous plan and encourages the internationalisation of the research system. It recognises that the lack of international mobility and the reduced capacity of to attract researchers with foreign experience to Spanish research centres are still important challenges of the Spanish research system (PECTI: 8).

Recent policy measures aimed at implement some elements of the Innovative Doctoral Training (e.g. Campus of International Excellence or Severo Ochoa programmes) (see section 4.1). Only a few doctoral programmes exist in collaboration with foreign universities and the introduction of

⁵⁴ In addition, some regulatory measures to correct the public deficit (e.g. Royal Decree-Law 20/2011) have limited staff recruitment and the filling of positions left vacant by retirees.

English as a spoken language in PhD courses is still in an early stage. Interdisciplinary research options are recognised by the LCTI and the EESTI, but they mainly refer to the mobility of researchers. Education curricula did not frequently include transferable skills training. However, the Bologna Process is helping to include this aspect, at least formally, in the educational plans of universities. The National Agency for the Evaluation and Accreditation (ANECA) evaluates and recognises the quality of PhD programmes. It grants PhD programmes with a “[Mention of Excellence](#)” when they comply with certain criteria of quality.

LCTI and the EESTI follow the Charter & Code for researchers. More than 70 Spanish universities have subscribed to the European Charter for Researchers ([Euraxess](#) access 15.10.2013) and four institutions have acknowledged the HRS4R ([Euraxess](#): access 15.10.2013). Spanish government requires all universities that present applications to obtain public support from tenders for Human Resources to accept and comply with the Charter. Where all universities obtained public support, it could be said that implicitly all universities subscribed to the charter.

5.4 Gender equality and gender mainstreaming in research

Gender considerations are being incorporated into policy making. The new Law of Science, Technology and Innovation (LCTI 2011) mentions gender issues and the EESTI includes them as one of its 5 principles. However, legal and other barriers to the recruitment, retention and career progression of female researchers appear to exist, especially at high level. Gender imbalance in decision-making process is being increasingly considered, but gender dimension in research programmes appear to be less frequent. Research institutions rarely conduct impact assessments of practices to identify gender biases. Therefore, strategies to correct them are still not frequent.

The previous government specially promoted policies for the promotion of women. Spain had (from April 2008 till October 2010) a Ministry of Equality and each law presented in the parliament required an impact report about the effects on gender aspects.⁵⁵ The [Strategic Plan on equal opportunities \(2008-2011\)](#) includes gender issues in research. The proportion of female researchers in Spain is higher than the one of the EU-27, 38% against 33% for 2009 (EC, 2013c). The proportion of male scientists and engineers in the total labour force in Spain is higher than the proportion of women (2.5 against 2.1 for 2010), but gender differences are lower than the ones of the EU-27 average (3.65 against 1.75) (EC, 2013c). However, gender differences appear to remain at high level. The share of female grade “A” (the highest) staff among female academic staff is still one of the lowest in Europe. In 2010, 3% of women working in the academic sector were at grade A, while this figure was 13% for men. At EU-27 level, 7% of women and 17% of men were at grade A level (EC, 2013c). Therefore, discrimination against women in the labour market still exists and the gender gap is not closing as rapidly as it could be desired (EC, 2007; UMYC, 2011). Some data show clear discrimination and difficulties for women to enter the research system. A survey showed that men are more successful in obtaining the stable and better paid jobs (Villaroya et al., 2007). Despite the fact that females obtain better evaluation during their university studies, they are less successful when they apply to obtain pre or post-doctoral scholarships (Villaroya et al., 2007 and UMYC, 2011).

⁵⁵ The Ministry aimed at promoting social policies on gender included in the [Law for the Equality \(3/2007\)](#) and in the [Law Against Gender Violence \(1/2004\)](#) and other social programmes of the [Institute for women](#).

The new Law LCTI improves several aspects in the career of the researchers. The future replacement of the 2+2 system (two years scholarship and then a two year contract) by a four-year employment contract implies the full recognition of certain rights such as unemployment benefits and maternity leave. From 2006 to 2011, most contracts and scholarships included career breaks based on parental leave. However, maternity leave still has negative effects on the career of a researcher because: (1) until recently, some scholarships did not pay social security in the first two years; (2) once the women obtain a contract it was necessary to reach the minimum time span of social security contributions to have the right to maternity leave (approximately 180 days); (3) the lack of formal contracts (including researchers required to be self-employed for working at some universities) entails female researchers losing several rights in comparison with other mothers⁵⁶ and (4) the 4 months of maternity leave is not always compensated for with a four months extension of the contract (Villaroya et al., 2007). The UMYC study showed that having children is still one of the main obstacles for the productivity and promotion for women in science.

The LCTI and other policy measures (e.g. EESTI and PECTI) have included important positive changes regarding gender equality and gender mainstreaming in research. The new LCTI also addresses the issue of gender imbalances in decision-making process and encourage institutional changes on gender. First point of the 13th additional provision establishes that “all the institutions and committees regulated by the law, as well as, all the evaluation and selection committees of the Spanish R&D and Innovation system should follow the gender balance principle established by the Law 3/2007, 22 March.” This implies that any sex will account for neither more than 60% nor less than 40% of the total. The new LCTI also aims at encouraging the gender dimension in research programmes (second point of 13th additional provision⁵⁷). Following the LCTI the EESTI includes “gender equality” and “gender dimension in research” as one of its 5 basic principles (principle 5). In the same way, the PECTI mentions these issues (see page 28) as a horizontal measure. However, there is not a specific programme to tackle these issues. In addition, the list of indicators to measure progress does not include any indicator to measure gender balance. Therefore, the Plan appears to be quite vague in the application of “gender equality” and “gender dimension in research” established by the law. The LCTI also encourage the change on gender, including funding agencies, research organisation and universities. In particular the sixth point of the 13th additional provision establishes that “Public Research Bodies should adopt within 2 years “gender balance Plans” that will be yearly monitored. These plans should include measures to award institutions that improve their gender balance indicators.” Access to 14 university plans on gender equality could be access from the following [link](#). The elaboration of plans on gender equality in firms and other institutions is supported by the Ministry of Health, Social Security and Equality (before Ministry of Equality) since 2009.⁵⁸

National and regional Institutes for women have developed important work for the promotion of gender equality and gender dimension (including research programmes) (see, for example, [Institute for women](#) created in 1988).

⁵⁶ Some regions (“Comunidades Autónomas”) provide some benefits (e.g. access to kindergarden) or financial state deductions for young children.

⁵⁷ It establishes that the EESTI and PECTI should “include the gender dimension in research programmes in all the process, including definition of priorities in research, research problems, theoretical frameworks, methods, collection and interpretation of data, conclusions, technological development and future research. They should also encourage studies with a gender perspective and the analysis of the situation of women and promote and increase recognition of female researchers in research groups.”

⁵⁸ http://www.msssi.gob.es/ssi/igualdadOportunidades/iEmpleo/Planes_de_Igualdad/conv_pdi.htm

5.5 Optimal circulation, access to and transfer of scientific knowledge including via digital ERA

Some policies and institutional measures to define and coordinate access to and preservation of scientific information have been implemented. The new law (LCTI) (e.g. art 37 on open access), the new strategy EESTI (2013-2020) (e.g. articulation mechanism number 2) and the new plan PECTI (2013-2016) (e.g. sub-programme AEESD2.2) could be considered the most important policy actions. Other specific initiatives are also important, the Spanish Foundation for Science and Technology (FECYT) facilitates access to researchers working at national research organisations to bibliographic research information (Web of Knowledge and Scopus). It is worth mentioning the national joint programme [RECOLECTA](#)⁵⁹. At regional and institutional level, purchases by consortia of university libraries are common. RECOLECTA provides access to search for documents stored in the 58 institutional repositories. Several regional regulations promote the access to open repositories with peer-reviewed scientific articles (e.g. Asturias and Madrid). At institutional level, 21 Spanish research institutions have signed the Berlin Declaration ([OpenAire](#): Spain). It is also worth mentioning other initiatives, such as, [Alhambra Declaration](#)⁶⁰, [Latindex](#) and [Dialnet](#).⁶¹ Open access measures for publications and data resulting from publicly funded research were less frequent. However, as mentioned, the PECTI has implemented the LCTI by requiring researchers to make publicly available their databases for the first time in its calls for 2013 (e.g. Promotion of R&D and innovation towards societal challenges) (see 4.2 for more details).

As mentioned, the LCTI (2011) has improved several aspects regarding Intellectual Property Rights and knowledge transfer, the new Law LCTI has changed the regulation of the ownership of Intellectual Property Right produced by the staff of university of public research bodies to allow researcher to profit from their patent earnings, modifying the previous Law of Sustainable Economy (Law 2/2011). The LCTI has also introduced other changes to improve the mechanisms of knowledge transfer: (1) increasing the value of transfer activities (e.g. by detecting research groups whose knowledge could be applied or by increasing the role of OTRIs) (2) promoting the “units of excellence” (art. 33.1) or (3) developing an open-access archive with research results. It encourages the creation of Technology Based Enterprises (EBTs) by allowing researchers to work part-time in private firms created by the organisations in which they are working and by eliminating restrictions on the maximum share ownership of a private company (10%) and the restrictions on being a board member in private companies.

⁵⁹ It is a national joint programme of the Spanish Foundation for Science and Technology (FECYT) and the Spanish Public Universities and Research Libraries Network (REBIUN) to create a nationwide e-infrastructure of Open Access scientific for repositories in Spain. and its integration with international repositories. It is currently working in also includes a statistics module to enable the measurement of visits and document downloads from the national open science repositories. facilitate comparable data — compliant with the Knowledge Exchange Statistics Module guidelines. .

⁶⁰ It was signed on May 2010 by a group of open access’ stakeholders (e.g. editors, librarians, funding agencies, university rectors and authors) from the South European countries (Spain, Portugal, France, Italy, Greece and Turkey), whose main languages are different from English, to promote open access to scientific productions

⁶¹ It aims at collecting and facilitating access to research publications done in Spanish and Portuguese speaking countries.

Annex 1. PERFORMANCE OF THE NATIONAL AND REGIONAL RESEARCH AND INNOVATION SYSTEM

Feature	Assessment	Latest developments
<p>1. Importance of the research and innovation policy</p>	<p>(-) Policy governance had been complex and fragmented, with a consequent lack of coordination in policy design and implementation (see next feature)</p> <p>(+) The solution to the major societal challenges is receiving growing attention in Spanish R&D and innovation policies.</p> <p>(-) Decreasing funds for R&D and innovation</p> <p>(-) New lower R&D intensity target of 2% has been set</p>	<p>(+) Research and innovation policies are moving towards a better integration as previously separated research and innovation national strategies and plans have been merged into single documents (EESTI 2013-2020 and PECTI 2013-2016).</p> <p>(+) The EESTI (2013-2020) and PECTI (2013-16) follow the efforts of previous measures and increase their focus on the promotion of R&D and innovation on societal challenges (see section 4). EESTI includes it as one of its four general objectives.</p> <p>(-) The important decreasing trend in R&D and innovation investments threaten the sustainability of the R&D and innovation system</p> <p>(-) New Spanish Strategy for Science, Technology and Innovation (EESTI) (2013-2020) has recently set a new lower target of 2% GERD per GDP for 2020. This target has been ratified by the National Reform Programme (2013)</p>
<p>2. Design and implementation of research and innovation policies</p>	<p>(+) There is a multi-annual STI framework in place aiming at providing a long-term policy context to prioritise expenditure on STI. New instruments have been designed to improve the role of different stakeholders (e.g. new LCII, 2011).</p> <p>(-) Lack of coordination between national and regional STI policies</p> <p>(+) Increasing alignment of national and regional policies with the European ones</p> <p>(-) R&D policy evaluations are still</p>	<p>(-) This framework didn't guarantee a predictable policy and budgetary framework during the crisis. Some measures and instruments envisaged have not yet been implemented (e.g. Spanish Research Agency)</p> <p>(-) Important budget cuts in R&D funding appears to be applied without a previous analysis on strengths and weaknesses, showing a lack of prioritisation.</p> <p>(+) Improved National and Regional coordination could be expected as the new law LCII (2011) has included several mechanisms to address this recognised challenge. Specially, the Council of Science, Technology and Innovation (CPCII) and the Information System of Science, Technology and Innovation (SICTI).</p> <p>(+) New policy measures (new law LCII, new strategy EESTI and new plan PECTI) continue previous efforts towards an increasing alignment with the European policies.</p> <p>(-) New lower R&D intensity target has been set by the new strategy EESTI 2013-2020 and ratified by NRP (2013)</p> <p>(+) Policies for Smart specialisation have been encouraged could also help to improve integration between national and regional strategies and increased alignment with European policies</p>

	not a systematic activity (Heijs and Martínez, 2011)	(+/-) The Spanish Observatory of R&D (ICONO) has implemented a web platform of indicators with increasing number of indicators available at national and regional. However, indicators chosen to monitor the new strategy and plan are still general (Modrego et al., 2012b)
3. Innovation policy	<p>(+) The role of innovation is increasingly important in the R&D and innovation system</p> <p>(-) Supply and demand-side policies appear to be not developed in a consistent manner</p>	<p>(+) This trend can be seen through the objectives of the strategies and plans, new initiatives, instruments and budget allocation. For example, Research and innovation strategies and plans have been merged (EESTI 2103-2020 and PECTI 2013-2016), increasing number of initiatives promoting innovation and increasing budget allocated through credits.</p> <p>(-) Lack of execution of the budget for public expenditure by the central government on R&D and innovation (in the period 2009-2011, between 21% and 45%) indicate that supply and demand-side policies are not developed in a consistent manner.</p> <p>(-) The high levels of unemployment indicate that a better match between education and training supply and employment needs should be aimed</p>
4. Intensity and predictability of the public investment in research and innovation	<p>(-) The existence of multi-annual plans in education, research and innovation haven't ensured the predictability and long-term impact of public investments.</p> <p>(+) Public funding is increasingly aimed at leveraging greater private sector investment</p> <p>(+) Innovative financing solutions, such as, public-private partnership and the use of tax incentives have been explored and adopted.</p>	<p>(-) The sharp decline in public R&D and innovation investments indicate the weakness of the R&D and innovation system. For example, in 2013 the total budget for public expenditures by the central government on R&D and innovation has returned to levels of 2005-2006.</p> <p>(+/-) There is an increase number of policy instruments implemented aimed at leveraging greater private sector investment (e.g. Tax credits, patent box). However, the non execution of an important part of the budget of central government for R&D (in the period 2009-2011, between 21% and 45%) indicate that the demand for some of these innovation policies an instruments was not properly considered.</p> <p>(+/-) The effectiveness of these innovative financing solutions is difficult to assess as there is not publicly available evaluations of projects, such as, INNPRONTA or INNPACTO (public-private partnerships). Tax incentives are very generous, but deductions require to handle with a highly bureaucratic procedure. The diminishing total deductions for R&D could indicate that the implementation of this mechanism could be improved.</p>
5. Excellence as a key criterion for research and education policy	<p>(+) Research funding is increasingly allocated through a competitive basis</p> <p>(+) Institutes and projects are increasingly evaluated on the basis of internationally recognized criteria</p> <p>(-) The level of autonomy of education and research institutes is very low (specially for managing human</p>	<p>(+) The new plan PECTI (2013-2016) clearly states that most of the funds will be distributed through competitive funding mechanisms.</p> <p>(-) Budget cuts could affect the evaluating practises. Specially in the case of Institutes. Results of evaluations are usually used for allocating funding to projects. However, these evaluations are not usually used for allocating funding to institutes.</p> <p>(-) Low levels of autonomy might have been prevented institutes for finding more innovative, strategic and performance based solutions to implement budget cuts. The centralised management of the CSIC budgetary crisis might be a counterexample. The dual and rigid market for researchers (public functionaries vs temporary researchers) and the lack of implementation of extraordinary measures is making young mobile researchers to specially suffer the consequences of the crisis. For example, the CSIC has reduced in the last years its employees by a -10.4% (17.9% non-public functionaries and 1.4% functionaries), its training contracts by -85% (JAE) and their grant holders by -29.6% (see section 4.1)</p>

	<p>resources-public functionaries), which discourages the use of open recruitment methods and explore alternative sources of funding</p> <p>(-) Legal, financial and social framework for research careers are limited and do not offer attractive conditions specially for young mobile researchers and females in comparison to international standards</p>	<p>(+) Research institutions have reinforced their demand to improve the management of resources, especially human resources (see section 2.5).</p> <p>(+/-) The new law LCTI (2011) has introduced some important changes in the human resources for R&D, to improve mobility between sectors and to improve access to a research career (see section 4). However, some criticism exists regarding the scope of these measures as the “access contract” appears to be limited to facilitate the access by young researchers to a permanent research position and to improve the precarious situation of young and mobile researchers.</p> <p>(-) Budget cuts have also affected programmes for Human Resources as some of them have been delayed (e.g. Ramón y Cajal 2012, Juan de la Cierva 2012, PTA 2012 and Torres Quevedo 2012), cancelled (e.g. Jae-doc 2012 and other regional programmes). Budget cuts result especially harmful for young mobile researchers. some regulatory measures to correct the public deficit (e.g. Royal Decree-Law 20/2011) have limited staff recruitment and the filling of positions left vacant by retirees. Female researchers might also suffer as the proportion of females under temporary contracts is higher.</p>
6. Education and training systems	<p>(+) The level of supply of graduates is above the EU average (Percentage population aged 30-34 having completed tertiary education)</p> <p>(+) Education and training curricula is increasingly focus on equipping people with the capacity to learn and develop transversal competences, such as, critical thinking, problem solving, creativity. The Bologna process help this process to develop.</p> <p>(-) Entrepreneurship education and training was not widely available nor included in curricula. With some exceptions, partnership between formal education and other sectors were not actively promoted to that end.</p>	<p>(-) The high levels of unemployment (especially among youngsters) indicate that a better match between education and training supply and employment needs should be aimed</p> <p>(-) Budget cuts in education could negatively the implementation of innovative education and training curricula.</p> <p>(+)The Entrepreneurship and Internationalisation Support Act (Law 14/2013) was published on the 27th September 2013 and includes measures to promote entrepreneurship (promotion of training) and facilitate finance to the creation of new business (see section 2.4)</p>
7. Partnerships between higher education institutes, research centres and businesses, at regional, national and international level	<p>(+) Policies and instruments such as innovation/knowledge clustrers, are in place to encourage co-operation and</p>	<p>(+) The Spanish government has tried to strengthen the science-industry relationships by fostering during the last decade: public private cooperation; the creation of clusters; technology parks and technology centres; Knowledge Transfer Offices; and the promotion of spin-offs.</p>

	<p>knowledge sharing and at creating and more favourable business environment for SMEs.</p> <p>(+/-) Mobility between public and private organisations appears to be low, but policy measures have adopted to facilitate it, changing also intellectual property rights (IPRs) to facilitate knowledge transfer</p> <p>(-) Lack of entrepreneurial and university-industry culture (COTEC, 2012) are challenges that hinder the knowledge transfer between public and private sectors</p>	<p>The new Law, strategy and plan (LCTI, EESTI and PECTI) are again the most important new initiatives at national level and follow previous measures (e.g. INGENIO, e2i) to encourage knowledge transfer.</p> <p>The new Law LCTI has also introduced other changes to improve the mechanisms of knowledge transfer (in addition to the facilitation of changes in patent earnings): (1) increasing the value of transfer activities (e.g. by detecting research groups whose knowledge could be applied or by increasing the role of OTRIs) (2) promoting the “units of excellence” (art. 33.1) or (3) developing an open-access archive with research results. It encourages the creation of Technology Based Enterprises (EBTs) by allowing researchers to work part-time in private firms created by the organisations in which they are working and by eliminating restrictions on the maximum share ownership of a private company (10%) and the restrictions on being a board member in private companies</p> <p>(+) Spain has recently designed a large number of support schemes to foster public-private cooperation in R&D and innovation. These programmes aim to improve a level of public-private collaboration that has been considered low (OECD, 2006; COTEC, 2012). A specific National Programme (Np) on public-private cooperation has been designed to increase this cooperation. This programme is included in the Instrumental Working Line (IWL) “Articulation and internalisation of the system” of the Spanish National Plan for R&D and innovation (NP). In 2011, the Np on “Public-private Cooperation” distributed had two instruments: INNFACTO and INNPRONTA (FECYT, 2012). Some relevant sub-programmes in this action are : INNCORPORA (including Torres Quevedo programme); INNPLANTA (Technology parks); INNOCIDE (Knowledge Transfer Offices); NEOTEC (New Technology Based firms); Innovative Companies Associations and Clusters (AEI) Programme; INFLUYE (Technology platforms); INPRONTA (before CENIT); INNFACTO (public-private partnerships)</p> <p>In recent years Spain has launched broad institutional measures to facilitate public private cooperation (see Commitment 21: Knowledge Transfer). For example, the creation of a large number of Science and Technology parks in cooperation with universities and other research organisation. The INNPRONTA programme requires Public Private partnerships. These follow efforts of previous programmes, such as, the National Strategic Consortia for Technical Research (CENIT) that funded large long-term projects based on public private cooperation</p> <p>(+) The LCTI (2011) improves mobility between private and public organisations by allowing an extended leave for a maximum of 5 years and reducing partially the incompatibility for working in private firms. It has changed the Intellectual Property Rights (IPRs), allowing allow researchers to profit from their patent earnings. The National Reform Programme 2013 also aims at improving the protection of intellectual property rights through a reform of the Codified Text on the Law on Intellectual Property.</p> <p>(+) The Entrepreneurship and Internationalisation Support Act (Law 14/2013) includes measures to promote the investment in Venture Capital Funds</p>
<p>8. Framework conditions promote business investment in R&D, entrepreneurship and</p>	<p>(-) Policies to promote innovation, entrepreneurship and enhance the quality of</p>	<p>(+) The Entrepreneurship and Internationalisation Support Act (Law 14/2013) includes measures to promote entrepreneurship and the investment in Venture Capital Funds</p>

<p>innovation</p>	<p>the business environment are not really closely interconnected. There is a lack of entrepreneurial and university-industry culture (COTEC, 2012; 2013), hindering the knowledge transfer process</p> <p>(+) Venture capital is receiving increasingly policy attention (e.g. new strategy EESTI 2013-2020 follows previous efforts.</p> <p>(-/+) The process for starting up and running a business was not in line with other European countries. Spain occupied the 44 position in world rank of easiness in doing business, but has slightly reduce its distance from 2009 to 2012 with the 10 EU-27 best economies (Doingbusiness, 2013) Willingness to take a risk and no discrimination against fist time entrepreneurs could be considered low as the was a lack of entrepreneurial culture (COTEC, 2012)</p> <p>(-/+) The level of patenting is low compared to the EU average (in patents application per billion GDP (in PPS€), 1.43 against 3.9 in 2009) ,which could indicate the system for the protection of intellectual property in place could be improved and that the market for innovative products and services is not kept constantly up to date. But policy changes are being implemented (LCTI, NRP, 2013)</p>	<p>(-) Decreasing investments in risk capital The investments in risk capital including seed capital, start-up funds and funding for other stages of the business creation was in 2012 €1,470.2m and represents 0.009% of the Spanish GDP. This has decrease significantly since 2010 (€2,479.7m) by -20.4% in 2011 and by -25.5 in 2012. In Spain there were about 54 networks and groups of Business Angels in 2009 (OECD, STI Scoreboard 2011, from FECYT).</p> <p>(+) The Entrepreneurship and Internationalisation Support Act (Law 14/2013) was published on the 27th September 2013 and includes measures to promote entrepreneurship (promotion of training) and facilitate finance to the creation of new business (see section 2.4)</p> <p>(+) The new Law LCTI has changed the regulation of the ownership of Intellectual Property Right produces by the staff of university of public research bodies. It modifies the previous Law of Sustainable Economy (Law 2/2011) to allow researchers to profit from their patent earnings. The National Reform Programme 2013 aims at improving the protection of intellectual property rights through a reform of the Codified Text on the Law on Intellectual Property.</p>
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<p>9. Public support to research and innovation in businesses is simple, easy to access, and high quality</p>	<p>(+/-) Different strategies and plans for R&D and innovation have been trying to address the governance challenges of the R&D system (OECD, 2006) by, among other things reducing the number of objectives and support schemes. However, as the EESTI 2013-2020 these challenge remain. The consistency with the support available at EU level have been also increasingly encouraged</p> <p>(+/-) National funding is increasingly allocated through international evaluation procedures and encourages transnational cooperation (e.g. EESTI). Important research calls have been delayed or cancelled making the access to finance for research difficult, especially for young researchers.</p> <p>(+) Innovation and funding for private R&D innovation has been increasingly encouraged through divers policy instruments. The new strategy EESTI (2013-2020) and plan PECTI (2013-2016) follow the efforts of previous plans and strategies (e.g. INGENIO 2010, National Plan for R&D (2008-2011) and the e2i) encouraging the creation of NTBFs and university spin-offs and risk capital. Facilitating support for young innovative companies.</p>	<p>(-) The budget cuts could have required a more limited, well targeted and clearly differentiated support schemes (Modrego, et al., 2012b)</p> <p>(-) Several important national, regional and institutional calls were delayed or cancelled during the last two years, some programmes suffered delays (e.g. call for proposals of the R&D plan on fundamental research projects and Research Training (FPI)) or significant reductions (e.g. Research Training – FPI and FPU – with a reduction of 200 grants), or were cancelled entirely (e.g. the Jae programme). Also, many regions reduced their budgets for R&D and innovation and cancelled research training grants (e.g. Madrid, Castile and Leon and the Canary Islands). These has make the access to funds for research more difficult.</p> <p>(+)The Entrepreneurship and Internationalisation Support Act (Law 14/2013) includes measures to promote entrepreneurship (promotion of training) and facilitate finance to the creation of new business. This could enhance support to young innovative companies to commercialise ideas rapidly and promote internationalisation.</p>
<p>10. The public sector itself is a driver of innovation</p>	<p>(-) It can't be said that in the management of budget crisis the public sector has provided incentives to stimulate innovation</p>	

	<p>within its organisation and in the delivery of public services. Formal political discourse in support for R&D and innovation has been contradicted with severe public cuts to R&D and the delay of important R&D programmes.</p> <p>(+) Public procurement of innovative goods and services as a policy instrument to promote innovation has been increasingly promoted through different mechanisms. New Strategy EESTI (2013-2020) and Plan PECTI (2013-2016) follow previous efforts (e.g. Law on Sustainable Economy (2011)). Policy programme Innodemanda provided funds technologies for public procurement innovation. In addition, the Council of Ministries (8/07/2011) agreed on setting a 3% target of new investments of the general public administration to be devoted to innovative public procurement and a guide to disseminate the procedures.</p> <p>(+/-) Open access is increasingly promote in the Spanish R&D system. Although government data owned was not always usually and freely available.</p> <p>New law LCTI includes a disposition (art. 37) on open access.</p>	<p>(+) New Strategy EESTI (2013-2020) and Plan PECTI (2013-2016) also try to encourage public procurement of innovative goods and services. The Plan PECTI (2013-2016) includes public procurement of innovative goods and services within the Strategic Action of Economy and Digital Society, Programme of business leadership (AEESD 3). Five tenders are listed in the CDTI web but it is not clear if the 3% objective has been met. No specific information on public procurement is found in the provisional Budget published of the working plan of the PECTI for 2013. The European Public Sector Innovation Scoreboard (EPIS) 2013 shows that Spain is above the EU-27 average in most of the indicators (13 out of 22)</p> <p>(+) The new la LCTI has improve open access through disposition (art. 37). New Strategy EESTI (2013-2020) includes an articulation mechanism promoting open access. PECTI (2013-2016) sub-programme for the development of new technologies (AEESD2.2) that includes the promotion of open access. Research calls for 2013 (e.g. Promotion of R&D and innovation towards societal challenges) require researchers to make publicly available the data gathered.</p> <p>(-) Data on the implementation of R&D projects and programs has been scarce during 2012 and 2013.</p>
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		<p>and infrastructures</p> <p>(+/-) An open labour market for researchers</p> <p>(+/-) Gender equality and gender mainstreaming in research</p>	<p>(-) Ex-post evaluation is not a common practice</p> <p>(-) Portability of grants is limited — either institutionally or internationally</p> <p>INFRASTRUCTURES</p> <p>(+) ESFRI is considered as an important initiative</p> <p>(+) It contributes significantly to a broad range of pan-European research infrastructures</p> <p>(-) Budget cuts for R&D are causing a delay in the payment of the country's financial contribution to some international research infrastructures (e.g. CERN).</p> <p>An open labour market for researchers</p> <p>(-) Need of policy measures to address the lack of transparent, open and merit-based recruitment</p> <p>(-) Budget cuts result especially harmful for young mobile researchers</p> <p>(+/-) Although some policy measures have been implemented to encourage intersectoral mobility, intersectoral mobility appears to be very low.</p> <p>(-) Previous job experience in industry or abroad is generally not recognised when accessing to a research position.</p> <p>Gender equality and gender mainstreaming in research</p> <p>(+) Gender considerations are being recently incorporated into policy making. The LCTI mentions gender issues and the EESTI includes them as one of its 5 principles.</p> <p>(-) Legal and other barriers to the recruitment, retention and career progression of female researchers appear to exist, especially at high level.</p> <p>(+) Gender imbalance in decision making process is being increasingly considered</p> <p>(-) gender dimension in research programmes appear to be less frequent.</p> <p>(-) Research institutions rarely conduct impact assessments of practices to identify gender biases.</p> <p>Optimal circulation, access to and transfer of scientific knowledge including via digital ERA</p> <p>(+) Policies to define and coordinate access to and preservation of scientific information are recent. The FECYT facilitates access to researchers working at national research organisations to bibliographic research information (Web of Knowledge)</p> <p>(-) Open access measures for publications and data resulting from publicly funded research are rare.</p>
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		<p>(+/-)Optimal circulation, access to and transfer of scientific knowledge including via digital ERA</p>	
5	<p>Priority European Research Infrastructures</p>	<p>(+) New Law LCTI (2011) facilitates access to research infrastructures</p> <p>(+) New Strategy EESTI (2013-2020) and new Plan PECTI (2013-2016) include specific sub programme to research infrastructures</p> <p>(-) R&D budget cuts have affected financial commitments to European Research Infrastructures</p>	<p>(+) LCTI includes several elements for a partial solution to the legal barriers to access to research infrastructures (additional provision 17).</p> <p>(+) The EESTI considers the “sustainability and use of scientific and technological infrastructures” as one of its specific objectives (sub-objective 2). And the PECTI follows the strategy and devotes to research infrastructures one of its sub-programmes (number 4). Spain contributes significantly to a broad range of pan-European research infrastructures.</p> <p>(-) Budget cuts for R&D are causing a delay in the payment of the country’s financial contribution to some international research infrastructures (e.g. CERN, European Science Foundation (ESF)). Spain has reduced its voluntary participation in the ESA by 75% and it is not clear if its participation in the European Extremely Large Telescope (E-ELT).</p>
7	<p>SME Involvement</p>	<p>(+) New policy measures emphasise the role of innovation and SME involvement (e.g. LCTI, EESTI, PECTI)</p> <p>(+) The Entrepreneurship and Internationalisation Support Act (Law 14/2013) was published on the 27th September 2013 and includes measures to promote entrepreneurship and facilitate finance to the creation of new business.</p> <p>(-) Funds for</p>	<p>(+) The importance of innovation and SMI involvement in increasing in the national research system. Strategies and Plans emphasise the role of innovation and SME.</p> <p>(+)The Entrepreneurship and Internationalisation Support Act (Law 14/2013) includes measures to promote entrepreneurship to facilitate finance to the creation of new business implement tax incentives for R&D and encouraging the internationalisation of business.</p> <p>(-) Funds for innovation are mainly based on credits (not subsidies), which discourage SMEs to participate, especially in a context of economic crisis.</p>

		innovation based on credits partially not executed	
11	Venture Capital Funds	<p>(+) The Entrepreneurship and Internationalisation Support Act (Law 14/2013) includes measures to promote the investment in Venture Capital Funds</p> <p>(+) Strategies and Plans increasingly reinforce risk capital.</p> <p>(-) Decreasing investments in risk capital.</p>	<p>(+) The Entrepreneurship and Internationalisation Support Act includes fiscal incentives for business creation</p> <p>(+) Innovation and funding for private R&D innovation has been increasingly encouraged through divers policy instruments. The new strategy EESTI (2013-2020) and plan PECTI (2013-2016) follow the efforts of previous plans and strategies (e.g. INGENIO 2010, National Plan for R&D (2008-2011) and the e2i) encouraging the creation of NTBFs and university spin-offs and risk capital, paying attention</p> <p>(-) The investments in risk capital including seed capital, start-up funds and funding for other stages of the business creation was in 2001 94.95m and represents 0.01% of the Spanish GDP. This has decrease significantly since 2008 (496.21) (source Eurostat from FECYT). In Spain there were about 54 networks and groups of Business Angels in 2009 (OECD, STI Scoreboard 2011, from FECYT).</p>
13	Review of the State Aid Framework	<p>(+) Clusters have been increasingly encouraged</p> <p>(-) Data availability prevents assessing the evolution of these programmes.</p>	<p>(+) Two main subprogrammes could be considered regarding the promotion of innovation clusters:</p> <p>-Subprogramme Innovative Companies Associations and Clusters (AEI) Programme</p> <p>Subprogramme of technology platforms-INNFLUYE</p> <p>(-) Due to data availability (no on programmes executed after 2011. And no working programme for 2012. Mani programmes of WP 2013 are not open) it is difficult to assess the evolution of these for 2012-2013</p>
14	EU Patent	<p>(-) Spain has neither signed the Agreement on a Unified Patent Court nor ratified it.</p>	<p>(-) Due to the objection to the translation requirements only in English, German and French, Spain has not signed the Agreement on a Unified Patent Court.</p>
15	Screening of Regulatory Framework	<p>(+) New Strategy EESTI (2013-2020) and Strategic Energy Plan (SET) plan</p> <p>(-) It does not specified the screening of new or existing regulations</p>	<p>(+) The EESTI includes as an articulation mechanism (number 5) The harmonisation of criteria and practices of evaluation ex-ante and ex post. It mentions the need to collaboration between the administration and the private sector to eliminate regulatory barriers in energy sector</p> <p>(-) However, it does not envisaged an specific screening of new or existing regulations</p>
17	Public Procurement	<p>(+) Law on Sustainable Economy (2011) and new Strategy (EESTI) and Plan (PECTI) follow previous policy efforts and encourage public procurement.</p> <p>(+) Suprogramme Innodemanda (NP</p>	<p>(+) Law on Sustainable Economy (2011) introduced public procurement of innovative goods and services as a policy instrument to promote innovation. New Strategy EESTI (2013-2020) and Plan PECTI (2013-2016) also try to encourage public procurement of innovative goods and services.</p> <p>(+) Innodemanda provides funds technologies for public procurement innovation</p> <p>(+) The Council of Ministries agrees on setting a 3% target of new investments of the general public administration to be devoted to innovative public procurement and a guide to disseminate the procedures.</p>

		<p>2011) provides funds public procurement.</p> <p>(+) Agreement of the Council of Ministries on Innovative public procurement (8/07/2011) setting a 3% objective and a guide on the topic</p> <p>(-) No clear if the objective of 3% has been meet.</p>	<p>(+) 5 tenders are listed in the CDTI web but it is not clear if the 3% objective has been met</p>
20	Open Access	<p>(+) New law LCITI includes a disposition (art. 37) on open access.</p> <p>(+) New Strategy EESTI (2013-2020) articulation mechanism promoting open access.</p> <p>(+) PECTI (2013-2016) sub-programme for the development of new technologies (AEESD2.2) that includes the promotion of open access.</p> <p>(+) Regional initiatives promoting open access.</p> <p>(+) RECOLECTA programme</p> <p>(+) Institutional level initiatives.</p> <p>(+) Latindex and Dialnet initiatives</p> <p>(+) FECYT access to bibliographic information</p> <p>(+) Euroam initiative</p> <p>(+) Normalised CVs or researchers</p> <p>(-) Public budget cuts could also affect the implementation of</p>	<p>(+) LCITI art. 37 states that: Public agents of the Spanish Science, Technology and Innovation will drive the development of repositories, own or shared, open access to the publications of its research staff, and establish systems to connect with similar initiatives nationally and internationally; The research staff whose research activity is financed largely with funds from the State Budget will issue a digital version of the final version of the contents which have been accepted for publication in research journals or periodicals serial as soon as possible but not later than 12 months after the official date of publication; The electronic version will be published in open access repositories recognized in the field of knowledge in which research has developed, or open access institutional repositories; Public electronic version may be used by public administrations in their evaluation processes; The Ministry will provide centralized access to repositories, and its connection with similar national and international initiatives; All this without prejudice to agreements under which they have attributed or transfer to third parties the rights to publications, and does not apply when the rights to the results of the activity of research, development and innovation are likely protection..</p> <p>(+) The New Strategy EESTI (2013-2020) includes as an “Articulation mechanism” (number 2) the promotion of open access to data, publications and research results financed by public funds, including guidelines to create shared archives.</p> <p>(+) PECTI (2013-2016) includes a sub-programme for the development of new technologies (AEESD2.2). This programme includes the promotion of “Open Access” through technological forums and platforms. It appears that the plan is less ambitious in its implementation of the strategy and the application of the LCITI regarding open access.</p> <p>(+) There are also some regional regulations that promote the access to open repositories with peer-reviewed scientific articles. For example, the Autonomous Region of Asturias — it calls for deposit in its institutional repository with an embargo of no more than six months — and the Autonomous region of Madrid — it includes papers, working papers and data and a field dependent embargo no longer than 6 months (EC, 2011).</p> <p>(+) RECOLECTA is a national joint programme of the the Spanish Foundation for Science and Technology (FECYT) and the Spanish Public Universities and Research Libraries Network (REBIUN) to create an e-infrastructure for repositories in Spain and its integration with international repositories. It is currently working in a statistics module to enable the measurement of visits and document downloads from the national open science</p>

		<p>measures regarding open access.</p> <p>(-) Measures regarding open access for SMEs appear to be less frequent</p>	<p>repositories compliant with the Knowledge Exchange Statistics guidelines. It also will include a statistics module to facilitate comparable data — compliant with the Knowledge Exchange Statistics Module guidelines.</p> <p>(+) At institutional level, 21 Spanish research institutions have signed the Berlin Declaration (OpenAire: Spain). Open institutional repositories are becoming frequent in Public Universities, especially open access to PhD dissertations. Some of them include “Creative Commons” licenses. Some universities, like the University of Alicante, give direct financial help to departments or research groups according to the number of documents they deposit in the institutional repository (Open Aire; EC, 2011c). The Alhambra Declaration was signed on May 2010 by a group of open access’ stakeholders (e.g. editors, librarians, funding agencies, university rectors and authors) from the South European countries (Spain, Portugal, France, Italy, Greece and Turkey), whose main languages are different from English, to promote open access to scientific productions</p> <p>(+) Latindex and Dialnet aim at collecting and facilitating access to research publications done in Spanish and Portuguese speaking countries.</p> <p>(+) The FECYT facilitates access to researchers working at national research organisations to bibliographic research information (Web of Knowledge and Scopus). At regional and institutional level, purchases by consortia of university libraries are common. RECOLECTA provides access to search for documents stored in the 58 institutional repositories..</p> <p>(+) Eduroam ES project, coordinated by IRIS Network, supports a common roaming environment between Spanish research organisations, allowing individual researchers to access network services in other research public organisations.</p> <p>(+) At national and regional level, there are several initiatives to collect information of researchers (CVs) through the “Normalized Curriculum Vitae” (CVN) s . CVN is a format to exchange research information among systems. . It is implemented in 90 Spanish institutions (50 universities) and nearly 60,000 researchers have created their CV in the CVN format. Also, FECYT is working on the standardization of CVN with the European standard CERIF (Common European Research Information Format).</p>
21	Knowledge Transfer	<p>(+) New Law LCTI (2011), the new Strategy EESTI (2013-2020) and the new Plan PECTI (2013-2016) keep on encouraging knowledge transfer.</p> <p>(+) Programmes encouraging public-private collaboration (e.g. INNCORPORA, INNPACTO)</p> <p>(-) Lack of</p>	<p>(+) The Spanish government has tried to strengthen the science-industry relationships by fostering during the last decade: public private cooperation; the creation of clusters; technology parks and technology centres; Knowledge Transfer Offices; and the promotion of spin-offs.</p> <p>The new Law, strategy and plan (LCTI, EESTI and PECTI) are again the most important new initiatives at national level and follow previous measures (e.g. INGENIO, e2i) to encourage knowledge transfer. In particular, following the INGENIO 2010 initiative, integrated in the National Plan for R&D (2008-2011) and the e2i, the creation of NTBFs and university spin-offs, the promotion of R&D projects in general and more specifically public-private cooperation in long term strategic (e.g. INNPRONTA); policies to foster human capital, such as the incorporation of PhD holders into the private sector and the creation of the S&T infrastructure have all been heavily reinforced.</p>

		<p>entrepreneurial and university-industry culture</p> <p>(-) Activities, quality and success of these KTO offices appear to be heterogeneous (Heijis, 2012; Zabala, 2012)</p> <p>(-) Budget cuts have affected KTOs offices reducing their personnel, etc.</p>	<p>The new Law LCTI has also facilitate knowledge transfer by modifying the previous Law of Sustainable Economy (Law 2/2011) to allow researchers to profit from their patent earnings. The LCTI has also introduced other changes to improve the mechanisms of knowledge transfer: (1) increasing the value of transfer activities (e.g. by detecting research groups whose knowledge could be applied or by increasing the role of OTRIs) (2) promoting the “units of excellence” (art. 33.1) or (3) developing an open-access archive with research results. It encourages the creation of Technology Based Enterprises (EBTs) by allowing researchers to work part-time in private firms created by the organisations in which they are working and by eliminating restrictions on the maximum share ownership of a private company (10%) and the restrictions on being a board member in private companies</p> <p>(+) Spain has recently designed a large number of support schemes to foster public-private cooperation in R&D and innovation. These programmes aim to improve a level of public-private collaboration that has been considered low (OECD, 2006; COTEC, 2012). A specific National Programme (Np) on public-private cooperation has been designed to increase this cooperation. This programme is included in the Instrumental Working Line (IWL) “Articulation and internalisation of the system” of the Spanish National Plan for R&D and innovation (NP). In 2011, the Np on “Public-private Cooperation” distributed had two instruments: INNPACTO and INNPRONTA (FECYT, 2012). Some relevant sub-programmes in this action are : INNCORPORA (including Torres Quevedo programme); INNPLANTA (Technology parks); INNCADE (Knowledge Transfer Offices); NEOTEC (New Technology Based firms); Innovative Companies Associations and Clusters (AEI) Programme; INFLUYE (Technology platforms); INPRONTA (before CENIT); INNPACTO (public-private partnerships)</p> <p>(-) Lack of entrepreneurial and university-industry culture (COTEC, 2012) are challenges that hinder the knowledge transfer between public and private sectors.</p>
22	European Knowledge Market for Patents and Licensing	<p>(+) Law LCTI (2011) has changed Intellectual Property Rights (IPRs)</p> <p>(+) The National Reform Programme 2013 aims at improving IPRs</p>	<p>(+) The new Law LCTI has changed the regulation of the ownership of Intellectual Property Right produces by the staff of university of public research bodies. It modifies the previous Law of Sustainable Economy (Law 2/2011) to allow researchers to profit from their patent earnings.</p> <p>(+) The National Reform Programme 2013 aims at improving the protection of intellectual property rights through a reform of the Codified Text on the Law on Intellectual Property.</p>
23	Safeguarding Intellectual Property Rights	<p>(+) Several court rulings have been conducted on the basis of the horizontal Cooperation agreements.</p>	<p>(+) Not publicly available specific policy measures appear to be applied to support the use of the Guidelines on Horizontal cooperation Agreements regarding standard-setting agreements. However, legislation appears to be applied judging for the court rulings decisions.</p>
24	Structural Funds and Smart Specialisation	<p>(+) EESTI (2013-2020) and PECTI (2013-2016) includes the concept of Smart</p>	<p>(+) The new Spanish Strategy for Science, Technology and Innovation (EESTI) (2013-2020) includes the concept in one of its 6 priority axe (Priority 5) as the tool for increasing the competitiveness of the regional systems of Innovation. The Spanish State Plan for Scientific and Technical Research and</p>

		<p>Specialisation (RIS3).</p> <p>(+) Role of the Network of Public Policies for R&D and Innovation (REDIDI) disseminating and coordinating.</p> <p>(+) National Reform Programme 2013 uses RIS3 as a mechanism to improve R&D efficiency.</p> <p>(-) EESTI and PECTI do not establish clear competences in the design of national and regional RIS3.</p> <p>(-) Lack of some data at regional level.</p>	<p>Innovation (PECTI) (2013-2016) also mentions this concept. However, these documents do not clearly specify if it will be a national, regional or a shared competence</p> <p>(+) The Network of Public Policies for R&D and Innovation (REDIDI) has a role in disseminating and coordinating national and regional RIS³ strategies.</p> <p>(+) The National Reform Programme 2013 states that the design of regional RIS3 strategies will be finished by the end of the year</p>
25	Post 2013 Structural Fund Programmes	<p>(+) Structural Funds (SF) increasingly oriented towards R&D and Innovation.</p> <p>(+) Improved national and regional coordination due to SF.</p> <p>(-) The current crisis has created co-financing difficulties and full implementation of projects.</p>	<p>(+) The percentage of Structural Funds devoted to R&D and innovation is increasing. The percentage of these funds devoted to R&D rose from 14% (€3,810m) in 2000–2006 to 31% (€6,641m) in the period 2007–2013 (Heijs and di Anselmo, 2013)</p> <p>(+) The implementation of SF is based on the co-finance of national and regional administration. Thus, coordination between national and regional governments has improved.</p> <p>(-) Due to the crisis, some regions (e.g. Galicia, Madrid) are having problems to co-finance SF projects. There are difficulties for the full implementation of the programme for SF for R&D (e.g. S&T Infrastructures, and business R&D) (Heijs and di Anselmo, 2013).</p>
26	European Social Innovation pilot	<p>(+) Number of Spanish organisation in SIE</p> <p>(+) RESINDEX pilot index of Regional Social innovation</p>	<p>(+) The number of Spanish organisations included in the portal Social Innovation Europe (SIE) is higher than 33.</p> <p>(+) Index of Regional Social Innovation (RESINDEX) is a pilot study launched by Innobasque in collaboration with Sinnergiak Social Innovation (UPV/EHU) to build indicators of social innovation at regional level.</p>
27	Public Sector Innovation	<p>(+) Results of the European Public Sector Innovation Scoreboard (EPIS) 2013.</p>	<p>The European Public Sector Innovation Scoreboard (EPIS) 2013 shows that Spain is above the EU-27 average in most of the indicators (13 out of 22)</p> <p>Although the government effectiveness in Spain has felt form 1.82 in 2000 to 0.98 in 2010, it shows one of the highest improvements in E-government development Index (EgdI), in providing public services through the use of ICT in the periodo of 2003-2012. The share of in-house service innovators is high (89%) and the perception of the importance of innovation for winning procurement tenders from public administration organisation is higher than the importance of low cost. (EPIS:</p>

			2013)
29	European Innovation Partnerships	<p>(+) Programmes to promote public private cooperation.</p> <p>(+) The Spanish European Office disseminates Public Private initiatives</p>	<p>(+) In recent years Spain has launched broad institutional measures to facilitate public private cooperation (see Commitment 21: Knowledge Transfer). For example, the creation of a large number of Science and Technology parks in cooperation with universities and other research organisation. The INNPRONTA programme requires Public Private partnerships. These follow efforts of previous programmes, such as, the National Strategic Consortia for Technical Research (CENIT) that funded large long-term projects based on public private cooperation.</p> <p>To my knowledge there is not a central record of the Spanish participation on European Innovation Partnerships.</p>
30	Integrated Policies to Attract the Best Researchers	<p>(+) Broad range of instruments to attract researchers and other highly skilled from Europe or abroad.</p> <p>(-) Budget cuts have made the Spanish Labour Market for researcher less attractive. Programmes to attract best researchers have been reduced delayed (e.g. Ramón y Cajal) or cancelled</p>	<p>(+) Spain has a large number of instruments to foster Human Resources in science and innovation, including the mobility of such resources. Research mobility (inwards and outwards) and the training of researchers is encouraged through a wide range of national and regional programmes. National Programmes for R&D and Innovation (NP (2008-2011) and PECTI 2013-2016) include “specific programmes” for human resources with three overall “sub-programmes”: (1) training; (2) mobility and (3) employability. Moreover, the regional governments also offer a large number of schemes geared to R&D human resources (e.g. Ikerbasque).</p> <p>“Ramón y Cajal programme” that aims at increasing job opportunities for prominent researchers in the National Research System (foreigners and Spaniards with international experience). This programme has facilitated the return of national prominent researchers; has “opened” the system; and encourage similar programmes at national (e.g. Juan de la Cierva for young researchers), regional and institutional (e.g. Jae-doc in the CSIC).</p> <p>(-) Budget cuts have also affected programmes for Human Resources as some of them have been delayed (e.g. Ramón y Cajal 2012, Juan de la Cierva 2012, PTA 2012 and Torres Quevedo 2012), cancelled (e.g. Jae-doc 2012 and other regional programmes). Budget cuts result especially harmful for young mobile researchers. some regulatory measures to correct the public deficit (e.g. Royal Decree-Law 20/2011) have limited staff recruitment and the filling of positions left vacant by retirees.</p> <p>(-) In a research market with high levels of endogamy prominent young researchers with international experience find it difficult to access to research positions.</p>
31	Scientific Cooperation with Third Countries	<p>(+) Linkages with Latin American countries</p> <p>(+) Bilateral cooperation agreements and cooperation programmes with Third countries</p>	<p>(+) Due to its traditional relationship with Latin America Spain has several cooperation programmes with this region. One of the most outstanding ones is the “Iber-American Programme of Science and Technology for Development” for multilateral cooperation in the following areas: Agro-Alimentation, Health, Promoting Industrial Development, Sustainable Development, Global Change and Ecosystems, ICT, Science and Society and energy.</p> <p>(+) The Spanish government has several general bilateral cooperation agreements with countries outside Europe (such as Canada, China, India Korea, USA and Japan). Besides these general programmes Spain also has bilateral cooperation programmes in some specific fields with Brazil (Biotechnology, renewable energies, process engineering, nano technology and health) and Argentina (Biomedical, forensic and vegetal Genomics and Bioinformatics). The cooperation programmes</p>

			refer to some broad field but also address some of the grand challenges.
32	Global Research Infrastructures	<p>(+) The new law LCTI (2011), the new Strategy EESTI (2013-2020) and the new plan PECTI (2013-2016) improve aspects related to Research Infrastructures (RIs)</p> <p>(+) Contribution to a broad range of European and pan-European Research Infrastructures</p> <p>(-) Budget cuts have reduced contributions to RIs</p>	<p>(+)The new LCTI includes several elements for a partial solution to the legal barriers for joint programming and access to research infrastructures (Art. 44 and additional provision 17) The EESTI considers the “sustainability and use of scientific and technological infrastructures” as one of its specific objectives (sub-objective 2). And the PECTI follows the strategy and devotes to research infrastructures one of its sub-programmes (number 4).</p> <p>(+) Spain contributes significantly to a broad range of Research Infrastructures facilities and tries to participate in 25 of the 44 European RIs to enhance its percentage of return on that participation. It also promotes the role of Spanish industry in building and maintaining those infrastructures In recent years the Spanish government reinforced the domestic policy for research infrastructures (RI) which is reflected in a substantial increase in the annual budgets devoted to these policies and some new initiative Spain contributes significantly to a broad range of pan-European research infrastructures.</p> <p>(-) Budget cuts for R&D are causing a delay in the payment of the country’s financial contribution to some international research infrastructures (e.g. CERN, European Science Foundation (ESF)). Spain has reduced its voluntary participation in the ESA by 75% and it is not clear if its participation in the European Extremely Large Telescope (E-ELT).</p>
33	National Reform Programmes	<p>(-) Spain has set a lower target of 2% GERD per GDP for 2020 instead of the 3% target.</p> <p>(+) The new strategy EESTI (2013-2020) and new Plan PECTI (2013-2016) are the main measures regarding R&D</p> <p>(+)The Entrepreneurship and Internationalisation Support Act (Law 14/2013)</p>	<p>(-) The National Reform Programme 2013 ratifies the lower target of 2% of GERD per GDP for 2020.</p> <p>(+/-) It emphasises, as it did in the previous NRP, the new strategy and the new plan as important measures. These were also mentioned in the previous NRP. Some measures, such as, the creation of the National Research Agency are again mentioned but not implemented.</p> <p>(+) The law to support entrepreneurship and their internationalisation is a novelty as an important measure to boost innovation.</p>

Annex 3. NATIONAL PROGRESS TOWARDS REALISATION OF ERA

ERA Priority	ERA Action code	ERA Action	Recent changes	Assessment of progress in delivering ERA
ERA priority 1: More effective national research systems	MS01	Action 1: Introduce or enhance competitive funding through calls for proposals and institutional assessments	<p>(+) Spanish Strategy for Science, Technology and Innovation (EESTI) (2013-2020) (approved 1st February 2013)</p> <p>(+) Spanish State Plan for Scientific and Technical Research and Innovation” (PECTI) (2013-2016) (approved 1st February 2013)</p>	<p>(+) Spanish Strategy for Science, Technology and Innovation (EESTI) (2013-2020) promotes competitive funding through calls for proposals as the main mode of allocating public funds to R&D</p> <p>(-) The EESTI has set a new lower target of 2% GERD per GDP, instead of 3% set by the Europe 2020 strategies</p> <p>(+) Spanish State Plan for Scientific and Technical Research and Innovation” (PECTI) (2013-2016), implements the EESTI, thus, aims at increasing the role of competitive funding. Most of the funds will be allocated through competitive mechanisms.</p>
	MS02	Action 2: Ensure that all public bodies responsible for allocating research funds apply the core principles of international peer review	<p>(+) Spanish State Plan for Scientific and Technical Research and Innovation (PECTI) (2013-2016)</p>	<p>(+) The new Plan, implementing the EESTI (2013-2020) foresees increasing international peer review through its programmes of support to R&D Centers of Excellence.</p> <p>(-) The Assessment of the quality of research-performing organisations and their output is not the basis for institutional funding decision- peer review is, therefore, not part of such assessment nor leads to organisational change</p>

ERA priority 2: Optimal transnational co-operation and competition	MS06	Action 1: Step up efforts to implement joint research agendas addressing grand challenges, sharing information about activities in agreed priority areas, ensuring that adequate national funding is committed and strategically aligned at European level in these areas	(+) Joint Programming Initiatives Article 185 initiatives (+) Spanish State Plan for Scientific and Technical Research and Innovation” (PECTI) (2013-2016)	(+) Spain coordinates one Joint Programming Initiative (Water Challenges for a Changing) World) is member in eight others initiatives and is an observer in (Urban Europe – Global Challenges, Local Solutions). Spain is also involved in 3 articles 185, with one participant leading one of them. (*) Data provided by the European Union-needs to be ratified (+) It is a multiannual plan that implements the EESTI by setting its priorities, programmes, coordination mechanisms, costs and sources of funding. It follows the EESTI and emphasises the role of grand challenges
	MS07	Action 2: Ensure mutual recognition of evaluations that conform to international peer-review standards as a basis for national funding decisions	(+) Spanish Strategy for Science, Technology and Innovation (EESTI) (2013-2020) (approved 1st February 2013) (+) Spanish State Plan for Scientific and Technical Research and Innovation” (PECTI) (2013-2016)	The new strategy EESTI (2013-2020) includes international evaluation of competitive funding as one of its 5 basic principles (number 3). In addition, one of its 6 articulation mechanisms (number 5) considers the “harmonisation of criteria and practices of evaluation –ex ante and ex post–”, including international peer review. The new PECTI (2013-2016), as it implements the Strategy, also aims at increasing the role of competitive funding and “international peer review”. Most of the funds will be allocated through competitive mechanisms
	MS08	Action 3: Remove legal and other barriers to the cross-border interoperability of national programmes to permit joint financing of actions including cooperation with non-EU countries where relevant	PECTI (2013-2016) has include new calls for promote the specialisation of managers in R&D	(+) New calls for “Europe Managers”, “Europe Researchers” and “EMPLEA” all devoted to promote R&D management (MINECO, 2013) might increase the Spanish participation in international calls
	MS15	Action 4: Confirm financial commitments for the construction and operation of ESFRI, global, national and regional RIs of pan-European interest, particularly when developing national roadmaps and the next SF programmes	(+) Law of Science, Technology and Innovation - LCTI 2011	(+) Spain considers the ESFRI, to be an important initiative and contributes significantly to a broad range of these facilities. Spain will host at least three large ESFRI installations: the construction in Catalonia of one of the five supercomputers in Europe of the Partnership for Advanced Computing; the solar research infrastructure (EU-SOLARIS) at the Advanced Technological Centre for Renewable Energy in Almeria; and the European Spallation Source (ESS) in the Basque Country, an advanced centre for researching the atomic and molecular arrangement for materials
	MS16	Action 5: Remove legal and other barriers to cross-border access to RIs	(+) Law of Science, Technology and Innovation -	The Law of Science, Technology and Innovation from 2011 includes a provision (additional provision number 17) to remove legal barriers to access research infrastructures, in conformity with EU

			LCTI 2011	provisions.
ERA priority 3: An open labour market for researchers	MS24	Action 1: Remove legal and other barriers to the application of open, transparent and merit based recruitment of researchers		
	MS25	Action 2: Remove legal and other barriers which hamper cross-border access to and portability of national grants		
	MS26	Action 3: Support implementation of the Declaration of Commitment to provide coordinated personalised information and services to researchers through the pan-European EURAXESS3 network		Spain has more than 80 centres in different regions, 18 of which signed the Declaration of Commitment along 2013. FECYT publishes a guide for foreign researchers coming to Spain and also manages the web Euraxess Spain that provides information and support for foreign researchers coming to Spain, including the free download of the electronic version of the guide. The national portal is syndicated to the central European EURAXESS portal providing the input on practical information for researchers coming to Spain and mirroring the job and funding opportunities published in the EURAXESS Jobs portal. Although at the time of writing this report the statistics of performance of EURAXESS Spain in 2013 are not available yet, in 2012 the network gave answer to 28.848 consultations (more than 18% of the total replies given by all 40 national networks), mostly dealing on entry conditions, visas, job permits and funding opportunities.
	MS27	Action 4: Support the setting up and running of structured innovative doctoral training programmes applying the Principles for Innovative Doctoral Training.	Spanish Strategy for Science, Technology and Innovation (EESTI) and Innovation (EESTI) (2013-2020)	The Spanish Strategy for Science, Technology and Innovation (EESTI) (2013-2020) aims to promote "Industrial PhD programmes", through the exposure to industry and other relevant employment sectors in PhD training.
	MS28	Action 5: Create an enabling framework for the implementation of the HR Strategy for Researchers incorporating the Charter & Code	Law of Science, Technology and Innovation - LCTI 2011	(+) The LCTI has removed legal barriers and improved several aspects in the career of the researchers (replaces 2+2 system with a 4 year contract); addresses the issue of gender imbalances in decision-making process (60-40% ratio). The new LCTI also aims at encouraging the gender dimension in research programmes (see 13th additional provision) (+) The Spanish government requires all universities That present applications to obtain public support from tenders for Human Resources to accept and comply with the Charter. (+) More than 70 research institutions have endorsed the Charter & Code (Euraxess

				access 15.10.2013). The Spanish government requires all universities that present applications to obtain public support from tenders for Human Resources to accept and comply with the Charter. Where all universities obtained public support, it could be said that implicitly all universities subscribed to the charter. Four institutions have acknowledged the HRS4R (Euraxess access 15.10.2013).
ERA priority 4: Gender equality and gender mainstreaming in research	MS39	Action 1: Create a legal and policy environment and provide incentives	Law of Science, Technology and Innovation - LCTI 2011	(+) The LCTI has removed legal barriers and improved several aspects in the career of the researchers (replaces 2+2 system with a 4 year contract); addresses the issue of gender imbalances in decision-making process (60-40% ratio). The new LCTI also aims at encouraging the gender dimension in research programmes (see 13th additional provision). The EESTI and PECTI should “include the gender dimension in research programmes in all the process, including definition of priorities in research, research problems, theoretical frameworks, methods, collection and interpretation of data, conclusions, technological development and future research. They should also encourage studies with a gender perspective and the analysis of the situation of women and promote and increase recognition of female researchers in research groups”. EESTI and PECTI mention gender equality and the gender dimension of research, but there is no specific programme to address these issues.
	MS40	Action 2: Engage in partnerships with funding agencies, research organisations and universities to foster cultural and institutional change on gender	Law of Science, Technology and Innovation - LCTI 2011	(+)The Law of Science, Technology and Innovation (LCTI 2011) establishes in its additional provision number 13 that “Public Research Bodies should adopt within 2 years “gender balance Plans” that will be yearly monitored.
	MS41	Action 3: Ensure that at least 40% of the under-represented sex participate in committees involved in recruitment/career progression and in establishing and evaluating	Law of Science, Technology and Innovation - LCTI 2011	The Law of Science, Technology and Innovation range of 40-60% of under-represented sex in committees involved in recruitment/career progression and in project/program evaluation.
ERA priority 5: Optimal circulation, access to and transfer of scientific knowledge including via digital ERA	MS45	Action 1: Define and coordinate their policies on access to and preservation of scientific information	Law of Science, Technology and Innovation - LCTI 2011 Digital Agenda	(LCTI 2011) in its article 37 states that publicresearch organisations should promote thedevelopment of open access archives of the The Law of Science, Technology and Innovation publications of researchers, including the access to other similar initiatives at national and international level; researchers should publish a digital version of their results (publications) of publicly funded research no later than 12 months after their publication; these should be uploaded in open access

		for Spain	archives; and the Ministry should facilitate central access to these archives and to promote links with international archives.
		Alhambra Declaration on Open Access	<p>A Digital Agenda for Spain was adopted in February 2013, providing a framework reference and roadmap for the Digital Agenda strategy for 2013-2015 in order to develop the digital economy and society. One of its main objectives is to increase the efficiency of information technology investments in R&D&I.</p> <p>The Alhambra Declaration was signed on May 2010 by a group of open access' stakeholders (e.g. editors, librarians, funding agencies, university rectors and authors) from the South European countries (Spain, Portugal, France, Italy, Greece and Turkey), whose main languages are different from English, to promote open access to scientific productions.</p>
		Spanish State Plan for Scientific and Technical Research and Innovation" (PECTI) (2013-2016)	<p>The Spanish State Plan for Scientific and Technical Research and Innovation" (PECTI) (2013-2016) foresees a sub-programme for the development of new technologies (AEESD2.2). This programme includes the promotion of "Open Access" through technological forums and platforms.</p>
MS46	Action 2: Ensure that public research contributes to Open Innovation and foster knowledge transfer between public and private sectors through national knowledge transfer strategies	Law of Science, Technology and Innovation (LCTI 2011)	<p>The Law of Science, Technology and Innovation (LCTI 2011) introduced changes to improve the mechanisms of knowledge transfer: (1) increasing the value of transfer activities (e.g. by detecting research groups whose knowledge could be applied or by increasing the role of OTRIs or Research Results Transfer Offices (2) promoting the "units of excellence" (art. 33.1) or (3) developing an open-access archive with research results.</p>
		Law of Science, Technology and Innovation - LCTI 2011	<p>The Law of Science, Technology and Innovation (LCTI 2011) emphasises the role of innovation, technology and knowledge transfer by improving the mechanisms of knowledge transfer, granting property rights to researchers and reducing the incompatibility for researchers employed at public institutions to work in private firms.</p>
MS47	Action 3: Harmonise access and usage policies for research and education-related public e-infrastructures	RECOLECT A	<p>RECOLECTA is a national joint programme of Spanish Foundation for Science and Technology (FECYT) and the Spanish Public Universities and Research Libraries Network (REBIUN) to create an</p>

		and for associated digital research services enabling consortia of different types of public and private partners		e-infrastructure for repositories in Spain and its integration with international repositories. It provides a free open access platform and support to Spanish repositories so that they comply with international standards of interoperability and sustainability
	MS48	Action 4: Adopt and implement national strategies for electronic identity for researchers giving them transnational access to digital research services	IRIS Network	Eduroam ES is a project coordinated by RedIRIS, that supports a common roaming environment between Spanish research organizations. Allowing individual researchers to access network services in other research public organisations.

Annex 4

Table i: Main organisational changes and equivalences between the new and previous Spanish R&D and innovation systems

NEW R&D and innovation System	PREVIOUS R&D and innovation SYSTEM
MINECO	MICINN
Spanish Research Agency	
Spanish Strategy for Science, Technology and Innovation (2013-2020) merges:	National Strategy for Science and Technology (ENCYT)
- Spanish Strategy for Science and Technology (EEST)	National Strategy for Innovation (since 2010)
- Spanish Strategy for Innovation (EEI)	
The Spanish State Plan of Scientific and Technical Research and Innovation (PECTI) merges:	National Plan for R&D and Innovation
- Spanish National Plan for Scientific and Technical Research (PECT)	Spanish National Plan for Innovation
- Spanish National Plan for Innovation (PEI)	
Council of Science, Technology and Innovation (CPCTI)	General Council of Science & Technology (GSCT)
Advisory Council of Science, technology and Innovation (CACTI)	Advisory Council for Science and Technology Policy (ACSI)
Information System of Science, Technology and Innovation (SICTI)	

Table ii: Equivalences between New State Plan for Scientific and Technical Research and Innovation (PECTI) (2013-2016) and Spanish National Plan for R&D and Innovation (2008-2011) (NP)

New State Plan for Scientific and Technical Research and Innovation (PECTI) (2013-2016)	Spanish National Plan for R&D and Innovation (2008-2011) (NP)
Recognition and promotion of talent and employability Program	(IWL) Human Resources
Sub-programme of Education and training	Education and training programme
Sub-programme of Employability	Employability programme
Sub-programme of Mobility	Mobility programme
Promotion of excellence Programme	(IWL) R&D and innovation Projects
Sub-programme for knowledge generation	Sub-programme of basic research
Sub-programme of Institutional empowerment	(IWL) Institutional reinforcement; (IWL) Use of knowledge and technology transfer; (IWL) Articulation and internalisation of the system; Program of Science and Innovation Culture

Sub-programme for scientific and technological infrastructures	(IWL) Scientific and technological infrastructure
Business leadership programme	Sub-programme of applied research
Sub-programme for private R&D and Innovation	Sub-programme of technological development (IWL) Articulation and internationalisation of the system; (IWL) Internationalisation;
Sub-program of enabling technologies	Innovation projects
Sub-programme of collaborative R&D and Innovation	Networks and public private collaborations
Promotion of R&D and innovation towards societal challenges	Sub-programmes Public-private collaboration; INNFACTO; Basic Research; INIA; applied research; development;(IWL) internationalisation of R&D;(IWL) Use of knowledge and technology transfer
Challenges and actions	
Strategic Action in Health	
Strategic Action digital economy and society	

Box i: General and specific objectives of the Spanish R&D and innovation policies (based on previous policy framework –end 2012)⁶²

<p>I. Putting Spain in the vanguard of knowledge (3): (1) raising the profile of knowledge generation; (2) finance based on criteria of excellence and demand; (3) increasing the number of researchers and their qualification.</p> <p>II. Promoting a highly competitive structure of firms (5): (1) Increasing the capacity of the Science and Technology (S&T) infrastructure organisations and (2) its interdisciplinary use by all agents, especially small- and medium-sized enterprises (SMEs), fostering (3) cooperation and (4) technology transfer; (5) matching R&D to demand in the markets.</p> <p>III. Integrating the regional level into the national S&T system: (3) (1) Encouraging coordination between national and regional policies (2) including joint tenders and (3) the evaluation of the policies.</p> <p>IV. Strengthening the international dimension of the S&T system (5): Promoting (1) the international cooperation of Spanish R&D agents; (2) participation in and use of large European research facilities and (3) in the VII Framework Programme (FP); (4) providing access for foreign R&D agents to national public tenders; (5) coordination of R&D executing agents of different countries by ERA-NET.</p> <p>V. Making available a favourable atmosphere for R&D investments (4): Improving (1) cooperation; (2) transparency; (3) policy-management; and (4) organisation (evaluation criteria, access, etc.) to ensure the goal achievement is related to R&D and innovation investment.</p> <p>VI. Making available favourable conditions to promote scientific culture and the diffusion of S&T advances in society (3) (1) Using new means of communication to show the scientific and technological innovations to society; (2) designing stable structures to promote scientific culture; (3) creating networks for social communication in science and technology.</p>
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⁶² This scheme of goals is almost the same as that presented in the **National Strategy for Science and Technology (ENCYT)** – a common declaration of intentions approved by the 3rd Conference of the Regional Presidents (chaired by the President of the Spanish government) (EW, 2012).

Box ii: General and specific objectives of the Spanish R&D and innovation policies New EESTI 2013-2020

I. Recognition and promotion of talent and employability (3):

(1) Education and training in R&D and Innovation; (2) Mobility and development of research career; (3) Human resources employability.

II. Promotion of excellence (4):

(1) Institutional empowerment; (2) Sustainability and use of scientific and technological infrastructures; (3) Promotion of frontier knowledge; (4) Promotion and development of emergent technologies.

III. Business leadership (3):

(1) Encouragement of business R&D and Innovation; (2) Market oriented R&D and innovation activities; (3) Promotion of enabling technologies.

IV. Promotion of R&D and innovation towards societal challenges (8):

(1) Health, demographic change and welfare; (2) Bio economy; security and food quality, sustainable agriculture production and natural resources sustainability; (3) Energy, security and green energy efficiency; (4) Smart, sustainable and integrated transport; (5) Climate change, efficiency in the use of resources and raw materials; (6) Innovation and social change; (7) Digital economy and society; (8) Security, liberty and rights protection.

NEW LAW OF SCIENCE, TECHNOLOGY AND INNOVATION (LCTI)

The new **Law of Science, Technology and Innovation (LCTI)** (1st June 2011) replaced the so-called Law of Science of 1986. The new law aims to improve coordination with regional and European authorities, to take into account the growth of the Spanish R&D and innovation system, to improve research careers and to help the transition to an economy based on knowledge and innovation. It also mentions gender issues and ethics. The emphasis on innovation, which was missing in the Law of 1986, the design of several mechanisms aimed at improving national and regional coordination, and the project of the Spanish Research Agency are the main relevant aspects of the new Law. It modifies the governance and human resources for R&D and improves the mechanisms for the transference of knowledge.

Governance of the R&D and innovation system

The LCTI organises the governance of the R&D and innovation system as follows. The Ministry of Science and Innovation (MICINN) now – the Ministry of Economy and Competitiveness (MINECO) – is responsible for drafting and managing the R&D and innovation strategies and plans proposals. The LCTI envisaged two strategies and two plans that have recently merged into single documents.

- The **Spanish Strategy for Science and Technology and Innovation (EESTI) (2013-2020)** is a multiannual plan that sets the rationale, objectives and indicators of the Spanish R&D and innovation policy (see below a specific section for this document).
- The **Spanish State Plan of Scientific and Technical Research and Innovation (PECTI) (2013-2016)** is a multiannual plan that implements the EESTI by setting its priorities, programmes, coordination mechanisms, costs and sources of funding.

Both documents were approved on 1st February 2013 (see the specific section for this document).

The **Executive Committee for Science, Technology and Innovation policy (CDCTI)** is an inter-ministerial body responsible for the planning, evaluation and coordination of the main Spanish instruments for R&D and innovation.

Two main consultative bodies support the design and implementation of the R&D innovation strategies and plans:

- **Council of Science, Technology and Innovation (CPCTI)** – in charge of coordination with regional governments and other actors in the R&D system. It also supports the drafting of the national strategies. Its members are the Secretaries of State of the Ministries with R&D and innovation responsibilities and representatives of each of the regional governments “Comunidades Autónomas”. It replaces the General Council of Science & Technology (GSCT).
- **Advisory Council of Science, Technology and Innovation (CACTI)** in which the research community, enterprises and trade unions are represented. It reports on the strategies and plans and offers information, suggestions and opinions. It replaces the Advisory Council for Science and Technology Policy (ACSI).

The Ministry, in collaboration with other ministries, drafts the R&D and innovation plans. The CDCT and CACTI report on the drafts before these are subjected to the approval of the Government.

The LCTI 2011 envisages the creation of the Spanish Research Agency (to be created). This Agency aims to be an autonomous entity that will assign R&D funds on grounds of scientific merit. The draft of the General State Budget (PGE) of 2012 forbade the creation of any public agency, making it necessary to include an amendment to allow the creation of the Research Agency. The LCTI does not include specific details about the structure and responsibilities of this agency, which will be, together with the **Centre for Industrial Development (CDTI)**, the main funding bodies of the R&D and innovation system. It is assumed that the Agency will be responsible for the research-oriented projects whereas the CDTI will manage policy instruments oriented towards the enterprises. Other organisations, such as the Carlos III Health Institute, also fund research.

The **Information System of Science, Technology and Innovation (SICTI)** is responsible for the data collection and analysis for the monitoring of all policy programmes and instruments of the R&D and innovation policy. The system aims to gather information coming from national and regional actors (the National State Administration – AGE – and the Regional Administrations – “Comunidades Autónomas”). The system is under the umbrella of the MINECO and the Council of Science, Technology and Innovation (CPCTI). The LCTI emphasises the coordination between national and regional information systems through the SICTI and the CPCTI.

The **Committee of Ethics in Research** is an advisory body on the ethics of research and technology.

The design of several mechanisms aimed at improving national and regional coordination, such as the Council of Science, Technology and Innovation (CPCTI) and the new information system (SICTI), as well as the project of the Spanish Research Agency are the main changes in the governance of the R&D and innovation system brought by the new law. Figure 1 shows the structure of the Spanish research and innovation system and Table i summarises some of the main organizational changes and equivalences between the new and previous Spanish R&D and innovation system.

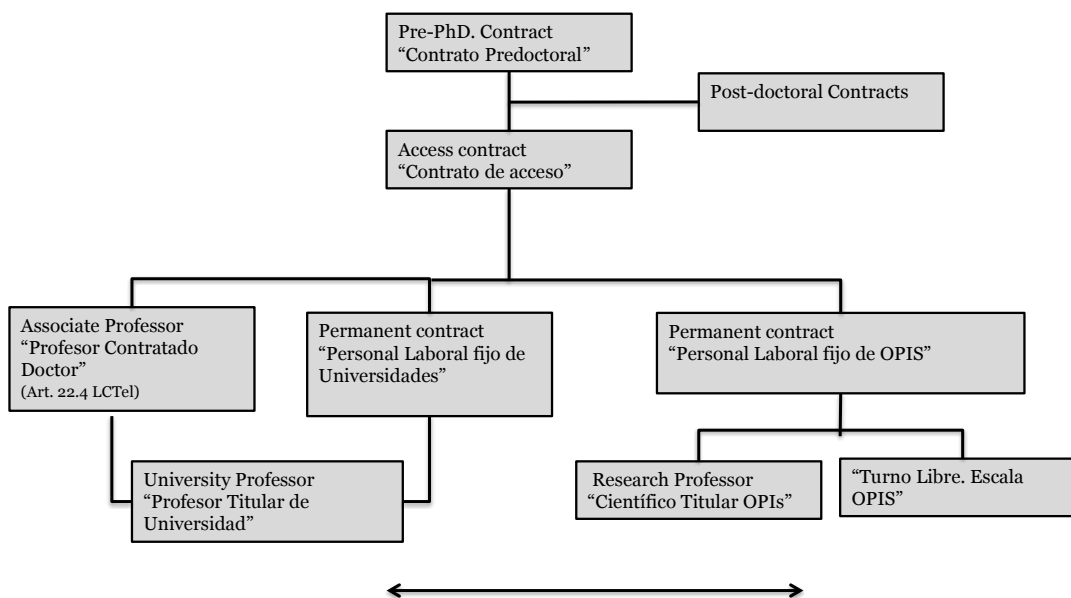
Human Resources

The LCTI includes four types of private (non-civil servant) labour contracts: (1) to carry out a PhD degree (four years maximum with minimum wages) (Art. 21); (2) of access (five years and

maximum of 80 hours of teaching) (Art. 22); (3) for researchers working on research projects (D.a 23a); and (4) for distinguished researchers or scientists, “of great prestige” who will be able to occupy key positions in management or in “important” programmes (which can be permanent) (Art.23). The pre-PhD contract will be delayed till 2014 and the access ones could be conditioned by the State budget and public employment supply. Moreover, it has created a unified professional career. The different official professional scales for scientists with a civil servant status in public research organisations (PROs) will be unified in three, comparable to those of the Spanish National Scientific Research Council (CSIC): (1) research professor, (2) scientific researcher and (3) permanent scientist. This unification facilitates staff mobility between the PROs (see Figure 2 below).

The LCTI also improves several aspects in the career of the researchers. The future replacement of the 2+2 system (two years scholarship and then a two year contract) by a four-year employment contract implies the full recognition of certain rights such as unemployment benefits and maternity leave. In addition, the LCTI improves mobility between private and public organisations by allowing an extended leave for a maximum of 5 years and reducing partially the incompatibility for working in private firms (see section below).

Figure 2. Scheme of a research career



Source: MINECO

Mechanisms for knowledge transfer

The LCTI emphasises the role of innovation, technology and knowledge transfer by improving the mechanisms of knowledge transfer, granting property rights to researchers and reducing the incompatibility for researchers employed at public institutions to work in private firms. It aims at improving mechanisms of knowledge transfer by: (1) increasing the value of transfer activities (e.g. by detecting research groups whose knowledge could be applied or by increasing the role of OTRIs) (2) promoting the “units of excellence” (art. 33.1) or (3) developing an open-access archive with research results. It encourages the creation of Technology Based Enterprises (EBTs) by allowing researchers to work part-time in private firms created by the organisations in which they are working and by eliminating restrictions on the maximum share ownership of a



private company (10%) and the restrictions on being a board member in private companies. It modifies the previous Law of Sustainable Economy (Law 2/2011) to allow researchers to profit from their patent earnings.

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LIST OF ABBREVIATIONS

ACSI	Advisory Council for Science and Technology Policy
AEVAL	Spanish Agency for Evaluation/Agencia de Evaluación y Calidad
ANIRC	National Association of Ramón y Cajal Researchers/Asociación Nacional de Investigadores Ramón y Cajal
AGE	National State Administration/Administración General del Estado
BERD	Business R&D Expenditures
CACTI	Advisory Council of Science, technology and Innovation/Consejo Asesor de Ciencia, Tecnología e innovación
CDCTI	Executive Committee for Science, Technology and Innovation policy Comisión Delegada del Gobierno para Política Científica, Tecnológica y de Innovación
CDTI	Centre for Industrial Development/Centro para el desarrollo tecnológico Industrial
CPCTI	Council of Science, Technology and Innovation Consejo de Política Científica, Tecnológica y de Innovación
COSCE	Spanish Confederation of Scientific Societies/Confederación de Sociedades Científicas de España
CRUE	Spanish Conference of University Rectors/Conferencia de Rectores de las Universidades Españolas
EBTs	Research based enterprises/Empresas de base tecnológica
ENCYT	National Strategy for Science and Technology/Estrategia Nacional de Ciencia y Tecnología
EECT	Spanish Strategy for Science and Technology /Estrategia Española de Ciencia y Tecnología (before ENCYT)
EEI -e2i	Spanish Strategy for Innovation /Estrategia Española de Innovación
EESTI	Spanish Strategy for Science, Technology and Innovation /Estrategia Española de Ciencia y Tecnología y de Innovación
EU	European Union
EW	Erawatch
FECYT	Spanish Foundation for Science and Technology/Fundación Española para la Ciencia y la Tecnología
FEDIT	Spanish Federation of Technology Centres/Federación Española de Centros Tecnológicos
FJI	Spanish Federation of Young Researchers/Federación de Jóvenes Investigadores
FTE	Full-Time Equivalent
GBAORD	Government Budget Appropriations or Outlays on R&D
GDP	Gross Domestic Product
GERD	Gross Expenditure on Research and Development
GSTC	General Council of Science & Technology
HEIs	Higher Education Institutions
ICONO	Spanish Observatory of R&D/Observatorio Español de I+D+i
INE	Spanish Institute of Statistics/Instituto Nacional de Estadística
ISCHII	Carlos III Health Institute/Instituto de Salud Carlos III
IWL	Instrumental Working lines/Líneas instrumentales de Actuación
LCTI	Law of Science, Technology and Innovation/Ley de Ciencia, Tecnología e Innovación

MEC	Ministry of Education/Ministerio de Educación
MEDU	Ministry of Education, Culture and Sports/Ministerio de Educación Cultura y Deporte
MICINN	Ministry of Science and Innovation /Ministerio de Ciencia e Innovación
MINECO	Ministry of Economy and Competitiveness (before MICINN)/Ministerio de Economía y Competitividad
MINETUR	Ministry of Industry, Energy and Tourism/Ministerio de Industria Energía y Turismo
MITYC	Ministry of Industry, Tourism and Commerce /Ministerio de Industria, Turismo y Comercio
NP	Spanish National Plan for R&D and Innovation/Plan Nacional de Investigación Científica, Desarrollo e Innovación Tecnológica
Np	National programmes/Pogramas nacionales
OPIs	Public Research Bodies/Organismos Públicos de Investigación
PROs	Public Research Organisations
PECT	Spanish National Plan for Scientific and Technical Research/Plan Estatal de Investigación científica y técnica (before NP)
PECTI	Spanish State Plan of Scientific and Technical Research and Innovation (2013-2016) (It merges the envisaged PECT and PEI)/Plan Estatal de Investigación Científica y Técnica
PDI	Platform for Dignifying Research/Plataforma por una Investigación Digna
PEI	Spanish National Plan for Innovation/Plan Estatal de Innovación
PGE	General Government Budget/Presupuestos Generales del Estado
RIS ³	Research and Innovation Strategies for Smart Specialisation
R&D	Research and Development
SICTI	Information System of Science, Technology and Innovation/Sistema de información sobre ciencia, Tecnología e innovación
SGCTI	General Secretariat of Science, Technology and Innovation/Secretaría General de Ciencia, Tecnología e Innovación
SMEs	Small and Medium Enterprises
SSRDI	State Secretary of Research, Development and Innovation/Secretaría de Estado de Investigación, Desarrollo e Innovación

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