Strategic Evaluation on Innovation and the Knowledge Based Economy in relation to the Structural and Cohesion Funds, for the programming period 2007-2013

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Executive Summary

The Spanish economy continues to maintain strong growth rates and relatively high levels of job creation. But low productivity is a problem. Although the Spanish economy is more job-intensive, it is not getting more efficient in terms of the use of its work-force. Per capita GDP has stagnated at 95% of the EU-25 average since the middle of the last decade. Developments in innovation capacity are vital for the country's social and economic future.

The current indicators for the research and innovation remain well below the EU average. The government target is for R&D investment to increase to 1.5% of GDP in 2007 and to 2% in 2010. However, regional disparities remain high, with R&D being concentrated in the more industrialised regions (Madrid, Catalonia and, to a lesser extent, the Basque Country).

One widespread shortcoming in Spanish regions is the way the innovation system is managed. Although many regions boast good basic research capacity and infrastructure, the transfer of knowledge to the production sector is not systematically organised. In most regions, interface and transfer structures are weak and require substantial improvement if they are to acquire the degree of specialisation and professionalism required to catalyse local stakeholders' potential for innovation.

The main policy document is the **Spanish Research, Development and Innovation Plan (R&D and Innovation Plan 2004-2007)**, which is the high level national R&D strategy and sets out the public innovation policy framework. At national level, state aid schemes and fiscal policy offer relatively favourable conditions for innovation but does not necessarily have an incentive effect beyond already innovative firms. Moreover, all the regions have developed plans for the promotion of research, technological development and innovation. The proliferation and growing importance of regional RDTI policies makes coordination with the central administration a crucial issue for more efficient and effective action.

The Community Support Framework for Spain 2000-2006 for Objective 1 regions has been important in enhancing innovation culture in the less developed regions and facilitating major improvements in RDTI management and institutional capabilities in Objective 1 and 2 regions. Fund absorption capacity is high in Objective 1 regions, since a substantial part of the resources have contributed to improving university and research centre installations and staff and to actually running research projects. However, in spite of regional and national priorities, the administration of research projects co-financed by the Structural Funds has often lacked a strategic approach and evaluation does not usually include a systematic analysis of impact in terms of transfer of results and improvements in regional competitiveness.

New interventions on human resources are essential, as is the operational integration of technology and human resource policy measures. Human resources training for RDTI needs to be attended to and forms a perfectly appropriate policy target for Objective 1 and Objective 2 regions.

There is plenty of potential for innovation in the eligible regions. Apart from Madrid, where RDTI concentrates on new technologies, several scientific poles can be identified with the potential to develop new production activities linked to existing scientific abilities in, for example, biomedicine in Castilla y León and Catalonia, digital contents in Catalonia, Valencia, biological agriculture in Murcia, Andalusia and Extremadura, or industrial activities with expansion potential such as engineering and nanotechnologies in the Basque Country and Navarra and biochemical technology in Aragon and Catalonia..

This study concludes that there are different types and levels of innovation potential across the regions, with major high-tech innovation potential in the most technologically advanced ones. Intermediate regions currently undergoing industry-based structural changes had good innovative industrial potential, with emerging high-growth sectors (Andalusia, Cantabria, La Rioja, Aragon, Comunidad Valenciana and Castilla y León). The other Spanish regions are currently working to achieve a minimum technological base and appropriate innovation to improve their competitiveness levels and their ability to attract production investments. Unfortunately, there is no effective inter-regional coordination on different regional innovation and technological development policies, which is considered an important tool for facilitating technology diffusion and transfer.

Spain's specialisation in tourist services requires an accompanying effort to support RDTI development to maintain its current competitive position, a key factor in maintaining employment and economic growth levels. Spain has business leaders in this sector, but the most common interpretation of the concepts of RDTI in the minds of policy makers often does not include innovation in services, particularly in the hotel trade, tourism and restaurants.

Recommendations for the main investment priorities for Structural Funds over the programming period 2007-2013 may be summed up as follows:

- Support increases in RDTI expenditure through a comprehensive system of business incentives.
- Support upgrading of strategic policy intelligence capacities and tools in regional public administrations and institutional management capacity.
- Support inclusion of Objective 1 regions in 7th Framework programme to help research groups and enterprises to join European networks;
- Support for innovative actions, especially in connection with activities that imply diffusion of new technologies and the digital society.
- Synergies and external factors in Spanish regional policies do not seem to be sufficiently planned; real overlapping of potential in RDTI administration exists at regional and state level. Providing incentives for exchanges between regions in the same member state or with regions in other Member States would be a valuable move.

1 Introduction

In March 2000, the EU Heads of State and government launched an ambitious political initiative designed to make the European Union "the most competitive, dynamic, knowledge-based economy by 2010." Known as the 'Lisbon Strategy', the agenda includes a broad range of policies and regulatory measures to achieve this goal.

At the 2005 Spring Council of the European Union, Heads of State and government concluded that all appropriate national and Community resources, including those of the Cohesion Policy, should be mobilised to renew the basis of Europe's competitiveness, increase growth potential and productivity and strengthen social cohesion, stressing in particular knowledge, innovation and the optimisation of human capital. In short, the Council recognised that while some progress had been made since 2000 in moving towards the Lisbon Strategy goals, "a new partnership for growth and jobs" was still needed.[1]

In launching the discussion on the priorities for the new generation of cohesion policy programmes, the Commission published a draft Community Strategic Guidelines on 6 July 2005 entitled "Cohesion Policy in Support of Growth and Jobs: Community Strategic Guidelines, 2007-2013". One specific guideline entails increasing knowledge and innovation for growth. More specific areas of interventions proposed by the Commission include: improvements to and increases in RTD investment, facilitating innovation and promoting entrepreneurship, promoting the information society for all, and improving access to finance.[2]

Innovation is an important factor in releasing the potential of the Lisbon agenda. The knowledge captured in new technologies and processes can drive growth and competitiveness and create new jobs. But knowledge must be treated as part of a wider framework in which businesses grow and operate. Developing a knowledge-based economy requires adequate levels of investment in R&D, education and ICT, as well as creating a favourable environment for innovation.

Less developed areas of the Union are also faced with this new competitiveness challenge. Increasing cohesion leads to improvements in living standards and the reduction of economic and social disparities, which depend to an important extent on increases in productivity. Increasing competitiveness implies economic change through the introduction of new technologies and new methods of production as well as the development of new skills. Innovation is at the heart of this process. Technological and organisational change and new demands generated by rising income levels and factors creating new economic opportunities all contribute to the growth potential of these countries.

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[1] Communication to the Spring European Council (2005) "Working together for growth and jobs: A new start for the Lisbon Strategy", COM (2005) 141. Available at: http://www.europa.eu.int/growthandjobs/key/index_en.htm.

[2] Communication from the Commission (2005) "Cohesion Policy in Support of Growth and Jobs: Community Strategic Guidelines, 2007-2013", COM (2005) 0299. Available at: http://www.europa.eu.int/comm/regional_policy/sources/docoffic/2007/osc/index_en.htm.

Structural Funds are the main Community instruments for promoting economic and social cohesion. In past and current programmes, they helped to enhance research potential and innovation in businesses and to develop the information society, particularly in the less developed areas. Cohesion policy has also promoted regional innovation strategies and similar information society-related initiatives.

The overall objective of the strategic evaluation study, as set out in the terms of reference, is that it should provide conclusions and recommendations for future Structural Fund and Cohesion policy. In particular, the Strategic Evaluation will be used to prepare the negotiations with Member States for 2007-13, to prepare the next operational programmes and to provide input for the 4th Economic and Social Cohesion Report.

In line with the tender specifications, this country report addresses the following issues:

- An analysis of the current situation in innovation and the knowledge-based economy at national and regional level. For the national level, performance is compared to the average performance for the EU25 Member States plus Romania and Bulgaria; and at regional level, where possible given available statistics, compared to a typology of EU regions;
- Lessons from the past and current experience of implementing innovation and knowledge economy measures in the Structural Funds, both in terms of priorities and strategic approaches; as well as in terms of operational implementation;
- Main needs and potential for innovation in the eligible regions drawing on available studies, strategy development and future and foresight studies; and
- Recommendations on main investment priorities for Structural Funds over the programming period 2007-2013 and their implications for regional development.

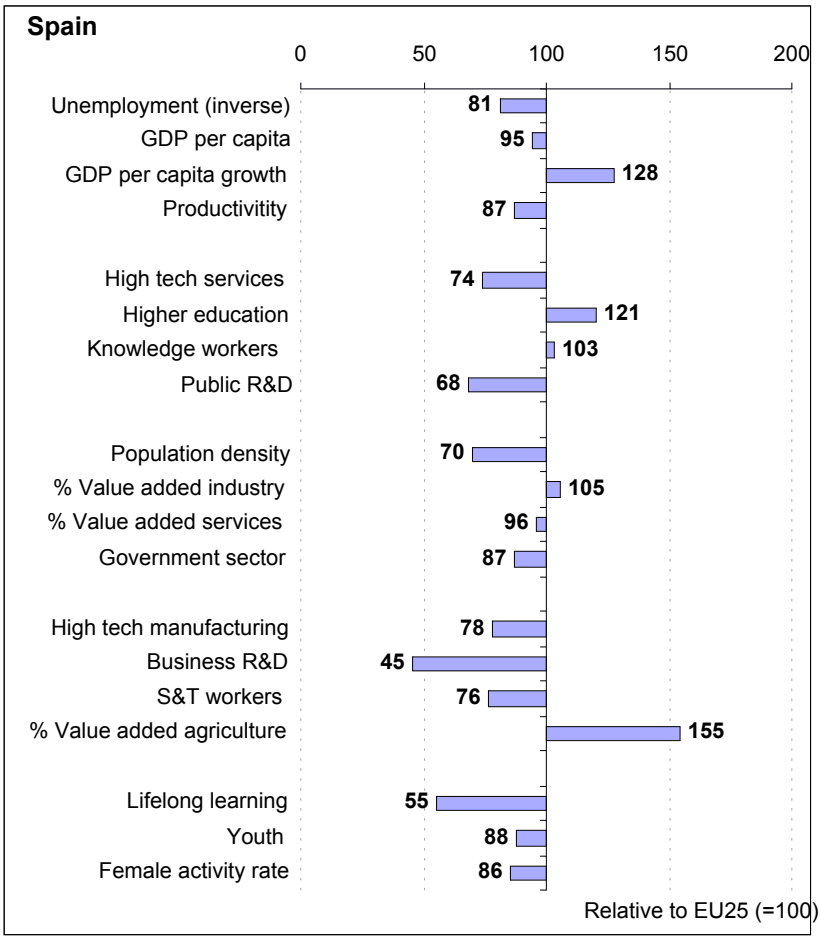
2 Investing in innovation and knowledge: a comparative overview of regional performance

This section provides a synthetic overview of the relative performance of the country and, where relevant, the main regions, with respect to the EU25 average for a number of selected key structural innovation and knowledge indicators. The analysis aims to identify the **main disparities and needs** at national and, wherever possible, regional level with a view to supporting the definition of priorities for future Structural Funds interventions (see sections 5 and 6 of this report).

2.1 Country overview: innovation and the knowledge economy

Exhibit 1 below provides a snapshot picture of the relative position of Spain compared to the EU-25 average for a series of key knowledge economy indicators.

Exhibit 1: Relative country performance for key knowledge economy indicators



Source: calculations of MERIT based on available Eurostat and national data from 2002-2003 depending on indicator. Detailed definitions and data for each indicator are provided in Appendix B.

In recent years, the Spanish economy[3] has maintained growth rates and relatively high levels of job creation in comparison with other more developed European Union (EU) countries. This positive performance intensified between 2003 and 2005 as the growth differential of Spain increased with respect to the EU average, avoiding deceleration and, as was the case of some other Member States, the 2003 recession. This facilitated a major reduction in unemployment. However, a number of factors risk to reverse this trend. First, the country is faced by a loss of competitiveness, due in part to a high rate of inflation, which is creating a growing external imbalance. Secondly, a rapid increase in family debt levels and house prices, together with rising interest rates, presents a clear risk to domestic consumption led growth. These factors will, sooner or later, lead to a significant adjustment of the Spanish economy that is currently boosted to a large extent by tourism and construction activities.

Moreover, productivity in Spain remains comparatively low, at 87% of the EU25 average, as shown in Exhibit 1. While labour productivity increased in the 2001-05 period by an average 0.5% this was lower than the European average and much lower than the average in more dynamic economies, such as the USA. In short, the Spanish economy's process of real convergence (with GDP now at 95.4% of the EU25 average) is based on an intensive, but not more efficient, use of the labour force. Labour intensity in Spain increased from 81% to 114% of the EU level between 1986 and 2003. This suggests that a major issue in Spain is technology diffusion to and application in enterprises in order to improve productivity; while continuing to support emerging sectors and private sector activities able to maintain employment growth.

Another issue is that that the Spanish economy is less specialised in goods and services of high technological content, which entails greater risks when competing against countries with low labour costs. For instance, gross added value generated by information and communication technologies (ICT) accounts in Spain for only 10% of the total, whilst in France, Italy or Germany the figure is five percentage points higher. One explanation is that a limited number of high and medium-high technology enterprises dominate private sector R&D activities. In 2004, these high to medium high tech sector firms invested 3,432 million Euro in R&D, 14% up on the previous year. This amount accounted for 70.5% of the total R&D expenditure of the enterprise sector. The number of full-time R&D employees in the high and medium-high technology sectors rose to 46,634, with an annual increase of 9.2%. These sectors accounted for 65.6% of full-time R&D staff and 67.3% of researchers in enterprises.

Gross Expenditure on Research and Development (GERD) stood at 8,945 million Euro in 2004 or 1.07% of the Gross Domestic Product (GDP). This represents a 9% increase over 2003. Business accounted for the largest percentage of total R&D expenditure (54.4% of the total or 0.58% of GDP), followed by the higher education sector (with 29.5% of total expenditure, or 0.32% of GDP). Public R&D expenditure accounts for 16% of the total or 0.17% of GDP. The remainder being due to Private Non Profit Institutions (IPSFL). R&D activities are financed mainly by the private

[3] Information and data from a range of sources has been used here, including the National Statistics Institute (INE), European Union and EUROSTAT reports and previous data from CICYT.

(48.7%) and public sectors (41%) with funds from abroad (6.2%) and from Higher Education (4.1%) providing the remaining 10.3% of total R&D expenditure.

The qualification levels of the Spanish population have improved in recent years and individuals with university degrees represented 24% of the population in 2004, compared with 23% for the OECD[3]. However, despite major efforts in recent years, and an increase in Full Time Equivalent (FTE) researchers, certain weaknesses still persist in terms of the supply of innovation-related human resources. There is, also, a question mark over the quality of many of the degree courses in Spain, and an even bigger one over whether the systems instils even minimum levels of questioning, curiosity and drive in the young people holding qualifications. At the same time, without a degree it is almost impossible to make progress in any area of work, such is the rigidity of the labour market and such is the belief in the value of formal qualification over practical experience, know how and entrepreneurial spirit[4]. So, while the numbers may be high, it is no surprise that the impact on the economy of these graduates is not as great as it would seem it could be. The problem is compounded by the fact that the civil service based education system is unable to offer places to the many excellent PhDs who fight their way towards a good education, creating a problem of brain drain.

This problem is compounded by the fact that enterprises continue to absorb a limited number of science and engineering (S&E) graduates and the life-long learning system does not respond to the needs of highly qualified personnel in R&D and innovation, especially in emerging sectors. Finally, an important bottleneck to a more intense innovative activity is that the active population's participation in continuous training or lifelong learning programmes in 2002 was much lower in Spain than in other EU countries (55%).

Another problem is that not enough importance is given to some non-high-tech but innovative sectors that are vital to the Spanish economy, such as the tourism and leisure industry. At the national level, neither indicators nor policies have been defined with the requirements of these sectors in mind, despite with the fact that they generate a strong demand for innovative solutions in areas such as information technologies (IT), energy savings, environmental procedures or new construction materials. Some efforts have been made in certain regions in recent years (e.g. in the Balearic Islands), however this remains a crucial field to explore in Spanish innovation policy.

The conclusions arrived at on the basis of the key indicators used in this report can be developed further by referring to the European Innovation Scoreboard (EIS) indicator results for 2005 (available at www.trendchart.org). In general, the EIS indicators for Spain add weight to some of the more cautionary findings for the economy (that it is boosted by construction and tourism rather than founded on competitive business, that

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3 COTEC 2005, pg 67

4 A recent article in the Economist captures some of the problems: "*In effect, universities in these countries (speaking of Italy and Spain) have become government-owned degree mills. Their aim is to get the greatest number of young people in and out for the least money and trouble. Really determined students may fight their way through to gain a professor's attention, win a research scholarship and start doing some real work, probably in postgraduate study. The others will arrive in the labour market, qualification in hand…"* (The Economist, 22 January 2004).

the economy is superficially in good shape but that it is at a very major turning point). The EIS identifies some serious problems in the field of innovation which present significant challenges which must be addressed for the future development of national competitiveness, The Scoreboard puts the country into the category 'losing ground' ranking it 16th out of the EU25 in its synthesis of innovation indicators, in an innovation peer group based on performance which include Lithuania and Slovenia. The Scoreboard country summary concludes that while Spain has the foundation in place for strengthening both innovation diffusion and creative innovation there are a number of key barriers to be overcome.

In more detail, the EIS shows that while Spain has a relatively balanced performance on most indicators it is very weak in innovation and entrepreneurship where it ranks 22 from 23, a result of the very low rates of innovation activity in Spanish SMEs and low supplies of venture capital. Currently business R&D is at only 45% of EU average and only 2% of firms are strategic innovators which figure places Spain 17th out of 19 EU member states. In contrast, Spain ranks 1st for technology adoption, and this accounts for almost half of Spanish innovative firms. A key challenge is, therefore, to increase overall total innovation expenditures (69% of EU average even with public sector input boosting figure significantly), in particular in the business sector, improve access to innovation capital and catalyse more strategic and creative innovative activities.

The Scoreboard also supports the findings related to education and training suggested by the indicators used to write the earlier paragraphs of this section of the report . It points out, for example, that lifelong learning is a key weakness (EIS gives it as only 52% of EU average), and points out that this is a barrier to effective and widespread technology diffusion and take-up, but adds that the trend in this area is favourable. It also points out a key weakness in youth educational attainment (i.e., % of population aged 20-24 having completed at least upper secondary education) which has actually worsened over the five years to 2005 by three percentage points to reach only 61.8% of EU average.

Other key challenges are to increase the percentage of SMEs involved in innovation collaboration (38% of EU average), and increase ICT investments which in 2005 was 17% below the average for EU. All these weaknesses, some very grave, need to be addressed as a matter of urgency and it needs to be carefully explored whether the Structural Funds can play a role in getting the Spanish innovation culture on a stronger footing.

2.2 Regional disparities and recent trends

To analyse and describe EU knowledge economies at regional level, all relevant statistical information available for a majority of regions was reduced and condensed. The approach involved factor analysis to condense the information from a list of selected variables into a small number of factors. These factors are:

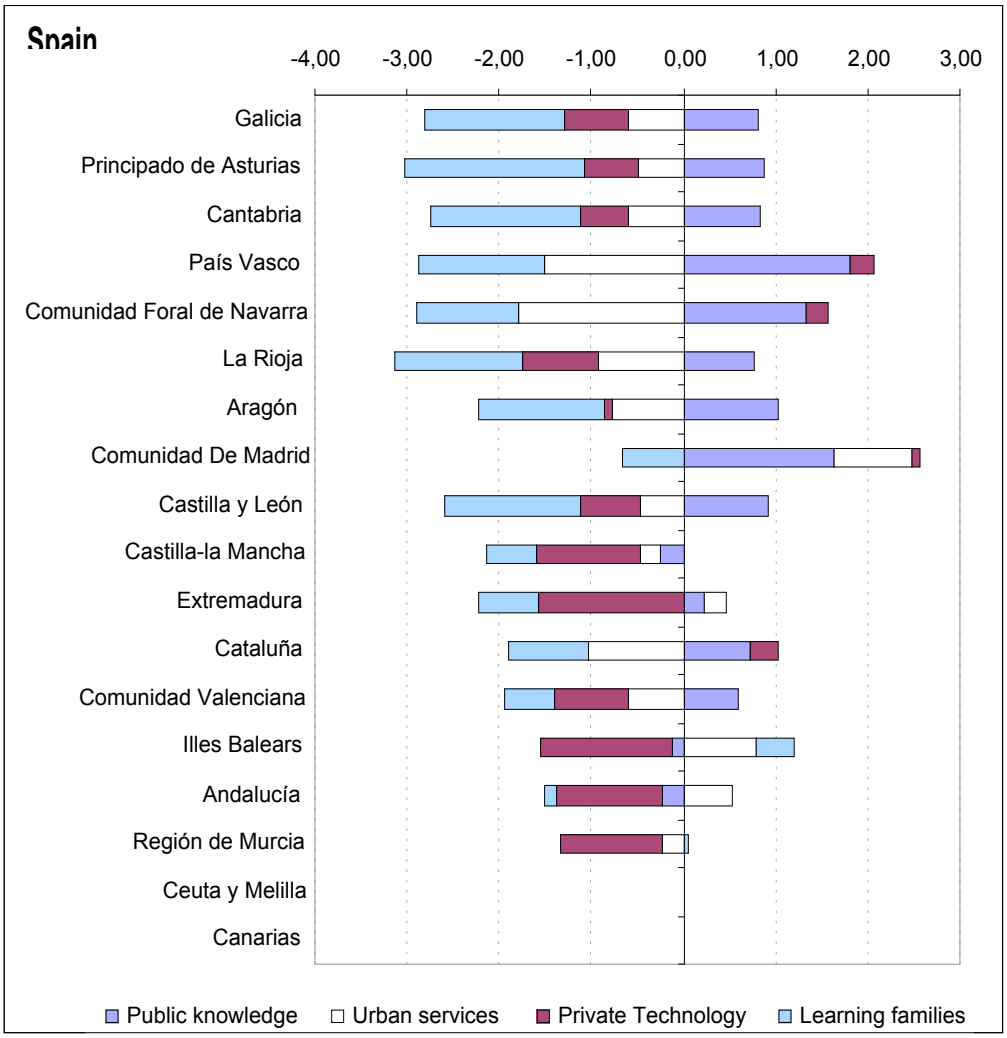
- Public Knowledge (F1): human resources in science and technology combined with public R&D expenditure and employment in knowledge-intensive services are the most important or common variables in this factor. Regions with large universities will rank high in this factor.
- Urban Services (F2): The most important variables for this factor are value-added share of services, employment in government administrations and population density. A key observation is that academic centres do not necessarily co-locate with administration centres.
- Private Technology (F3) This factor is most strongly influenced by business R&D, occupation in S&T activities, and employment in high- and medium-high-tech manufacturing industries.
- Learning Families (F4). The most important variable in this factor is the share of the population below the age of 10. Learning Families could also be interpreted as an institutional factor indicating a child-, learning- and participation-friendly environment, or even a 'knowledge-society-life-style' based on behavioural norms and values that are beneficial to a knowledge economy.

In a second step, the 200-plus EU27 regions were grouped into 11 types of regions (see appendix A) displaying similar characteristics by means of a cluster analysis. In Spain the regions were grouped as follows[5]:

- **The Community of Madrid** stands out from the other Spanish regions as a member of the "**Local sciences & services**" cluster. This is normal, because many central government services and the headquarters of the largest enterprises are located there.
- Five other Spanish regions are classified as "**Southern Cohesion**": **Castilla-La Mancha**, **Extremadura**, **Illes Balears**, **Murcia** and **Andalusia**. These regions, with the exception of the Baleares that depending the years is the first or the second wealthy region in Spain, have lower incomes and traditionally specialise in agro industry activities and tourism. Their expenses in R&D come from 0,44% in Castilla la Mancha till 0,89% in Andalusia (0,25% in Baleares).

[5] For Canarias and Ceuta y Melilla there was insufficient available data for the relevant indicators to permit their inclusion in the factor analysis.

Exhibit 2: Regional factor scores per region



Source: MERIT. The bars are stapled factor-scores showing the deviation (1=standard deviation) per factor from the average of 215 EU regions (0.00). The longer the bar, the bigger is deviation. Detailed regional scorecards can be found in Appendix B.

- The other 10 Spanish regions are classified as "**Ageing Academia**". However, inside this group there are clear differences between Navarra, the Basque Country and Catalonia and the others, with Aragon in an intermediate situation. The first group of three regions has a relatively higher presence of Tech Manufacturing, Business R&D and S&T workers compared with the European average. This situation is explained by a long industrial tradition, and the continuity of regional R&D and innovation policy since the early nineties . Aragon has benefited from the impact of industrial activities developed since the 1980's. The other six regions have followed different trajectories: Galicia, which remains an Objective 1 region, is a mix of large rural areas with modern industrial developments. Asturias and Cantabria have gone through an important industrial restructuration process. Castilla y León, Rioja and Valencia have a wealthy mix of agro-food and traditional industrial sectors (and tourism for Valencia). At the same time Catalonia, Castilla y León, Galicia and Valencia have strong universitary systems. These difference explain divergent patterns in their regional innovation system notably in terms of investment, with gross expenditure on R&D (GERD) ranging

from 1.43%/GDP in the Basque Country in 2003 to 0.47% of Cantabria, and from a rate of business expenditure on R&D (BERD) of 1.09% of GDP in the Basque Country to 0.18% in Cantabria (Cotec 2005 , page. 101).

Exhibit 3: recent trends per region in key indicators

		Unemployment	Per capita GDP	Industry share	Agriculture share	Population density	Tertiary education	R&D intensity
		1996-2003	1996-2002	1996-2002	1996-2002	1996-2002	1999-2002	1996-2002
		%-pnt ch.	% growth	%-pnt ch.	%-pnt ch.	% growth	%-pnt ch.	%-pnt ch.
EU25		--	--	--	--	--	--	--
Spain		-6,80	6,08	-0,74	-1,60	4,48	3,26	0,20
Galicia	ES11	-2,80	5,73	0,37	-2,88	-0,43	3,71	0,31
Principado de Asturias	ES12	-6,90	5,62	-1,78	-1,07	-1,57	1,22	0,08
Cantabria	ES13	-9,40	6,96	-0,09	-2,18	1,50	2,38	0,02
País Vasco	ES21	-8,30	6,81	-0,14	-0,93	0,38	5,35	0,09
Comunidad Foral de Navarra	ES22	-3,50	5,97	0,16	-1,30	4,67	3,45	0,35
La Rioja	ES23	-5,70	5,80	-1,14	-3,09	6,12	6,66	0,18
Aragon	ES24	-6,00	5,85	-0,89	-2,40	1,20	3,21	0,17
Comunidad De Madrid	ES3	-9,50	6,44	-2,58	-0,08	8,65	4,41	0,22
Castilla y León	ES41	-5,50	5,74	0,64	-4,09	-1,88	1,46	0,30
Castilla-la Mancha	ES42	-6,40	5,62	1,45	-5,28	4,19	3,05	0,04
Extremadura	ES43	-7,10	6,51	-0,11	-0,52	-0,39	2,42	0,25
Catalonia	ES51	-5,90	5,44	-1,69	-0,45	4,79	3,98	0,35
Comunidad Valenciana	ES52	-6,70	6,29	-0,46	-1,65	7,66	2,57	0,24
Illes Balears	ES53	-1,90	6,02	-0,49	-0,64	15,28	3,28	0,06
Andalusia	ES61	-7,70	6,42	0,74	-2,57	3,67	1,93	0,01
Región de Murcia	ES62	-9,10	6,72	0,65	-2,40	10,15	3,69	0,07
Ceuta y Melilla	ES63	--	1,57	--	--	3,04	--	--
Canaries	ES7	-6,20	5,82	2,58	-1,42	11,52	-10,39	0,11

Source: MERIT based on Eurostat data for period indicated

From this first general classification, it becomes possible to adapt the general typology to the Spanish situation, since within the second group of “Southern Cohesion regions" there are clear differences between Illes Balears (Southern Cohesion 1) and the rest (Southern Cohesion 2).

Economic growth in the Illes Balears in recent years has been based on “sun, sea and sand” tourism and the services associated with this activity (including construction); and, to a lesser extent, on the consumer goods industry. This has led to a paradoxical situation of low R&D expenditure in one of the highest per capita income Spanish regions. The science, technology and innovation system is under-developed, with a low percentage of GDP spent on R&D and few researchers. At the same time, Balears has innovative enterprises in the tourist industry active around the world (Meliá, Barceló, and Iberostar). These enterprises need to maintain a high level of innovation in processes and products and they need to use different technologies to remain competitive in this mature sector; in fact, the number of innovations in hotel industry

is bigger that in many industrial sectors[6]. However, this is not a formalised R&D activity, and is not included in statistics. Therefore innovation in the tourist (neither in service) sector has not been considered a component of Spanish RTDI policies and in Baleares is only in the last years that major efforts have been made.

In spite of their intentions to diversify production towards others industrial sectors and, in urban areas, services, in the other regions, i.e. Castilla la Mancha, Extremadura, Murcia and Andalusia, agriculture and agro-food remains a major presence in relative terms, and there are highly competitive. In Murcia and Andalusia tourism and construction activities are of big importance. Weaknesses as regards RTDI are:

- Low private R&D expenditure in terms of GPD, accompanied by a greater public effort since the 90s (much lower in Castilla la Mancha that in the others).
- Inadequacy of the technological transfer system and little collaboration between public and private sectors.
- Insufficient human capital, as science and technology education and the number of senior and junior researchers is well below the European Union average.
- Groups and research centres too dispersed, the lack of critical mass hindering the quality and quantity of scientific production in the system.
- Lack of effective coordination between the main players involved in techno-scientific and technological innovation and development policies and programmes.

Although the group of regions forming the "Ageing Academia" cluster is less heterogeneous, some subdivisions may be made. To begin with, the Ageing Academia group 1 includes regions that historically have led the country's industrial development, namely the Basque Country and Catalonia, along with Navarra that is a more recently industrialised region. Higher per capita income levels, and a highly qualified labour force, put them in the forefront of R&D expenditure in Spain. They have technological development policies and an important level of private investment in R&D and innovation. The Basque Country and Catalonia have a broad network of research centres. However, as the technological development has occurred only in the last 20 years, in a European perspective, this group still suffers from a relatively low level of R&D expenses and little cooperation on technological transfer between universities and business world.

The other regions (Aragon, Asturias, Cantabria, Castilla y León, Galicia, La Rioja, Valencia) in the Ageing Academia 2 cluster, are regions with declining industries or which form part a second wave of industrial development in Spain, which in the 1970s and the 80s moved away from agriculture and mining. RTDI-related weaknesses include:

- Few financial, economic and human resources devoted to R&D (0,7-0,9%/GDP with the exception of Cantabria that remain at 0,47% for 2003).
- Collaboration between public and private sectors on technological development remains scarce. This leads to a low technological innovation rate and an imbalance between private and public expenditure on R&D (private expenditure

[6] "Estudio Exploratorio sobre Innovación en el Sector Turístico Balear", Cotec, 2001; "Pautas de Innovación en el Sector Turístico Balear", Cotec, 2004

on R&D ranges from 0.18%/GDP in Cantabria to 0.47% in Castilla y León, which has the highest rate of all the Objective 1 Spanish regions).

- The inadequacy of the system for transferring research results from the scientific system to the production system. Research rarely corresponds with the specialized production sectors and there are major difficulties in promoting cooperation between different players.

2.3 Conclusions: innovation and knowledge performance

Low productivity in the Spanish economy is one weakness with an important impact on RTDI activity. High job creation rates are concentrated in low technology level activities requiring a largely unskilled workforce. Consequently, highly skilled labour tends to be absorbed slowly. The fact that the Spanish economy specializes in non high-tech sectors of industrial activity produces a similar dampening impact on innovation.

Much Spanish private RTDI activity is concentrated in Madrid, Basque Country and Catalonia (70% of the total private Spanish expenditure in R&D, Cotec page. 99). With the exception of the Castilla y León, enterprise RTDI expenditure is lower than public expenditure in all Objective 1 regions.

Exhibit 4: summary of key disparities and needs per region

Region / group of regions	Key factors explaining disparity of performance (weaknesses)	Key needs in terms of innovation and knowledge economy
Local sciences & services (Madrid)	▪ Basic Public research important, with strong tradition of excellence, and less oriented to business world ▪ Largely unstructured system of R&D, explained in part by the strong weight of the State Administration compared with the Regional Government. ▪ Low transfer levels. ▪ Few attention to the SME explained by the presence in the region of the most important Spanish enterprises	▪ To maintain the growth in R&D expenses. ▪ Improve the technological transfer system, reinforcing the synergies between Research Centres (Universities, CSIC) and enterprises ▪ To develop a network of territorial service centres that permit to support the SME's.
Southern Cohesion 1 (Illes Balears)	▪ Shortage of researchers. ▪ Incipient level of technological transfer institutions ▪ Lack of support resources ▪ Inadequacy of instruments to support innovation in tourism	▪ Adapted Science Technology Plan ▪ Allocated biggest resources in R&D activities, as well public that private. ▪ Growing attention to innovation in services and tourism. ▪ Develop specific measures to promote the private-Public cooperation in innovation tourism activities.
Southern Cohesion 2	▪ Absence of big tracking	▪ Creation and development of

Region / group of regions	Key factors explaining disparity of performance (weaknesses)	Key needs in terms of innovation and knowledge economy
(Castilla-La Mancha, Extremadura, Murcia and Andalucía)	companies. ▪ Specialization in traditional sectors, without the development of specific R&D&I policies adapted to this. ▪ Shortage of researchers in private sector ▪ Incipient transfer level ▪ Traditional popular culture, not addressed to technology and science activities	service centres in the territory. ▪ Planified creation of technological infrastructures answering to the priorities of the Regional Strategy. ▪ Measures adapted to the needs of SME in traditional sectors. ▪ Programmes to promote the public-private cooperation and to diffuse the culture of innovation.
Aging Academia 1 (Basque Country, Navarra, Catalonia)	▪ Low rhythm of creation of New Enterprises Based in Technology. ▪ Underdeveloped high-tech services sector ▪ R&D&I policy more oriented to the technology and not linked to University (with the exception of Catalonia) ▪ Lack of big enterprises in hi-tech sectors.	▪ Maintain the rhythm of growth in R&D expenses. ▪ Science system more integrated with innovation activities. ▪ More attention to the enterprises that are not making R&D activities. ▪ To maintain the monitoring activities over the system, to avoid duplications
Aging Academia 2 (Galicia, Asturias, Cantabria, La Rioja, Aragón, Comunidad Valenciana and Castilla León)	▪ Universities and support bodies with little tradition. ▪ Strong presence of low-tech sectors with low level of creation of NEBT ▪ Difficulty to attract new foreign investments in the knowledge sectors ▪ Low expenditure in R&D. ▪ Centres and research groups dispersed, with difficulty to obtain the critical mass to be competitive in a global perspective (due to the low level of expenses in R&D as well to the small dimension of the regional markets).	▪ Need of a well defined network of technological and innovation centres. ▪ Increase the level of R&D expenditure, in particular in the private sector ▪ To promote a change in the mentality of the University sector ▪ Bigger public-private cooperation. ▪ Effective leadership.

3. Innovation and knowledge: institutional context and policy mix at national and regional levels

Structural Fund support for innovation and knowledge is contingent on and seeks to strengthen the existing national (and/or regional) innovation system[4] in each Member State. In particular, institutional, legal and financial factors in the innovation system can limit the potential for certain types of intervention. Moreover, within the framework of the EU's Lisbon objectives, Structural Fund interventions are expected to complement and provide added value to the national (or regional) policy framework. In some Member States, Structural Fund interventions in favour of innovation and knowledge are marginal with respect to the national investment and policy effort; in others, Structural Funds provide the main source of funding for such interventions. In both cases, there is a need to identify relevant national and EU policies that might have an impact on decisions on funding priorities.

3.1 Institutional and legal framework for innovation and the knowledge economy

This section appraises two major factors that condition the potential for coordinated intervention of EU and national (regional) policies in favour of innovation and knowledge:

- The first concerns the organisational structures of public and semi-public bodies responsible for the design, implementation and monitoring of innovation and knowledge economy policies.
- The second concerns the institutional, legal and financial frameworks, which condition the linkage of national (regional) financing with EU financing.

In Spain, Structural Funds are managed inside the national programmes, and there are no specific sectorial bodies linked to them. For this reason, it is necessary to understand the overall Spanish innovation system to explain how the Funds are used in favour of innovation and knowledge. At the same time, it is should be remembered that under the Spanish Constitution, innovation policy is largely the competence of the Autonomous Communities (regional) governments while science and research policy is essentially a national competence. Hence, a lot of policies and measures that support enterprise level innovation activities are developed at regional level, and the Structural Fund programming documents often poorly explain these activities.

[4] The network of organisations, individuals and institutions, located within or active within national or regional boundaries, that determines and shapes the generation, diffusion and use of technology and other knowledge, which, in turn, explain the pattern, pace and rate of innovation and the economic success of innovation.

Diagram 1 shows the present general Spanish innovation policy governance system[5]. This ministerial organisation underlines the commitment of the Spanish Government to foster the integration of science, technology and industry matters, and a commitment to the information society and its integration within a global framework according to the guidelines of the EU Lisbon Strategy. More precisely, a separate body, the Inter-ministerial Commission on Science and Technology, is in charge of coordinating the activities of the Ministries related to R&D and innovation policies and is supported by the Secretariat-General of Scientific and Technological Policy.

There are two main consultative and support departments: the **General Council of Science and Technology** and the **Advisory Council for Science and Technology**. The General Council of Science and Technology has as a main mission to ensure coordination amongst the Autonomous Communities and the relations between them and the central administration. The **Advisory Council for Science and Technology Policy** was created to promote a more participatory approach to the design and development of R&D policy. These bodies were created with a view to fostering a more coherent and integrated framework able to develop the National Plan in a optimal way. However, the outcome is somewhat less positive and in fact they have not had an important effect on the improvement of the coordination between the different administrations. This is largely because they have no real powers to decide about the application of the budget, and depend on the good will of the administrations responsible for the sectorial or regional policies.

At an operational level, the Secretariat of Universities and Research Policy of the Ministry of Education and Science, and in particular the Directorate Generals for Research and for Technological Policy, manage and control activities and actions included in the National R&D and innovation Plan and to support large-scale research installations. It does this in co-operation with the Autonomous Communities and other Ministries.

In the Ministry of Industry, Tourism & Trade, the **Secretariat-General of Industry** plays an important role in innovation policy, and is the divided in two Departments:

- The DG of Industry, with competences related to R&D and innovation policies. This department manages all subsidies related to industrial innovation.
- The DG of SME Policy, in charge of the promotion of public policies to encourage the development and creation of small and medium enterprises.

In the same Ministry, the **State Secretariat of Telecommunications and Information Society**, with powers in communications and ICT, is also a key player given the importance of information and communication technologies and the diffusion and uptake of such technologies as a driver for innovation[7].

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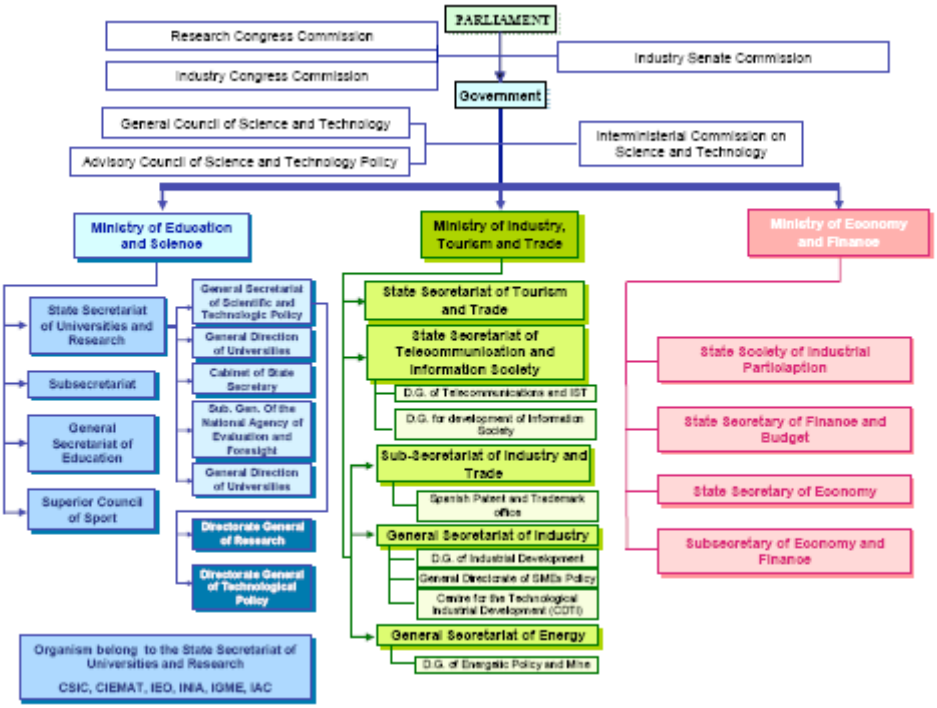
[5] See the European Trend Chart on Innovation, "Annual Innovation Policy Trends And Appraisal Report. Spain. 2004-5". European Commission, 2006. Available at: http://trendchart.cordis.lu/reports/documents/Country_Report_Spain_2005.pdf

[7] The State Secretariat is divided in two departments: The DG of Telecommunications and ICT. Its main areas of activity are the planning, promotion and development of infrastructures and services related to telecommunications and the information society; and the DG for the development of the Information Society. This department works to foster the Information Society in all social and economic fields (citizens, companies, public administration, etc.).

Diagram 1: Spanish Innovation Policy Governance System



Source: European Innovation TrendChart, Country Report for Spain, 2005

Other Ministries are also involved in the national innovation policy governance system, such as the Financial Affairs Ministry and the Ministry of Health. The Financial Affairs Ministry is responsible for Spanish fiscal policy and has the global responsibility for public budgetary development. It designs fiscal incentives for research and development activities. The main objective of the recent set of regulatory reforms is to stimulate private investment in technological innovation and to support the start-up of NTBFs. The Ministry of Health is responsible for promoting research on genomics via the Genomics and Proteomics Research Foundation.

As a specialised agency, the Centre for Technology and Industrial Development (CDTI)[8] plays an important role offering funding to enterprises working on new innovative activities. The financing given by CDTI basically comes from own resources and from the ERDF. The mission of CDTI is to help Spanish companies improve their technological level by: financing business R+D+I projects; managing and promoting Spanish participation in international programmes of technological co-operation; supporting business technology transfer, promoting the creation and consolidation of technology-based companies.

In general, the national Ministries support R&D and innovation activities by launching tenders to finance (by grants or by loans) enterprises, technological centres or universities. It is important to underline that these tenders are managed at a central level, without a network of regional representatives, and for this reason they are particularly relevant for the more innovative enterprise, but have not been instrumental in promoting a general upswing in innovation activity, in particular in the less developed territories or in the less advanced industrial sectors.

[8] http://www.cdti.es. The Centre for the Development of Industrial Technology (CDTI) is a public business organisation under the Ministry of Industry, Tourism and Commerce.

At the regional level, all Spanish regions have developed plans for the promotion of research, technological development and innovation. They have regional ministries in charge of sectorial policies, with their own budgets and the powers to define specific regional measures. Since 1995, Spanish regions have been relatively active in developing regional innovation strategies (RIS), notably with the support of the ERDF (first under Article 10 during 1994-99 period, seven regions, and then with the support of the Innovative Actions since 2000, all Spanish regions but with seven focusing specifically on the knowledge and technological innovation theme[9]). The ex-post evaluation of the RIS at European level[10] noted that the EU intervention had a positive effect in terms of contributing to better management practices and more effective strategies being developed, with Castilla y Léon being cited as an example. Interestingly, this region was the precursor of the RIS trend in Spain, as one of eight Regional Technology Plan pilot projects funded during the 1994-96 period[11].

In the majority of the regions, there now exist regional development agencies in charge of competitiveness policy, working as well on the promotion of innovation and entrepreneurial activities. Over the last decade, almost all regions have supported, notably through Structural Fund programmes, the creation of technological centres, technological parks, business innovation centres and other technological infrastructures. This has led to a thickening of the institutional support systems in the Spanish regions, although whether this has improved effectiveness of support to enterprises or not is a moot point.

The growing importance of regional RTDI policies requires close coordination with the central government's actions and this is becoming increasingly important. Although there have been various attempts over time to create co-operation mechanisms, the general impression remains that effective and satisfactory coordination has still to be achieved. In the future, it would help the development of a national strategy to explore more fully the potential for collaboration between the different regions. Such co-operation is particularly important because starting from such a low level of R&D and innovation activities, the Spanish regions risk to duplicate similar infrastructures, with each individual initiative unable to achieve the critical mass need to be effective at national or European levels.

Both at national and at regional level, there is only a limited number of private institutions working in the innovation promotion field. The most important ones are the technological centres, but while on paper they are often private legal entities, in the majority of cases they are dependent on public initiatives and public budgets. One main exception is COTEC[12], a Foundation, created in by a group of Spanish enterprises with the support of the King, that has played an important role in the promotion of a culture more oriented to R&D and innovation. COTEC has notably published a series of White Books on Regional Innovation Systems, providing diagnostics and recommendations for improvement, as well as an annual report on innovation and technology in Spain.

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9 http://ec.europa.eu/regional_policy/innovation/cartes/prai_es_mai2004.pdf
10 http://ec.europa.eu/regional_policy/sources/docgener/evaluation/rado_en.htm
11 http://ec.europa.eu/regional_policy/innovation/innovating/inno-pro.htm
12 www.cotec.es

Exhibit 5: main organisations per policy area

Policy objectives	Type of organisation	
	National (and/or regional) public authorities and agencies	**Key private or non-profit organisations**
Improving governance of innovation and knowledge policies	▪ Regional Governments ▪ Ministry of Industry, Tourism and Trade ▪ Ministry of Education and Science ▪ CICYT, Inter-ministerial Science and Technology Commission	▪ FECYT, Science and Technology Spanish Foundation
Innovation-friendly environment	▪ Regional Development Agencies ▪ Min of Industry, Tourism and Trade ▪ ICO, Official Credit Institute ▪ Ministry of Education and Science ▪ CDTI : Centre for Industrial Technological Development ▪ Ministry of Economy	▪ COTEC (Spanish Foundation for the Promotion of R&D) ▪ Entrepreneurs Association ▪ Chambers of Commerce
Knowledge transfer and technology diffusion to enterprises	▪ Ministry of Education and Science ▪ INIA - National Institute of Agriculture and Food Research ▪ OCYT, Organisation of Science and Technology	▪ Science Parks ▪ Technology Centres ▪ IRCs ▪ University-Enterprise Foundations ▪ OTRI, Tech Transfer offices
Innovation poles and clusters	▪ Min of Industry, Tourism and Trade	▪ Technological Parks ▪ Entrepreneurial Associations
Support to creation and growth of innovative enterprises	▪ CDTI - Centre for Industrial Technological Development ▪ ICO, Official Credit Institute ▪ Regional Development Agencies	▪ ANCES (Spanish Association of BIC) ▪ Associations of Young Entrepreneurs Chambers of Commerce
Boosting applied research and product development	▪ Ministry of Education and Science ▪ CDTI - Centre for Industrial Technological Development ▪ Ministry of Industry, Tourism and Trade ▪ Regional Governments.	▪ Carlos III Foundation ▪ Technology Centres ▪ Foundations University-Enterprise.

Source: study team based on national/regional policy documents, Trend Chart reports, OECD reports, etc. See appendix C for a detailed definition of the policy categories.

Some specific issues arise for both national and regional innovation systems due to the way that institutions are set up, interact and are managed. At the highest conceptual level, and this is a motif of this paper, it is in general very difficult to make precise claims about the effectiveness or otherwise of policy implementation and impact as a result of the almost complete lack of evaluation. It is difficult enough to describe this complex system but to assess its effectiveness or efficiency or to propose that certain levers will be better than others to pull for clear reasons is almost impossible.

The research and innovation system must become a 'learning system' as a matter of the greatest urgency. It is said that everything is evaluated, and in fact it is true, there are quality and assessment agencies all over the place, but they are 'bean counting' units and the system suffers chronically from knowing 'the price of everything but the value of nothing' to paraphrase Oscar Wilde. A way must also be found to persuade people that evaluation is about learning, not just about punitive judgement. The same

idea goes for regional systems: do we have enough support institutions and the right ones, is currently a very difficult question to judge.

At institutional level it is clear that inter-ministerial coordination needs to be improved radically, and that in the opinion of some, the Ministry of Science and Technology was a good coordination point, but that has now been eliminated. Policy is highly fragmented and a clearer innovation strategy needs to emerge that is properly coordinated with broad reforms in other fields, such as labour market and competition reform.

At a more detailed level it difficult to say that there is a shortage or a lack of institutions. For example, between firms and university R&D labs there are university institutes with business partners; contract research institutes supported by universities; independent R&D centres, some not for profit; technology diffusion offices, sector technology adoption offices, sectoral productivity centres; and others. However, it is very difficult indeed to say what is missing from this mix for users of the system without much more system level intelligence. Nevertheless, it can be said confidently that there is a problem with high level coordination, a problem with strategy and the setting up of clear, performance related targets, a problem with implementation tactics and the fine tuning of policy instruments, a tendency to use the same tools for a number of purposes rather than identify pressing issues and respond to them specifically, that there is too wide a gap between support to basic research and support to business and that there no matching of supply and demand.

In general, it might be said that after many years of high levels of public investment dedicated to building infrastructure it must be assumed that the physical base of institutions does not need to be augmented without very clear reason and that the clear challenge is now to find ways to 'wire-up' and target resources, employ highly motivated specialised staff on regular contracts and get everything working against common, simple, realistic agenda. It seems unlikely that, without the staffing and strategy and motivational issues being improved that any more 'bricks and mortar' investments would see a good return on investment in this field. All these general issues will be explored in greater detail in section 5 and 6, below.

3.2 Policy mix assessment

This section provides an overview and analysis of the national and regional policy mix in favour of innovation and knowledge in which the Structural Fund interventions take place. The analysis is conducted with respect to seven broad categories of objectives of innovation and knowledge policies (see appendix C for an explanation of each category).

Measures identified per category of the policy objectives are then further sub-divided in terms of the direct beneficiaries of funding (or legislative) action. To simplify, the report adopts three broad types of organisation as targets of policy intervention:

- Policies supporting academic and non-profit knowledge creating institutions;
- Policies supporting intermediary/bridging organisations involved in innovation support, technology transfer, innovation finance, etc.;
- Policies providing direct support to innovation activities in the private sector.

Since 2000, the Spanish policy focus on science and technology has begun to shift from an R&D oriented policy towards an innovation-oriented approach, At National level, the **Research, Development and Innovation Plan (R&D and innovation Plan 2004-2007)** [13] is the overall R&D strategy and public innovation policy. The plan covers a broad range of scientific areas and also considers measures directed towards innovative enterprises, support to technological innovation and R&D excellence. The plan provide a general framework for the development of different measures and programmes; but leaves the development of new sectorial R&D activities to the responsibility of the respective Ministries.

The plan set a series of objectives: i) improve Spanish science and technology levels; ii) increase human resources devoted to R&D and innovation (both in the public and the private sector), iii) reinforce researchers' rights; iv) strengthen Spanish science and technology in the international sphere (especially in the European Research Area); v) support major infrastructure interventions and vi) Promote the perception of the role of basic research in society by publicising its new findings.

The current Spanish Government's priorities for Science and Technology are:

1. Favouring the mobility of researchers from universities and Research Centres to the private sector and Technology Centres
2. Encouraging the employment of young researchers in public and private sector.
3. Favouring R&D cooperation between research groups and businesses by creating new R&D instruments for large projects: Proyectos Estratégicos (Strategic Projects) and Proyectos Singulares (Single Projects).
4. Favouring the participation of Spanish partners in new European projects by creating National Technology Platforms.

In order to increase the number of innovative enterprises, a new fiscal environment was created in 2003, with greater deductions and less bureaucracy. Finally, to improve the national innovation system, the Government considers that the solution lies not only in increased R&D and education resources but also in strengthening the

[13] See the European TrendChart on Innovation Report for Spain 2005, www.trendchart.org

relationship between science and technology players (universities, businesses and public administrations). The overall objective set by the Government is for GERD to reach 1.5% of GDP in 2007 and 2% in 2010.

The matrix below summarises the current policy mix at national level. Intensity of support (financial or political priority) for different policy areas and targets is indicated by a simplified colour coding system.

Exhibit 6: Policy mix for innovation and knowledge

	Target of policy action		
Policy objectives	**Academic /non-profit knowledge institutions**	**Intermediaries/bridging organisations**	**Private enterprise**
Improving governance of innovation and knowledge policies			
Innovation-friendly environment			
Knowledge transfer and technology diffusion to enterprises			
Innovation poles and clusters			
Support to creation and growth of innovative enterprises			
Boosting applied research and product development			
Legend			
Top policy priority			
Secondary priority			
Low priority			

Source: calculations of study team based on national/regional policy documents, Trend Chart reports, OECD reports, etc.

Improving governance of innovation and knowledge policies is largely achieved through the national plan. This plan clearly states that "innovation stands for the result of multiple interactions between the existing players: universities, public and private research centres, enterprises and enterprise groups, financial entities, users and public administrations." The Regional Plans play the same role in each autonomous region.

Innovation-friendly environment is reflected in the wide-ranging PROFIT programme[14]. The Government uses this technical research development programme to structure a group of measures designed to stimulate enterprises and other organizations to perform research and technological development. It also provides support to innovative businesses through instruments favouring an entrepreneurial environment. Endowed with 660 millions Euro per year, it is co-financed by the Structural Funds.

[14] See: http://www.trendchart.org/tc_datasheet.cfm?id=6288

In addition, each region has their own range of measures to promote and support R&D and innovation activities, in both research centres and in enterprises. Certain regions have developed measures to stimulate the participation of less advanced enterprises and areas in innovation activities. This is done by funding outreach activities of personnel of regional innovation intermediaries with the aim of fostering a change in the attitudes of the entrepreneurs. This is the case of the Network of Agents to Promote Innovation in Peripheral Areas in Castilla y Leon supported under the LEGITE Innovative Actions programme (ERDF co-funded)[15], or the Network of Technological Spaces in Andalusia (RETA)[16]. Both these networks have people working in the field, all around the region, to visit entrepreneurs and to encourage them to participate in projects supported by the regional innovation policy.

Knowledge transfer and technology diffusion to enterprises is broadly picked up in most of the programmes on technological innovation, at national and regional level. The 40 million Euro PETRI programme[17] to stimulate the transfer of research results seeks to facilitate the acquisition and the transfer of knowledge and technology by enterprises, especially through co-operation initiatives.

The generalised process of developing technology centres at regional level has helped to improve the transfer process. The risk in the future is the individual investments of the various regions generate a multiplication of similar institutions with a limited market for their activities. In some way this risk exists already for the automotive or aeronautical sector centres, which almost all regions are aiming to develop. On the other hand, the technological centre for shoes (INESCOP), with its headquarters in the Valencia region, has subsidiaries in other regions of Spain which enable it to mobilise and profit from wider range of expertise and at the same time generate new competences in the region.

Innovation poles and clusters have not been sufficiently developed to date in general Spanish R&D and innovation policies. This is therefore now considered a high-priority objective. However, a few regions have implemented specific cluster support policies (notably the Basque Country and Catalonia since the early nineties) and could serve as examples for the other Spanish regions.

One phenomenon in Spain is the development of a network of technology parks to facilitate a cooperative environment. They are now important actors in the innovation system, and some of them (Cartuja 93 in Sevilla, PTA in Malaga, Boecillo in Castilla y Leon, for instance) represent a pole of new hi-tech clusters in their regions. In other cases, as is the Basque Network, they are concentrating a large part of the private regional R&D, representing a point of reference as well to stimulate new innovative comportments that stimulate new forms of industrial urbanism. The development of this instrument has received important support from regional governments, and more recently from one specific measure of the Ministry of Education and Science, which finances collaborative research to enterprises located in technological parks.

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15 See: http://www.jcyl.es/jcyl-client/jcyl/cee/ade/temas/legite

16 Seehttp://www.reta.es/. RETA is composed of 33 members including 8 science and technology parks and 19 innovation and technology centres.

17 See: http://www.trendchart.org/tc_datasheet.cfm?id=6426

One example of the kind of measures introduced as **support to creation and growth of innovative enterprises** at national level are changes to the regulatory environment to facilitate the creation of new business, with a simplification of the procedures and the creation of a network of one-stop-shop in different villages. To support their growth, the national government has developed agreements with the ICO (Official Credit Institution) to provide access to finance at more favourable than market conditions. At regional level, almost all the regions have programmes to foster a more entrepreneurial culture, to promote new entrepreneurs, to finance them, and they have created incubators and BIC (normally all these measures co-financed by Structural Funds)

A key contribution to **boosting applied research and product development** at the national level is the Ministry of Education and Science's "Support for technical research for strategic and single scientific-technological projects" programme[7]. Endowed with 125 millions Euro in 2005, this is a key factor in providing "an appropriate infrastructure to leading-edge businesses and to facilitate their growth and survival." It is co-financed by the Structural Funds. There are also programmes for smaller projects of cooperative research, managed by Ministry of Education when they involve Public Institutions of Research (OPI) and by the Ministry of Industry when they involve only enterprises and technological centres. Certain regions have also launched programmes that co-finance this type of activity.

One trend is the emergence of a series of science parks, launched normally by universities with the aim to promote the commercialisation of their research as well as the creation of new enterprises based on this research. Normally oriented to knowledge intensive activities such as biotechnology, in some cases they are already operational (Science Park of Barcelona University, a first example of a joint Science Park launched by Complutense and Autonomous Universities of Madrid) or in the start-up phase (as in Granada). In some cities, such as Salamanca or Granada, Science Park could be an effective way to facilitate the diversification of the local economy, since the only real sources of new knowledge are the researchers of the university, but which until now have not been incited to consider the economic spillovers of their activity.

Increased investment in basic research capacities has inspired several programmes of the Ministry of Science and Education at national level and programmes in each region to support investment in new leading-edge infrastructures or basic research projects developed by leading teams, including programmes to finance university investments in research infrastructures. There are too programmes to facilitate the training of young researchers and to attire senior researchers to Spanish Universities.

[7] CICYT, 2006, Command PRE/402/2006, 16 February, (BOE. 20-02-2006) and Command PRE/690/2005, 18 March, (BOE 19-03-2005).

3.3 Conclusions: the national innovation system and policy mix

In Spain, basic RTDI promotion measures are structured and supported by both the national RTDI Plan and regional development and innovation policies at the level of the autonomous communities. There has been a gradual shift over the last decade in the use of available funds (with funding programmes for RTDI as often as not being co-financed by the Structural Funds) from supporting basic university research and industrial research to paying more attention to improving the environment for innovation (networks, technological parks, clusters, etc.).

The different instruments developed by the various national and regional institutions cover a broad range of basic needs, both of enterprises and of researchers. However, these measures are more addressed to already innovative enterprises than to traditional firms; in general these are reactive (they provide financement) and not proactives (they do not have the means to change in an active way the behaviour or capacities of enterprises in terms of their innovation management and processes and thereby stimulate new activities). At the same time they are conceived in the majority of cases from a linear perspective, namely, based on the assumption that it is enough to inject finance in one part of the system to generate the desired final output (improved competitiveness of enterprises).

There are only a few cases where innovation policies are designed from a systemic point of view with the aim of improving the overall functioning of the innovation systems. These exceptions can be found in the regions that have developed in a consequent way the Regional Innovation Strategies Programme of the DG Regio (for instance Castilla y Léon), and in regions such as the Basque Country or Catalonia that have developed technological and industrial policies since the 1980s. This conclusion underlines the importance of continuing to invest in improved policy planning, design and evaluation capacities for innovation at national and regional levels during the coming programming period.

In Spain there is a higher share of SMEs than the European average, and a smaller presence of hi-tech enterprises; at the same time there is a strong presence of non-research intensive activities, such as tourism. From an objective point of view, this creates a difficulty to increase the rate of R&D expenditure. In the future, if the responsible of the innovation policy want to reach the Lisbon objectives, they have to take in account these characteristics and to define a more innovative innovation policy, better adapted to the national and regional reality.

The bottlenecks to developing a new 'innovation systems' type policy are numerous. They need to be managed by more abundant and qualified personnel, at a moment where administrations are reluctant to increase their personnel. They have to be maintained over time and they give results only after a long period. Finally, they involve significant changes and adaptations to the institutional and programming realities, which the administrative and financial control services have difficulties to support. All of this suggests the need for increased 'policy learning' and training actions targeting those responsible for the design, implementation and control of Structural Fund interventions in favour of innovation and knowledge in Spain.

Exhibit 7: Key opportunities and constraints for investment by the Structural Funds

Policy objectives	Opportunities for Community funding (national priorities)	Constraints or bottlenecks (factors limiting Community funding)
Improving governance of innovation and knowledge policies	▪ Adaptation to specific regional and sector needs. ▪ Adopt an integral and global approach of the problematic	• Overlapping between regional and national policies • To define policies based on "copy and paste" success cases in other countries.
Innovation-friendly environment	▪ Stimulate the participation of SMEs of traditional sectors in R&D&I activities ▪ Promote the generation of synergies in RTDI between the different actors	• Tendency to think only in terms of promotion of hi-tech activities • Lack of entrepreneurial culture in innovation in mature sectors.
Knowledge transfer and technology diffusion to enterprises	▪ Promote a more entrepreneurial attitude in researchers ▪ Labour mobility of researchers between university enterprises and technological centres.	• Difficulties to link the university, technology centres and enterprises.
Innovation poles and clusters	▪ Promote the spirit of cooperation between entrepreneurs ▪ To maintain the support policy to Technological and Science Parks ▪ To define the measures to favours the activities developed in a collective way	• Lack of civil cooperation culture • Difficulties to finance so immaterial activities as collaboration • Poor development and institutional promotion of this kind of activity
Support to creation and growth of innovative enterprises	▪ Support the creation of spin-offs, nurseries, incubators and financial instruments that really assume the risk. ▪ To define specific risk financial instruments adapted to the low potential rate of growth of the new innovative enterprises	• Too much "commercial bank mentality" amongst the responsibles of the financing programmes • Absence of entrepreneurial culture and capability at university and research centres
Boosting applied research and product development	▪ Promote pilot cooperation projects between university, technology centres and business. ▪ Development of technological or service centres where non-existent.	• Lack of culture of cooperation.

4. Structural Fund interventions to boost innovation and create a knowledge economy: 2000-2006

This section analyzes patterns of Structural Fund expenditure in innovation and knowledge-based economy in the current programming period (2000-2006 for EU-15 or 2004-2006 for the new Member States). It looks at these patterns from a strategic point of view (the policy mix pursued by Structural Fund programmes) and at operational level (fund consumption, management of innovation measures, indications of relative effectiveness of measures, case studies of 'best' practices).

4.1 Strategic framework for Structural Fund support for innovation and knowledge

4.1.1 Strategic approach to innovation & knowledge in Structural Fund programmes

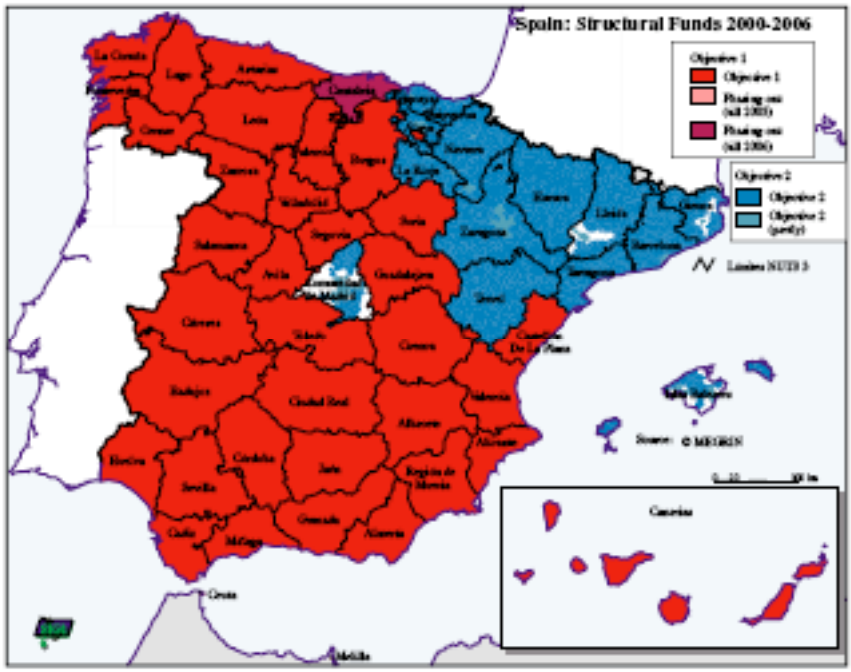
The Community Supporting Framework (CSF) for Spain 2000-2006 for the Objective 1 regions has nine priority axes of development, of which only one, "Knowledge Society" (Innovation, R&D, Digital society), relates to research, technological development and innovation (RTDI) type measures. The development strategy is defined through 23 Operational programmes, 12 of which are regional (one for each Objective 1 region, see Exhibit 8b) and 11 multiregional, of which only the "ERDF-ESF Operational programme on Research, Development and Innovation" concerns this study. This OP has allocated 2,418,925,670 Euro of eligible expenditure, of which 1,693,316,041 Euro come from the Structural Funds.

The multiregional programme aimed to coordinate regional R&D capacity and activities, convergent action by central administration and the autonomous Communities, and synergies with regional programmes. The ESF part of the multiregional programme is structured around 2 high-priority axes: Priority 1: Support investment in human capital involved in research, science, technology and the transmission of knowledge to the production sector (307,530,171 €); and Priority 7: Technical assistance (801,394€).

The ERDF part of the programme is structured in 6 axes:

- Priority 2: Research, Technological and Innovation Projects (1,167,791,418€)
- Priority 3: Scientific equipment (546,094,552€)
- Priority 4: Technology Transfer (91,555,279€)
- Priority 5: Public Research Centres and Technological Centres (250,501,427€)
- Priority 6: Large Scientific Infrastructure (54,091,429€)
- Priority 7: Technical Assistance (560,000€)

Exhibit 8a: Structural Funds – Eligible areas in Spain for Objective 1 and 2 (2000-2006)



Source: Inforegio, 2006

Going to the regional OP, the Objective 1 regions devoted almost 5% of total funds to RTDI, and the Objective 2 regions, something more than 28%. All these funds are provided by ERDF, and are supplemented by national public funds. It is interesting that no private co-funding has been reported for RTDI as co-financement, when in the reality it is clear that in some of the measures there are private expenditures.

Exhibit 8b: Overall allocation of resources at objective 1 and 2 levels (planned figures in Euro)

Objectives	Total cost	SF			NF	
		Total	ERDF	ESF	Public	Private
RTDI INTERVENTIONS						
Objective 1	2 912 892 577,55	2 058 601 252,68	2 023 801 499,68	-	854 291 324,87	0,00
Objective 2	1 638 976 574,67	819 488 287,34	819 488 287,34	-	819 488 287,34	0,00
TOTAL COHESION POLICY						
Objective 1	63 984 867 725,00	41 263 277 733,00	25 315 803 145,00	9 143 822 543,00	21 371 658 280,00	1 349 931 712,00
Objective 2	6 168 805 714,00	2 866 760 525,00	2 551 478 500,00	315 282 025,00	3 148 531 356,00	153 513 833,00

Source: programming documents and financial data provided by DG REGIO

Exhibit 9: Regional allocation of resources (Euro)

Programs	RTDI INTERVENTIONS			TOTAL		
	Total SF	ERDF	ESF	Total SF	ERDF	ESF
Andalucia Ob.1	163.837.201,56	163.837.201,56	-	8.186.021.509,00	6.427.411.070,00	971.354.167,00
Asturias Ob.1	13.990.000,00	13.990.000,00	-	1.397.911.755,00	1.079.307.156,00	106.175.000,00
Canarias Ob.1	17.834.292,00	17.834.292,00	-	1.927.504.763,00	1.510.266.778,00	262.307.908,00
Cantabria Ob.1	7.010.170,00	7.010.170,00	-	309.609.149,00	206.960.221,00	34.776.000,00
Castilla y Leòn Ob.1	75.731.206,00	40.931.453,00	-	3.294.657.914,00	2.301.773.395,00	322.368.866,00
Castilla La Mancha Ob.1	13.323.392,00	13.323.392,00	-	2.199.563.890,00	1.528.026.050,00	242.200.000,00
Ceuta Ob. 1	-	-	-	80.499.632,00	64.899.632,00	15.600.000,00
Communidad Valenciana Ob.1	194.441.024,00	194.441.024,00	-	2.865.472.017,00	2.145.792.712,00	497.504.245,00
Extremadura Ob.1	28.692.674,00	28.692.674,00	-	2.225.177.267,00	1.579.118.955,00	363.573.000,00
Galicia Ob.1	48.482.803,12	48.482.803,12	-	3.581.255.858,00	2.438.658.270,00	409.279.463,00
Melilla Ob.1	-	-	-	60.974.287,00	50.324.668,00	10.649.619,00
Murcia Ob.1	18.234.616,00	18.234.616,00	-	1.187.426.218,00	967.416.939,00	109.551.852,00
Total Regional OPs OBJ 1	**581.577.378,68**	**546.777.625,68**	**0,00**	**27.316.074.259,00**	**20.299.955.846,00**	**3.345.340.120,00**
Aragon Ob.2	82.975.855,00	82.975.855,00	-	319.531.004,00	306.886.285,00	12.644.719,00
Baleares Ob.2	24.165.920,00	24.165.920,00	-	94.337.162,00	92.553.030,00	1.784.132,00
Cataluña Ob.2	352.917.650,80	352.917.650,80	-	1.289.001.347,00	1.036.375.488,00	252.625.859,00
La Rioja Ob.2	10.504.538,02	10.504.538,02	-	44.286.794,00	43.596.427,00	690.367,00
Madrid Ob.2	122.183.067,52	122.183.067,52	-	411.993.189,00	390.721.011,00	21.272.178,00
Navarra Ob.2	40.613.145,00	40.613.145,00	-	94.499.952,00	92.724.696,00	1.775.256,00
País Vasco Ob.2	186.128.111,00	186.128.111,00	-	613.111.077,00	588.621.563,00	24.489.514,00
Total Regional OPs OBJ 2	**819.488.287,34**	**819.488.287,34**	**0,00**	**2.866.760.525,00**	**2.551.478.500,00**	**315.282.025,00**
Local	-	-	-	1.120.298.122,00	1.120.298.122,00	-
Fisheries	-	-	-	1.570.925.014,00	-	-
Fomento del Empleo	-	-	-	3.581.936.017,00	-	3.581.936.017,00
Iniciativa empresarial y Formación Continua	-	-	-	1.626.617.037,00	-	1.626.617.037,00
Lucha contra la Discriminación	-	-	-	339.637.592,00	99.815.195,00	239.822.397,00
Sistemas de Produccion Agrarios y Medioambientales	-	-	-	1.554.813.004,00	-	-
Investigación, Desarrollo e Innovación	1.477.023.874,00	1.477.023.874,00		1.693.316.041,00	1.477.443.874,00	215.872.167,00
Technical Assistence	-	-	-	17.042.734,00	7.640.000,00	2.267.000,00
Competitividad y desarollo del Tejido Productivo	-	-	-	1.864.082.108,00	1.864.082.108,00	-
Sistema de Formacion Profesional	-	-	-	131.967.805,00	-	131.967.805,00
Information Society	-	-	-	446.568.000,00	446.568.000,00	-
Total Multiregional OPs OBJ 1	**1.477.023.874,00**	**1.477.023.874,00**	**0,00**	**13.947.203.474,00**	**5.015.847.299,00**	**5.798.482.423,00**

Source: programming documents and financial data provided by DG REGIO

In Objective 1 regions, the Comunidad Valenciana and Andalusia account for 52% of these funds, followed by Castilla y León with 13%. These three regions are in a advantageous position because in recent years they have consistently supported the promotion of innovation and research.

In relative terms (SF dedicated to RTDI over total SF), Comunidad Valenciana ("Ageing Academia 2") stands out with 6% of their OP dedicated to providing resources for RDTI. Although as regards total R&D expenditure it is in an intermediate position in Spain as a whole (0.9% of GDP in 2004), it is not surprising that the Valencia region has allocated a relatively high amount as since the 1980's the regional authorities has give attention to the R&D&I activities, in particular promoting one of the most sophisticated networks of technological centres in Spain.

Only other three regions exceed 2% (Castilla y León, Cantabria and Andalusia). Castilla y León ("Ageing Academia 2") deserves special mention as one of the Spanish regions succeeding in implementing an innovation-based industrial development strategy. In this case, the departure point was the implementation of the Regional Technology Plan (the pilot project that anticipated the RIS in other Spanish regions), that permitted the rationalisation of the technological infrastructures and the definition of a well tailored set of measures. However, perhaps more importantly, it was the means to facilitate the elevation of the R&D&I policy to being one of the most important regional political priorities. Subsequently, other Community programmes as the RIS+ and the Regional Innovative Actions have allowed the region to develop new forms of intervention that have reinforced the political and social engagement towards innovation. In this way, the intensity of the R&D effort in

Castilla y León has been boosted from 0.5% of GDP in 1995 to 0.88% in 2003, ranking it second amongst the Objective 1 regions and sixth in Spain as a whole.

In Objective 2 regions, all except La Rioja (23.7%) dedicate more than 25% of the Structural Funds to RTDI interventions; Navarra investing around 43%, followed by the Basque Country and Madrid at around 30%, expenditure levels that put these regions, together with Catalonia, at the top of the investor pyramid for RTDI activities in Spain.

The variety of programmes and the sheer diversity of Spanish regions make it difficult to measure the impact of Structural Funds programmes on R&D. However, the capacity to incorporate R&D support in policy priorities since the 1990's needs to be stressed, in line with the political priorities of the country and the Commission. In all the cases, in the same way that in the national level, the programmes financed by SF are managed inside the regular regional programmes.

The exception are the RIS/RITTS and innovative actions, which most regions in Spain have undertaken. The impact of this implementation has been very different in each region, in function of the moment where the exercise was made, the implementing body, or the continuity of the Regional Government at the end of the definition of the strategy. However, it is impossible to draw a systematic conclusions without a more specific research.

4.1.2 Specific measures in favour of innovation and knowledge.

Exhibit 10 below summarises the relative importance of policy in favour of innovation and knowledge by showing the number of specific identified measures and their share of the total funding. The calculation of total funding has taken into account both national and regional public funding, but the results should be used with caution, because with the information obtained from the programming documents it is not easy in many cases to ascertain the exact content of the measures in terms of their priority. For example, the Canaries OP has as priorities to support investment in human capital, research and innovation projects, scientific and technological equipment, technological transfer, public research and technological centres and Information Society, that at the same time are both very generic and very similar to the national priorities as explained above.

At a general level, "Innovation-friendly environment" measures, although not particularly numerous, receive the majority of funds. At regional level specific objectives tend to be rather dispersed, but what stands out is the chapter on diffusion of the digital society (mainly in Objective 1 regions). The "Improving governance of innovation and knowledge policies" policy area, especially measures relating to "Investment in human capital in research, science and technology", was also important. The type of measure included in the framework of the structural funds is just the first step in support. Many of them, especially in Objective 1 regions, focused on achieving a critical mass of R&D support.

The relative importance acquired by "Knowledge transfer and technology diffusion to enterprises" and "Boosting applied research and product development" is due more to

the specific needs of Objective 2 regions and reflects a certain shift in innovation strategy towards technology transfer (from research centres to business).

Even if there are programmes in some regions that support cluster and other poles, as exposed before, there are no regional measure financed by Structural Funds explicitly supporting this type of objective. This is not to say that enterprises located in clusters have not profited from the activities financed by the Funds. It is the same for the technological parks, which are not specifically targeted by the OPs, but which have benefited considerably from funding in all the regions by measures co-financed by SF, under measures aiming at promotion of technological infrastructures.

Moreover, RTDI measures rarely take into account "Support to creation and growth of innovative enterprises". However, this does not means either that no activities have been supported in recent years to promote new enterprises in all the regions, rather if they fall under other priorities such as enterprise competitiveness.

Exhibit 10: Key innovation & knowledge measures

Policy area	Number of identified measures (all programmes)	Approximate share of total funding for innovation & knowledge measures	Types of measures funded
Improving governance of innovation and knowledge policies	**19**	**21.3 %**	Investment in human capital in research, science and technology
Innovation-friendly environment	**19**	**27.9 %**	Schemes to finance activities in enterprises; infrastructures and services for ICT diffusion; financial engineering; education and training aimed at developing industry
Knowledge transfer and technology diffusion to enterprises	**26**	**19.0 %**	Aid scheme for utilising ICT; technology transfer projects; technology infrastructures
Innovation poles and clusters	**0**	**0 %**	
Support to creation and growth of innovative enterprises	**5**	**1 %**	Financial schemes for spin-offs and innovative start-ups: grants to SMEs to improve innovation management
Boosting applied research and product development	**10**	**17.0 %**	Industrial research projects and related infrastructure; research infrastructures for non-profit/public university centres
Multipurpose measures (addressing more than one policy area simultaneously)	**17**	**13.8 %**	Technology diffusion and encouraging applied research

NB: this is a summary of the table in appendix D2. The total of the percentage share per policy area may amount to more than 100 since certain measures fall into several categories.

These regional innovation policies have already brought major benefits, basically from the growing importance given by Structural Funds to innovation as a means of achieving regional development. The importance placed by the Community guidelines to this policy since the time of the STRIDE programme, have been a major contribution to the growing importance of RTDI policy in all Spanish regions.

In the current period of programmation, the contribution of the Structural Funds to the regional expenses in R&D&I act as an important complementary source for national public and private resources, the contribution being around 17% of the total of executed R&D expenditure (data 2000-2005). It remains to be seen whether RTDI policy has been inserted so strongly in the political priorities that is now sustainable within the regional budgets, even given a future reduction in Structural Fund support.

4.2 Learning from experience: the Structural Funds and innovation since 2000

4.2.1 Management and coordination of innovation & knowledge measures

This section reviews the overall management of Structural Fund interventions in favour of innovation and knowledge during the current period. It examines the role of key organisations or partnerships in implementing Structural Fund measures on innovation and knowledge, the links between Structural Fund interventions and other Community policies (e.g. the RTD Framework Programme) and the financial absorption of the funds allocated to innovation and knowledge.

As mentioned previously, due to the Spanish institutional characteristics and the relatively low rate of the Structural Funds over the global Spanish public expenditure, the Funds have not generated specific bodies or instruments to canalise their application. However, this does not imply that they have had no impact on the Spanish innovation system. Although the implementing of Structural Funds has not generated the creation of new bodies, it has reinforced the importance of R&D&I expenditure in the priorities of the national government and the regions. At the same time, the rules governing the management of operations co-financed by SF have incited the Spanish authorities to open their policies to the new trends proposed from Brussels, such as the importance of private expenditure in R&D or the importance of the partnership.

From this point of view, there has been little or no coordination between measures or policies financed by the Structural Funds at regional and national level, and as a result it is difficult to detect synergies or explicit c-cooperation between different bodies. The paradox is that this lack of coordination meant that the programme contents in different regions tended to be similar, because the knowledge existing at the beginning at regional level was not enough to define “tailor made” policies adapted to each situation. However, this is a characteristic of the system, not a specific effect of the implementation of the Structural Funds. To the extent, that the system is becoming more mature one would expect to see a greater differentiation of policy priorities amongst the different regions.

RDTI programme absorption capacity is a major issue for SF management. Exhibit 11 synthesizes this question for Spanish Objective 1 and 2 regions. Absorption capacity

at the beginning of 2006 is high, despite the difficulties of implementation at the beginning of the period due to the more extensive and new bureaucratic exigencies of the Commission. On average Objective 1 regions used 58% of the funds in this period and Objective 2 regions 65% of the available SF.

In Objective 1 regions, technology transfer, innovation and RTDI infrastructure measures showed higher absorption capacity (close to 62%), while the others lagged far behind. This highlights problems concerning the lack of project implementation and weaker levels of dynamism of enterprises in these regions for RTDI projects and the higher demand for infrastructures and for applied research. In Objective 2 regions, the situation is somewhat different, the funds devoted to university research and to research centres having higher levels of acceptance (almost 74% of the funds had already been distributed). In these regions, major efforts must be addressed to technology transfer between university and business.

Exhibit 11: absorption capacity of innovation & knowledge measures

OBJECTIVES	ALLOCATED	DISBURSED TOTAL SF	EXPENDITURE CAPACITY
Objective 1	2,058,601,252.68	1,188,684,030.82	57.7%
Objective 2	819,488,287.34	529,379,552.83	64.6%

Provided by ISMERI,

Exhibit 11a: absorption capacity of innovation & knowledge measures by "pure" RDTI codes

CODES	ALLOCATED	DISBURSED	EXPENDITURE CAPACITY
OBJECTIVE 1			
18 - Research, technological development and innovation (RTDI) - detailed	321.736.424,58	153.588.455,16	47,7%
181 - Research projects based in universities and research institutes	786.724.230,18	448.302.940,26	57,0%
182 - Innovation and technology transfers, establishment of networks and	161.863.764,98	100.273.074,37	61,9%
183 - RTDI infrastructure	788.276.832,94	486.519.561,03	61,7%
TOTAL OBJ. 1	**2.058.601.252,68**	**1.188.684.030,82**	**57,7%**
OBJECTIVE 2			
181 - Research projects based in universities and research institutes	406.371.139,00	299.364.592,92	73,7%
182 - Innovation and technology transfers, establishment of networks and	124.006.112,90	66.297.992,71	53,5%
183 - RTDI infrastructure	289.111.035,44	163.716.967,20	56,6%
TOTAL OBJ. 2	**819.488.287,34**	**529.379.552,83**	**64,6%**

Source: programming documents and financial data provided by DG REGIO

The Multi-Region OP faced initial difficulties to disburse funds at the expected rate, due to both the new norms of the Structural Funds as well as to changes in the Spanish administrative structure), however after the first 2-3 years the level of expenditure improved. The update of the mid-term evaluation provides some insight into the outcomes of the OP. By October 2005, all the measures had a good level of execution with the exception of priority 4 (Technological Transfer) and the Technical

Assistance. The best rate of implementation was found in the Priority 6 (Large Scientific infrastructure) and in the Priority 5 (research and technological centres). This is rather significant, because shows that it is easier to expend when there is an investment and when the measure is addressed to the supply institutions (centres, researchers), and it is more difficult to promote expenses related to new activities from the demand side (enterprises), as is the case of technology transfer.

4.2.2. Effects and added value of Structural Fund support for innovation and knowledge

This section analyses the effects and added value of Structural Fund interventions in favour of innovation and knowledge during the current programming period. The analysis is based on two main sources, namely: available evaluation reports or studies concerning Structural Fund interventions; b) interviews and additional research carried out for this study. Accordingly, this section does not seek to provide an exhaustive overview of the effects or added value[10] of Structural Fund interventions, but is based rather on the examination of a limited number of best practice cases. These best practice cases may concern the influence of Structural Funds on innovation and knowledge economy policy (introduction of new approaches, influence on policy development, etc.), integration of Structural Funds with national policy priorities, promoting innovative approaches and partnerships, or measures which have had a particularly important impact in terms of boosting innovation potential, jobs and growth.

In general terms, it could be stated the Structural Funds have made a positive contribution to RTDI activity levels, although as is normal due to the importance of the financial envelope, their quantitative importance, in economic terms, has been greater in Objective 1 regions. There are clear differences between regions, largely due to the pre-existing situation. In regions like Canaries and Castilla La Mancha, where previous activity of this kind was scarce, the impact was lower because the political and social awareness was smaller, and the lack of pre-existing infrastructures and networks was more important.

[10] A good definition is "The economic and non-economic benefit derived from conducting interventions at the Community level rather than at the regional and/or national level". See Evaluation of the Added Value and Costs of the European Structural Funds in the UK. December 2003. (Available at : www.dti.gov.uk/europe/structural.html)

Good Practice Case one: Network of Agents for the Promotion of Innovation in Peripheral Areas – RIA Network. *The RIA network in Castilla y Leon represents good practice in appropriate and responsive policy making which addresses specific regional problems, customising interventions rather than just taking models from elsewhere. LEGITE is the Regional Innovation Action Programme supported by the SFs and RIA was developed as a sub-programme of this main action to create a greater focus on a particularly pressing regional issue i.e., the challenge of promoting and sustaining innovation in the very sparsely populated peripheral areas. RIA helps business to become more innovative and helps to strengthen local entrepreneurial culture by fostering cooperation and partnership with the existing support structures such as Local Development Agents or Local Action Groups in the LEADER initiative. The overall aim is to spark innovations in partnership with businesses on their 'home ground' in often isolated and much less favoured locations and, so, is a model of hands-on, proactive, customised support designed solve a tricky problem in the short term and in the longer term to embed innovation on the planning agendas of peripheral localities. Despite initial suspicion and indifference the project is making a difference and so far 170 cooperation agreements have been signed between business and support organisations.*

A long time scale needed to measure the impact of intervention measures on RTDI performance. Even so, Structural Funds seem to have had a positive impact in terms of RTDI interventions, both by increasing the financial resources available, as well as giving higher priority to this type of expenditures on the political agenda. At the same time, they have made the Spanish policy-maker more open to new ideas coming from Brussels, and in this way they have facilitated the modernisation of the policies (with the risk that this situation could favour a non-critical adoption of fashions or instruments better adopted to most developed systems). Finally, most observers argued that the analysis of the impact of Structural Funds could not be differentiated from the impact of the global R&D&I policy.

There is a clear exception to this rule, namely the impact of the innovative actions. The first great revolution in the attitude of Spanish policy-makers and researchers about the importance of R&D&I activity, and the need for a powerful policy to improve the situation, was the opportunity given by STRIDE programme (prior to 1995) to improve the equipment of the research centres, in particular the universities. The opportunities to improve the equipment of under equipped universities was a point of reference for a long time for all the researchers interested in the improvement of the Spanish science system.

More recently, the impact of pilot actions in the framework of Regional Innovative Action Programme deserves special attention[11]. This kind of programme has contributed to the development of bottom-up strategies and their incorporation in the mainstream to increase funds for R&D activities. However, perhaps more important was, first, the capacity to develop an integrated set of measures defined in function of one strategy and with the vocation to cover the overall aspects of the problematic in a coherent way; and second, the capacity to mobilise the regional actors, and to change in this way the collective culture about the importance of R&D&I for the competitiveness of enterprises and the regional economy. In general, this was especially important in Objective 1 regions, because in Objective 2 regions such as

[11] Executive Summary of The evaluation of the 1994-1999 ERDF Funded Innovative Actions Programme.

the Basque Country and Navarra there were already similar plans developed on their own budget.

The current Programme of Innovative Actions has also represented a big opportunity to experiment new methods of policy design and implementation. The importance of the lesson of this programme is that even with a limited amount of money, it is possible to generate more capacity to introduce new measures and new approaches than via the OP. It is necessary to stress that this is more evident in the regions where the management of the IA was assured by representative of the sectorial policies, since when the IA programme was managed by the same authorities as the OP their implementation and experimental capacity was not much bigger than the OP. One reason that could explain this impact is that the IA represented additional money, and hence the managing authorities could accept bigger risks in their use; and at the same time, when the IA was managed by sectorial policy-makers, they was not conceived as a financial transfer but rather as an opportunity to explore new ways.

Some examples could be found, as is the case of Cantabria and Castilla y Leon, where the IAs were managed by the Regional Development Agency. In the first case, the IA promoted the cluster of IT companies that before had not enough visibility in a region without technological tradition, and at the same time were promoted different measures to support the creation of new enterprises in this sector. In Castilla y Leon the IA was used to promote a network of regional agents to diffuse the innovation policy in peripherical areas and to create networks between enterprises located there and the technological centres located in the urban centres. The very positive answer of SME of very traditional sectors and management culture showed that is very useful to fund additional human resources to promote new entrepreneurial attitude, but that this is something that normally is not done in the mainstream policies.

Good Practice Case two: IMPULSO. *IMPULSO is a programme of activities to help build clusters, increase R&D spending, focus research and integrate innovation systems to improve competitiveness in key sectors in the region of Cantabria. It is a programme started under the EC's 'Innovative Actions' and was successfully embedded and mainstreamed as a key part of the Strategic Plan for Technological Development 2002-06. One sector where the programme carried out a cluster project was in the automotive parts sector which comprises 26% of the regional industrial product. The project brought together (through a 'kick-off' conference and regular meetings) a wide range of players from the private sector large and small (including, Robert Bosch, EvoBus Ibérica, Fundimotor, Bridgestone-Firestone etc.) with public sector representatives and customer organisations (for example, Group Volkswagen) to discuss and plan for issues related to the future development of the sector, with a particular focus on continuing professional education, supply chain issues and the role of the regional technology centres. IMPUSLO is good practice case of mainstreaming inclusive, bottom-up, demand driven sector policy under the aegis of the Structural Funds, in this case in the Innovative Actions.*

In the case of Baleares, the IA was managed by the General Directorate for Research and Innovation, and was an opportunity to experiment the new approach developed in the RIS, oriented to find the capacity of tourist activities to support the development of technological sectors such as IT or multimedia design. This approach mobilised different hotel associations, and introduced new ways to market the small hotels via the web.

Good Practice Case Three: INNOBAL XXI. *INNOBAL XXI (2002-03) was a programme in the EC's Innovative Actions programme as part of the Balearic Islands Innovation Plan (2001- 2004) and was also part of the RITTS project for the regions. The objectives were to raise the technological level in companies and promote innovation; creating quality, sustainable jobs; diversify the economy and promote knowledge based activities; to overcome problems of geographical isolation by means of technology and innovation. In the five action lines which ranged from support to support to traditional sectors and tourism through to promoting new knowledge based companies; the overall approach was to try to find how to transform the economy by creating new high added value activities by using new technology. Around 30 projects were supported. It is a good practice case of a small region, heavily reliant on tourism recognising and seizing the opportunities presented by technology to put the economy on a stronger, more diversified base for the future by promoting existing industries and by promoting new ones. The work was an excellent example of a 'tailor made' intervention to suit local circumstances and it managed to get right down to ground level, working at a very fine resolution while maintain, at the same time a longer term vision for change. It is also an excellent example of projects under an Innovative Action leading to what the project promoters themselves call 'after-effects' which are a series of follow-on actions and outputs that grew out of the first round of project work and comprise a range of websites, publications, sectoral and sub-sectoral strategies and plans, new memberships of various different European wide working groups and networks and a new annual innovation competition.*

Now that the Commission has renounced to play the role of direct founder of Innovative actions, this type of reflection could be of interest to the central government if it wants to define some type of experimental action in the new period, to ensure that regional policy-makers explore more innovative policy approaches.

It is also worth highlighting the principal conclusions of the evaluation of the Multi-Regional Operational Programme. These were:

- The direct contribution of the programmes financed by Structural Funds within the National Plan facilitated the level of expenditure and reinforced the national innovation system.
- However, this did not permit to explore new possibilities and made difficult the adaptation to the needs of the Objective 1 regions. The National Plan promotes excellence both in science and in technology, and it is better adapted to the characteristics of Objective 2 regions; in fact, in many programmes is easy to find the same applicants year after year.
- There are not horizontal measures to promote the coordination between administrations and with the regional governments (as a minimum these linkages need to be promoted in programmes co financed by SF)
- There is not an integration of the measures with the objective of the European Research Area.

With a view to future programming, the Evaluation gave some recommendations:

- To maintain the support to the National Plan, continuing in this way the reinforcement of the basis of the national innovation system, but to complement it with specific measures adapted to the regional differences and including ways to stimulate the demand. That it is something that could be made by the new Technological Fund approved in the December European Council. In this way, the regular OP on R&D&I could maintain their support to the basic activities and the new Technological Fund could be more addressed to stimulate innovative behaviour that will use the possibilities offered by the use of the regular OP and other traditional measures developed at national or regional level.

- Use of technical assistance to create a more favourable attitude regarding the RTDI, namely instruments such as seminars, training for SME in tender answering, diffusion of good practices, support to networks of innovative enterprise, diffusion events.
- Improve the active coordination between the State Administration and the Regional Governments.
- Enhance the role intermediary bodies at a territorial level, such as technological parks or chambers of commerce, to facilitate the participation of new SMEs in the programmes that support the innovation.
- Improve support to the mobility of researchers to the private sector
- Establish quantified strategic goals, to facilitate the monitoring of the measures

One big difficulty at the beginning of this programming period was the new prohibition to give advances in the operations supported by SF that was a way that Spanish Administration used to facilitate enterprises and non-profit organisations could use the funds. This prohibition is only explained by administrative and financial rules of the Commission and it created a key difficulty to promote the involvement of less advanced enterprises to the innovation world.

Another difficulty highlighted in the focus Group was the way that the Commission services apply Article 4 of the Regulation, in many occasions with retroactive and changing criteria. At present, a lot of efforts are devoted to accomplish these obligations, and the consequence is a bigger inclination to define in the future simpler programmes, to facilitate their control.

4.3 Conclusions: Structural Funds interventions in favour of innovation and knowledge

The multiregional Research, Development and Innovation operational programme and the RDTI-priority regional operational programmes have contributed to improve physical infrastructures and RDTI workforce, in particular in Objective 1 regions.

In these regions, a significant part of the resources have contributed to the improvement of university and research centre facilities and work teams and to the performance of research projects. However, a strategic approach has not always been used and RTDI-related actions offered more support than RTDI demanded. It may be that such actions have shown greater absorption capacity, but the evaluations do not usually include a systematic analysis of impact in terms of the transfer of results or improvements in regional competitiveness stemming from increased RTDI effort.

Absorption capacity in Objective 2 regions is higher, a difference explained by previous experience and the dynamism of the region itself. Technology transfer has been one of the priorities, with a strong institutional development, supporting, for example, the technology transfer offices of public research centres and the consolidation of university-business foundations. The most qualitative actions, or those with higher specific added value, were generally implemented in the frame of innovative actions.

Exhibit 12: main outcomes of innovation and knowledge measures

Programme or measure	Capability	Added value
To strengthen the equipment of basic research infrastructure.	Good execution of interventions	Support for regional and national investments in the area
To support investment in human capital in research, science and technology.	To generate awareness of the growing importance of innovation.	Reinforcement of national (and regional) priorities
Public research centres, Technology centres.	To create a critical mass close to real production situation.	Progress in business participation.
Support for technology transfer.	Diffusion of innovation culture to researchers and businesses	Synergies between basic research and business reinforced

Effectiveness → significant results achieved; good absorption and management performance, etc.

Added value of measures → reinforcement of national priorities, innovative approaches and solutions, institution building, etc.

5. Regional potential for innovation: a prospective analysis

This section summarises and draws conclusions from the analysis of the preceding sections, available studies and interviews and the focus groups conducted for this study to provide an analysis of regional innovation potential. In doing so, the aim is to provide a framework for orientations for future Structural Fund investments in innovation and knowledge.

Section 5.1 presents factors which influence regional innovation potential – some of them concern all regions as they are characteristics of the national innovation scene, others concern specific regions or sectors. Next, section 5.2 and 5.3 draws more detailed conclusions for each particular group of regions and refers to future challenges that have been set in foresight studies.

5.1 Factors influencing regional innovation potential

Some well developed regions are set to get stronger: RTDI activities are strongly concentrated in three regions, Madrid as the most important centre, and to a lesser extent, Catalunya (Barcelona) and Basque Country. These regions have their own customised research and innovation systems that, while still too fragmented, are very well endowed and would see a surge of productivity and international impact if they can be better linked up and clearer future objectives set.

We can identify some growth poles in the strong regions: A number of scientific poles can be identified which could form the basis for developing new production activities by consolidating links with existing scientific capabilities, for example: a digital contents pole developing in Catalunya around the @22 initiative, the new CatBio cluster currently being developed by the Generalitat and a mature network of other clusters, some high tech, and science parks. Strong poles are developing in the Basque Country in engineering nano-technologies and biotech, for example, the 'Biobask' initiative based in the Technological Park of Zamudio.

But other regions are beginning to focus and gain momentum: Our interviews and focus groups suggest that also, in recent years, many other regions have deployed efforts to increase their R&D activities as well as improving capacity for policy research and innovation in regional administrations which while some way away from the mature capacity of the leading regions are beginning to show some promise in emerging areas of the knowledge based economy. For example, in 2004 Castilla y León was the region spending the highest proportion of its public budget on R&D (fifth highest in total as proportion of regional GDP) despite being one of the less favoured regions in Spain. Their current innovation programme (LEGITE) is focused on traditional sectors but also contains commitments to develop new knowledge based sectors.

And they too have poles that are developing: We can see promising poles developing in: biotechnology in Castilla y León (focused on the Technological Park in Leon specialising in biotechnology in vegetables and animals) and Granada (at the Science Park of the Universidad de Granada) and biological agriculture in Murcia,

Andalusia and Extremadura. Other poles are developing in industrial sectors with potential for expansion, for example engineering-nanotechnologies in Navarra, biochemical processes in Aragon. There are also emerging poles in Andalusia (at the Technological Park of Andalusia in Malaga and Cartuja 93 in Sevilla) and in Castilla y Leon (at the Technological Park of Boecillo). Alternative energy, in particular wind energy technology is an established and growing sector in regions such as Galicia, Castilla y Leon as well as in the Basque Country. Tourism is a sector that plays a role in all regional economies and offers opportunities for development in particular in the creation of higher value added and less seasonal products while the industry as a whole needs to look very carefully to the future, like any other business, to ensure its survival in a future where it will no longer be able to compete for custom on price alone.

Wind power deserves to be singled as a good practice example of an innovative sector: Spain has the fastest growing wind energy market in the world and in 2004 overtook Germany as the country with the highest level of new installations and increased output by 38% and now delivers 5% of national electricity, thanks in part to a very favourable legislative framework. More than 500 companies led by the leading power suppliers, are now involved in the Spanish wind energy sector, with about 150 factories manufacturing turbines and components across the Spanish regions and in some cases leading the world in turbine and blade innovation. Including those indirectly employed in supplying components and services, the total number of jobs supported by Spain's wind industry has reached more than 30,000. This is estimated to double to 60,000 by 2010.

But investment generally remains too low technology transfer and entrepreneurial culture weak: One widespread negative factor affecting all Spanish regions is the business innovation culture in which innovation's role as a driver of competitiveness and profit is not well understood and investment remains low. Also, even in the most developed regions where good capacity and basic research infrastructure exist the transfer of knowledge to the production sector is not professional and effective enough.

A careful policy mix will be needed in most regions: In all Spanish regions there is a predominance of SMEs of traditional industrial sectors. If these regions want to increase their level of R&D&I activities, these enterprises have to be involved as well. The services provided will have to combine a carefully stratified policy mix of measures aimed existing innovative enterprises which might focus on the development of new entrepreneurial attitudes and the development and employment of qualified personnel to raise business spending on RTDI and other business services alongside the basic capacity building services for low innovation sectors.

And it all needs to take place in a better policy framework: Moving back up to the highest levels, there is an urgent need for better coordination of policy in this area between regional and national levels to avoid overlaps, confusion and delay. This is an important framework condition for making progress in innovation in the regions, in particular the less well developed ones.

Exhibit 13: factors influencing innovation potential by type of region

Region / type of region	Main factors influencing future innovation potential
Local sciences & services (Madrid)	▪ Strong concentration of high-level research ▪ Presence of high technology industries ▪ Developments in new techno-scientific fields ▪ Concentration of advanced RTDI services.
Southern Cohesion 1 (Illes Balears)	▪ Growing political awareness of importance of R&D&i ▪ Strong presence of potentially innovative tourist industry ▪ Awareness of the difficulty of maintaining competitiveness based only on price and about the change in the structure of the markets (new ways of distribution with internet and the low costs carriers)
Southern Cohesion 2 (Castilla-LaMancha, Extremadura, Murcia and Andalucía)	▪ Presence of traditional sectors and emerging ones with a strong growth potential ▪ Increase in companies linked to leading-edge technology sectors ▪ Public sector financial resources available
Ageing Academia 1 (Basque Country, Navarra, Catalonia)	▪ Growing focus on RTDI and innovation ▪ Some financial resources available ▪ Relatively high level of internationalisation of industry ▪ Development of new scientific fields.
Ageing Academia 2 (Galicia, Asturias, Cantabria, La Rioja, Aragón, Comunidad Valenciana and Castilla León)	▪ Good and improving technological base in industry ▪ Opportunity to transform universities & research centres to support work in industry. ▪ Some established network of dynamic SMEs

5.2 A prospective SWOT appraisal of regional innovation potential

The analysis of this section is based on an overall appraisal of innovation potential in the groups of regions analysed so far. The SWOT analysis identifies the major strengths, weaknesses, opportunities and threats in innovation and knowledge in each group of regions.

'Innovation Leaders' **(Basque Country, Catalunya, Madrid, Navarra – Local Science and Services and Ageing Academia 1)** (grouped- for the purposes of drawing conclusions to avoid repitition as same conclusions apply).	
Strengths ▪ Some nodes of excellence in research. ▪ Strong poles in new technologies e.g., ICT, biotechnology, multimedia, logistics, aeronautical. ▪ Slowly improving in policy setting and coordination at all levels ▪ Presence of research performing international companies ▪ Well established industrial sectors with technological capabilities (chemical industry, pharma, automotive, machine tools) ▪ Presence of world leading internation business schools	**Weaknesses** ▪ Potential held back by weak R&D investment effort compared with other metropolitan centres internationally ▪ Limited number of big Spanish hi-tech enterprises that could lead development of new products or technologies ▪ Difficulty of attracting and retaining highly qualified personnel, ▪ Bad at providing research targeted or relevant to industry ▪ Too many 'research' staff are research inactive civil servants ▪ Impossible to say exactly where we are with interventions as nothing evaluated, so making future policy is much more difficult than it should be
Opportunities ▪ Potential in innovation system is waiting to be fully exploited ▪ All the elements are in place, innovation systems have universities, centres, transfer services, hungry high tech companies ▪ New programmes provide opportunity to 'win hearts and minds' and dynamise culture	**Threats** ▪ Overcomplicated procedures ▪ International researchers will stop coming and those here will leave ▪ Mature industries (textile industry, food industry) at risk due to delocation strategies

'Less Favoured and Tourist Dependent' (Illes Balears – Southern Cohesion 1)	
Strengths ▪ Presence of major innovative companies in tourist industry ▪ Strong demand for the tourist products of the islands	**Weaknesses** ▪ Progressive de-industrialization ▪ Single sector dependence ▪ Competitiveness of strategic sectors deteriorating as much is still low cost
Opportunities ▪ Attraction of innovative business ▪ Retain high environmental quality ▪ Stimulate interest in innovation in services sector ▪ Find other Campers!	**Threats** ▪ Must diversify – what would happen if the bottom fell out of tourism?

'Developing Innovators' (Castilla-La Mancha, Extremadura, Murcia and Andalucía – Southern Cohesion 2)	
Strengths ▪ Presence of emerging high-growth sectors ▪ Growing political acceptance of importance of R&D&i activities	**Weaknesses** ▪ Industry largely undiversified ▪ Agro industry depending CAP and national policies which place low priority on innovation

	▪ Low levels of local demand, competitions, supply in emerging sectors hamper development of new shoots and buds. ▪ Innovation support needs to search our and get behind all knowledge based development
Opportunities ▪ Make regions attractive to major high-tech businesses ▪ Development of new business oriented technology infrastructures using best practice approaches ▪ High levels of Structural Funds allocated to these regions provide real opportunity to make long term difference	**Threats** ▪ Low business innovation levels ▪ Low potential for cutting-edge services ▪ Risk of progressive de-industrialization unless innovation becomes more widespread even in the most traditional sectors. ▪ Continued mistaking of innovation for science

'Catching Up Innovators' **(Galicia, Asturias, Cantabria, La Rioja, Aragón, Comunidad Valenciana and Castilla León – Ageing Academia 2)**	
Strengths ▪ Established, good quality university system ▪ Recent investments in science infrastructures ▪ Low level of industrial sprawl – clusters are tight	**Weaknesses** ▪ Links with national and international high R&D performance centres weakened still weak ▪ Low levels of awareness of importance of innovation in most businesses ▪ Dominance of sector in mature and traditional industries with low perceived for RDTI activities ▪ It is not always easy to attract young researchers to come to and stay in these regions as they are competing with other international destinations
Opportunities ▪ For supporting new technologies activities related to traditional industries (biotechnologies and agriculture, fisheries and food industry) ▪ For identifying emerging nodes, making sure the support infrastructures are fit for purpose to support them from research through to business services.	**Threats** ▪ Innovation support services don't grow or re-orientate and get the right policy mix to meet and create demand - windows of opportunity close traditional sectors remain innovative.

5.3 Conclusions: regional innovation potential

Policy headline 1: 'Innovation Leaders' need help with governance as weaknesses here are holding them back.

These regions have always been the drivers of economy from the Industrial Revolution onwards and are vibrant, flexible, with strong identities and business traditions and hard won but growing autonomy from central government (Catalunya and Basque Country). We do not foresee anything but continued growth and development in these regions and a full transition to the knowledge economy. What these regions do badly, however, is research and innovation governance and management, not necessarily in terms of producing policy documents and grand initiatives, of which there are always many, but at the detailed level of implementing actions through well managed programmes and projects. At the intermediate/focused level – where general policy pronouncements are articulated into action, effective management is mostly poor regional innovation potential not fully exploited as a result.

Policy headline 2: There is developing innovative industrial potential in the 'Catching Up Innovator – Ageing Academia 2' regions which needs reinforcing.

The interviews and focus groups held during this research suggest that these regions (Galicia, Asturias, Cantabria, La Rioja, Aragon, Comunidad Valenciana and Castilla y León) are experiencing an industry-based structural change, and have emerging high-growth sectors (biotechnology in particular). SF support could be a funding source in these regions for a new focus on high tech innovation support services and levels of support should be set high to accelerate the momentum that is already underway here if it is clearly identified.

Policy headline 3: Innovation potential in the regions from the technological periphery ('Developing Innovators' – Southern Cohesion 2) must be unlocked.

Emerging technologies such as biotech and nanotech have applications in even the most traditional of agricultural sectors and food production processes (which often rely on 'biotechnology' which is uncodified but improvable[18]) and innovative regional clusters can grow up based on up-grading the skills and materials that are part of the life and soul of these localities[19]. Also, even more importantly, non-technological types of innovation need to be recognised and promoted more actively: quality, branding, marketing, supply chain management (the Zara success story results from supply chain innovations, in large part) will bring more benefits to 'Developing Innovator' regions than more science.

Policy headline 4: Tourism is vast, relevant to all regions and thriving but steps need to be taken to ensure its future.

Tourism is a key sector for the Spanish economy, no only for the part it plays in GDP (12%) and its capacity to create employment (currently, 11%) but also for the knock-on effects it has on other sectors of the national economy such as retail shopping, the restaurant sector, construction and transport. But a recent foresight study carried out by the OPTI Foundation[20] has identified a number of near future threats to this key

[18] For example, research in Spain using biotech in the balsamic vinegar sector is linking the producers (in most cases two person business with generations of experience) and researchers in work that is likely to transform production processes which have remained the same for centuries and allow artisanally produced product to compete on price with industrial product while outdoing it on quality. This work is an example that suggests that even the slowest, the smallest, the most labour intensive traditional industries can be made more competitive and grow through applied leading edge research.

[19] A recent collection of foresight research (Agroalimentación, Tendencias tecnológicas a medio y largo plazo, OPTI 2003) in the agro-food sector, for example, found that in all regions, such as those in the Southern Cohesion 2 group that six key priority areas for future research could be idenfied as vital in improving competitiveness over the longer term. These were: responding to consumer demand for higher quality, safe products which come with full information about production and traceability; research into industrial processes, in particular conservation technologies; innovation in products, in particular 'functional foods'; sustainability and life cycle issues, in particular reducing environmental impact of the sector; legislation and new products, clarifying new laws and adapting products: applying ICTs in traceability, management and logistics. The document sets out a detailed research agenda and is the basis for further validation and prioritisation of an agenda for SF funded actions.
Another recent foresight study of the impact of bio-tech on agriculture could help set a research agenda which will link research providers and agriculture stakeholders in the Southern Cohesion 2 regions (Impacto de la Biotecnología en los sectores Agrícola, Ganadero y Forestal, OPTI 2003). Thoroughgoing analysis leads the authors to prioritise 12 research topics in three priority areas for maximium impact on competitiveness over the longer term. These are: prioritise the 12 technology areas, the key characterisitic of each is that they are all synthetic and require resources to bring together the diverse teams needed to meet the challenges; prioritise implementation of these new technologies in key product areas and support research that is already underway in national programmes of the Special Action on Genomics on the Ministry of Education and Science on the genomics of a range of important fruits; create programmes for managing innovation in agro-biotech, for example, direct collaboration between professional involved in improving vegetable and animal stock with geneticists and molecular biologists and the targeting of research in genetics and molecular biology on species relevant to making rural economies more competitive. The report concludes that with the natural advantages of climate and the expertise already available in the research system the links between geneticists and molecular biologists and agriculture professionals must be made stronger to relise enormous benefits for the country, this applies particularly in the case of the Southern Cohesion 2 regions identified in this report and special emphasis should be put on RTDI in this field in all funding programmes for SFs in these locations.
Equally detailed foresight work exists for fisheries technologies and aquaculture and should also be used in agenda setting where appropriate.

[20] The findings of this study (Estudio de Prospectiva de Sector Turismo, 2005) identify some clear areas where future research needs to focus – the conclusions are not regionalised and are presented as underpinning issues for all regional tourist markets: market research – public authorities must play a role in bringing together the biggest companies who keep vast databases and put this informaiton at the disposal of all stakeholders; a sector-wide drive to ensure high quality experiences for all tourists; focus the offer on high value, sustainable sectors overcoming 60 years of short termism and opportunism; evaluate the real likely impact of new technologies, in particular the internet; continuing professional education for workers involved in the industry. Alongside these 'soft' research issues, a number of technology developments are set down which the study rated as urgent, for example, satellite systems to monitor sensitive natural environments, modular building systems, integrated management software to reduce transaction costs etc.

and currently dynamic sector among them: that 80% of all holidays to Spain are still for the traditional 'sand and sun' holiday which is based on low cost; that 73% of all visitors come from just five Northern European countries and only for the Summer; that rival destinations are rapidly developing and undercutting Spain on price; that the sector is highly fragmented and has no strategy to identify and deal with threats or exploit opportunities; that the take up of new technologies by the vast majority of companies in the sector has been very slow etc. Tourism needs to be recognised as an industry like any other where innovation will drive sustainable competitiveness and contribute to regional wealth and wellbeing. Tourism must be included in planning as a sector with increasing needs for research funding to promote innovation along the lines suggested by the OPTI foresight study even if this means some adjustment of the current funding rules and even more adjustment of expectation of behalf of those deciding funding priorities.

6. Future priorities for Structural Funds support for innovation and knowledge; options for intervention.

6.1 Strategic orientations for Structural Fund investments in innovation and knowledge

This document was written independently of the opinions developing within the EC future SF priorities in the next funding period. However, in the latter drafting stages the working document 'National Strategic Reference Framework: Strategic Objectives and Key Issues for Spain in the Programming Period 2007-2013' was examined. It is relevant to draw attention to the fact that the conclusions of the current report coincide with those of the draft NSRF on a number of points, in particular:

'*Spain needs to make fundamental changes in its regional development strategy by progressively changing away from financing physical infrastructures and direct aid to enterprises….*' This report supports this guiding principle and this is reflected by the fact that the recommendations are for the 'soft' innovation issues of 'outreach', developing and supporting clusters and nodes, promoting foresight and evaluation, 'wiring up' innovations systems etc.

'*Implement regional innovation strategies that identify and exploit latent regional R&TD+i potential.*'. The key word here is 'latent', this report suggests that even the most traditional industries have potential that must be unlocked, recognising these are 'tough nuts to crack' but holding great potential.

'*Identify, consolidate or develop new regional Research and Technology "competence" centres in emerging economic sectors or technology areas…*' This report has identified emerging sectors in some regions and proposes that these need urgent and special treatment.

'*Facilitate access to advanced business services, including business plans and tutoring, intellectual property rights, incubation facilities, technology auditing and forecasting.*' The more advanced regions will now benefit most from *advanced* business services to fully unlock the power of their innovations systems, emphasising evaluations, foresight (linked to evaluations), programme and project management skills etc.

'Innovation, understood as the necessary steps to help firms introduce new, different or improved products, production processes and services into the market, including R&D as well as technological development, training, management, marketing, financing, quality, design, etc. is a priority, over and above pre-competitive R&D efforts…'This report supports this call for a more expanded understanding of innovation and it informs many of the recommendations, for SMEs in particular.

'*In each region, regional and national authorities have to coordinate their actions within a single strategy…*' This is of the utmost importance, perhaps an *a priori* condition of any new programmes.

In the rest of this section the report puts forward recommendations as to how headline issues might be turned into action and also propose some policy examples that officials might like to consider as possible models for activities 'on the ground' when in negotiation of later versions of the NSRF documents with Spanish stakeholders.

Key conclusion 1: 'Innovation Leader' regions need better research governance and management capacities: this is be key lever to pull right now.

In the future, SF investments will achieve greatest returns by focusing on governance and management issues to 'wire-up' the many, often confusing, often overlapping components to release the potential in these innovation systems. Catalonia, for example, in the last five years has made a very major investment in research centres in emerging scientific fields, nano, bio, photonics and others which have incredible capacity to contribute to regional and national economies if brought to bear in a professional and systematic way. All these regions enjoy a flood of qualified graduates, institutions for most research areas, networks of support staff and technology transfer offices in government and universities, policies for every conceivable aspect of science and research, the presence of many leading international companies, many returning scientists with international experience etc, etc. And yet, they still fall below EU averages on all key innovation output indicators.

Key recommendation 1. Link evaluation and foresight, develop new employment contracts, learn how to plan and manage to international best practice business standards.

The quickest way to improve performance in this regions is to help them make their 'systems' work as systems by promoting linkages, intelligence, management tools, prioritisation tools, strategy tools etc. These regions should start with systematic impact evaluations, not just accounting exercises, of all key policy initiatives. This simply does not happen at the moment in the public sector in this policy field. Foresight should also be embedded alongside evaluation to assist with prioritisation of work in all sectors. Regions should consider to begin training programmes in project and programme planning and management for both operational staff and senior managers and that this training continue until there is a cadre of staff with minimum professional skills in all areas of the public sector and as far as possible into the business community. More ambitiously, regions should explore ways of employing staff on merit based, secure but non-civil service contracts, this is difficult as most research staff are either civil servants, precarious temporary staff or grant holders. This is a difficult goal to achieve but the advanced regions must begin to open up the employment market in research to international researchers and make it easy for them to come and to stay and work in Spain.

A model of large-scale evaluation systems in research can be found in Finland or Sweden where most significant research and innovation actions as well as the overall system it is evaluated by international experts. An example of a systematic regional foresight can be found in Lombardia, which shares many economic similarities with Spanish Objective 2 regions, towns and sectors have been studied over the last five years by the Rosselli Foundation based in Milan and a very detailed picture of linked sectoral development objectives is emerging. During the last five years or so the EC

has been supporting regional foresight and there are a number of national and regional guides and support available from DG Res, Dir K and regions should be directed there for advice. Good examples of linking foresight and evaluation don't yet exist, but has been pointed out as the necessary next step and should be recommended here. Examples of training research management personnel come from Catalunya where the Generalitat has been running an over the last three years an ongoing programme of training in PRINCE2 (*de facto* standard for project management in businesses across EU) and Goal Oriented Project Planning (GOPP – an international standard planning method) buying in consultancy expertise, numbers of trained personnel will reach 80 (with plans to continue indefinitely) with the next iteration and a trained cadre of managers is slowly forming. An example of new employment contracts for researchers comes also from Catalonia. The Serra i Hunter programme of the Generalitat allows for flexible employment of non-civil servant staff and over 1000 staff will be brought into the region as a result of it over the next decade.

Key conclusion 2: Emerging sectors are the hardest to spot, but we need to pick up on early signs and weak signals of change and get behind them

There are signs high tech development such as biotech in the 'Catching Up Innovators - Ageing Academia 2' regions (Galicia, Asturias, Cantabria, La Rioja, Aragon, Comunidad Valenciana and Castilla y León) and that some other less developed regions are also beginning to develop strategies in new technology areas (e.g., Murcia has recently undertaken a foresight in biotech). These regions must capitalise on and give help increase the momentum of those stakeholders who are trying to develop activities in these areas as a key part of their support policy mix as their needs are distinct from the bulk of the SMEs who will normally be customers of their services.

Key recommendation 2: Proactive is the key word - support stakeholders need to get out into communities, identify new high tech opportunities, tailor support

Programmes specifically designed to scan for emerging sectors who might not be accessing the innovation support services need to be set up – policy makers need to group these firms together as their requirements will be generically similar while treating each firm as an individual case. These new firms and sectors will need to be tracked down, they will need specialist advice that may not be present in the region and they will need access to new and easily accessed forms of risk finance if they are to grow. Clusters should be promoted wherever possible and in general links to all sources of knowledge and expertise built proactively in partnership with them. Programmes to facilitate staff mobility between companies and universities need to be considered as should programmes to make it easy for companies to employ graduates. For companies that are ready for it, national and international brokerage services for joint project development should be considered – see the Transbio programme recently started by five EU regions coordinated from Barcelona as an example. More mature clusters of firms will benefit from foresights in their fields, both for the technological and social visions that they provide and for the networking benefits that come through the process. Possible policy initiatives to consider are: from Ireland, the Science and Technology Personnel Placement programme, the Technology Strategy Design programme from Tekes in Finland as well as, closer to home, the very well documented cluster development programmes in The Basque Country and Catalunya.

Key conclusion 3: 'Developing Innovator - Southern Cohesion 2' regions can build on their existing strengths –regions need not high tech driven to be innovative.

The regions with low levels of research and technology capacity still have a basis for innovation using traditional skills, products and services as the foundation. Tourism can be made more niche based and higher value, agricultural products can be refined and improved with research and packaged and sold differently in new markets, traditional industries such as textiles can be transformed by supply chain innovations. The futures agendas have been set down for agro-food and tourism, fishing and aquaculture and should form the basis for longer term objectives these traditional sectors.

Key recommendation 3: Scan traditional sectors, bring together science, sales and marketing, spark innovation opportunities, break open concept of innovation

Policy makers need to think of innovation as 'profitable change' that can take place in any industry, any company not only in new sectors. National and international expertise needs to be brought to bear on basic products such as oil, wine, fruit, textiles, shoes (let's keep in mind that Zara , Camper, Mango, Armand Basi, Miro etc. etc…are all Spanish regional companies, small family businesses, no different to many others, transformed into major international brands) to create wealth from what people are doing now and have always done, where they have potentially highly competitive 'know-how'. This work may involve bringing science to bear (and here we refer back to the agendas set out in the foresights mentioned above) often very high tech research, on traditional sectors to speed up processes or add new characteristics (to fruit and animal breeds for example) or functionality (to all foods) or it may be not be only technological innovation but branding, sales, marketing. Regions should aim at creative transformation of their core activities rather than simply opting to build science parks – the new emphasis should be on outcomes not infrastructure and capital projects. The groundwork has been done in the form of foresight studies that could form the basis for detailed regional validation exercises. Examples of policy to promote this linking of the traditional and the new could be developed from close study of the examples to hand, i.e., Camper and Zara should be the basis for understanding how to innovate in apparently ailing sectors. Other examples of promoting non-technological innovation are found in the work of National Institute of Technology Management in Ireland where a platform of non-technological innovation measures is in place.

Key conclusion 4: Low tech SMEs are so dominant in the economy that policy measures designed expressly for them must still be a top priority.

In all Objective 1 regions SMEs comprise more than 95% of companies and they need special treatment and will do so into the foreseeable future if we are to move any of them up the ladder of technological capability. This is the work of slow, incremental capability development, based on improvement rather than radical transformation, on technology diffusion rather than research that we need to keep doing and continually improving by learning from international good practice experiences. As a first step in each case, however, this report *strongly* recommends evaluation of where

stakeholders are with this work in each region. As with all the recommendations for evaluation in this report, regions should consider drawing evaluation teams from the international expert pool (who might then a perform a linked series of evaluations) as local teams too often depend on the founders of the system they might be looking at for their future income stream.

Key recommendation 4: Still a need for proactive mentoring of traditional sectors to solve problems and promote technology diffusion and innovations.

The majority of firms in the 'Developing Innovator' – Southern Cohesion 2 regions are low or minimum capacity technology companies often with no contact with research institutions of any kind, no research capacity and no perceived need for one. The work that needs to be done with them is very specialised, focused and will demand that service suppliers go out to find their clients proactively and take mentoring roles helping them to clarify their technology needs and point out opportunities. Examples for policy intervention here might be the MINT programme under the EC's SPRINT initiative, which although from the 90s was effective in working with SMEs using technology audits, building a relationship with an expert consultant over a period of time and helping companies think about integrating new technologies and innovating. Another example is the Finnish 'Technology Clinics' initiative by Tekes which builds effective and appropriate bridges between SMEs and researchers which was very quick and simple to access and provided 50% funding for project work although it would need to be more actively 'sold' to potential clients and perhaps levels of funding might be increased up to 75% in certain cases. 'Inter-trade Ireland' provides an example of an initiative related to non-technological innovation as it is aimed at promoting national and cross border trade in Ireland using sales consultants as well as technology experts. Overall, here the focus should be on technology diffusion and take up, alongside the organisational change and integration implications of innovation rather than on research.

Key conclusion 5: New emphasis on the importance of the innovation potential in the tourism sector

Tourism is a major sector in the Spanish economy but its potential to innovate has not been developed. The sector is thriving and now is the time to begin to systematise innovation efforts in all regions, but in particular those that depend very strongly on it e.g., Balearic Islands, Andalucia, Canaries.

Key recommendation 5: To support innovation in tourism and to develop clusters and tools.

Tourism is a diversified sector with big enterprises managed professionally and internationalised, and with many more small enterprises managed by their owners. It so diverse that it is difficult to formalise the innovation process, and there little experience with defining innovation policies. Clearly, such a large industry demands a careful policy mix at regional level. Regions should consider conducting their own foresight projects to validate the findings of national exercises and to benefit from all the tacit, network building benefits that come from foresight work; clustering of companies by sub-regional territories or by niche service offerings would also help to clarify future objectives and help clarify research needs and open dialogues with

regional research providers; policy initiatives, probably carried out by regional tourism promotion agencies, might use as their model the outstanding offering from Scottish Enterprise which has a series of services dedicated to innovation in the tourism sector in Scotland (for example innovation days). The Innovation Movement which is focusing on local areas and individual businesses and a specially develop innovation toolkit for tourism which is an interactive guide to creative ideas for individual businesses and collaborative projects).

6.2 Operational guidelines to maximising effectiveness of Structural Fund interventions on innovation and knowledge

Key conclusion 6: At high level must improve the coordination between the different institutions that make innovation policy

In Spain not only the different departments of the Central Government who make innovation policy but the regional governments also play an important role, both in setting Structural Funds policy and using the funds - this creates confusion and frustration. It would be important step forward if the Central Government were to coordinate their different Ministries involved in this aspect of SF policy as well as clarify finally roles and responsibilities with regions and for each region to coordinate its own often confusing raft of regional R&D&i polices. It would be possible in this way to work out how to share technological support infrastructures, to develop better cooperation activities between enterprises, and better bench-mark policies.

Key recommendation 6: Rationalise, simplify, coordinate, increase the impact of SFs in R&D&I

We recommend that a thoroughgoing, high level review the way the SFs in relation to R&D&I are administered and how programmes are implemented to simplify roles and responsibilities at national and regional level across the country. It should start with a clear picture of where stakeholders are now and come up with practical solutions focused on improving the impact of the OP in R&D&I. This report recommends strongly that this is done immediately and by an independent international team of experts and not by the government itself or by a team led by Spanish consultants.

The Technological Fund which will be approved at the Council of December 2006 could be a big opportunity to improve the quality of the Spanish innovation policies. In our opinion, the OP R&D&I and the part allocated to research and innovation by the Regional OPs, could continue in their general orientation as these programmes supply the base of the innovation system (financing of infrastructure, research teams and entrepreneurial investments, but only once some evidence has been produced about their positive impact) but should also start paying much attention to the 'softer' target areas we have outline above, proactive partnering, evaluations, foresights, scanning etc. The key problem is increasing the number of enterprises using these facilities Spain by planning services well, targeting them precisely and working in partnership with clients. Most, not all, but most, problems that can be solved in this planning period are not related to a shortage of research knowledge – what stakeholders need now is intelligence about the system, clear targets, prioritisation, the courage to say 'no' to some things, the courage to accept the evidence that all the

work over the last decades has not had the impact on productivity that it should have and the courage to look now for outputs.

Key conclusion 7: On the ground, many stakeholders find the SF programmes in the area of R&D&I poorly managed, confusing and difficult to access.

During the interviews, focus group and other research there was detected a discontent with many aspects of the way the OP for R&D&I has been implemented and some stakeholder who are calling for changes.

Key recommendation 7: To improve the practical and managerial aspects of the policies

This recommendation is multifaceted. Firstly, certainly problems must be addressed in the programme management, in particular this area is understaffed; secondly, the programmes have to have clearer objectives and be easier to access with bureaucracy cut back to the bone; thirdly, to be realistic about the needs and capacities of clients, for example, currently there is a move towards measures using loans not grants which may alienate many potential clients, especially the SMEs. Fourthly, the innovation policy requires flexible approaches.

Exhibit 14: Summary of recommendations on investment priorities

Region or group of regions	Strategic focus	Priority measures	Indicative financial resources
Local sciences & services (Madrid)	• Science-technology networks and innovation clusters	• Economic intelligence • Sector-based perspective. • Virtual technology park network. • Transforming industrial estates into intelligent areas.	• 12,000,000 €
Southern Cohesion 1 (Illes Balears)	• Innovation in tourism and related sectors.	• Systematic use of ICT in hotel industry. • Economic intelligence and Internet in tourist industry marketing. • Technological innovation in tourist supply industry. • Virtual support systems for innovation in tourist companies in the territory.	• 10,000,000 €
Southern Cohesion 2 (Castilla-La Mancha, Extremadura, Murcia and Andalucía)	• To support growth in RDTI expenditure • To reinforce regional innovation structuring.	• Structuring of demand in group structures (sector associations, clusters, industrial district and so on) • Development of innovative support infrastructures (Technology Centres, technology transference offices, technology parks). • Support for creation of value added service businesses. • Reinforce capacity of public administrations and autonomous bodies to support regional innovation system	• 600,000,000 €
Ageing Academia 1 (Basque Country, Navarra, Catalonia)	• Science-technology networks and innovation clusters.	• Creation of networks with international knowledge production centres in emerging technologies. • Development of combined interregional projects that facilitate infrastructure streamlining.	

Region or group of regions	Strategic focus	Priority measures	Indicative financial resources
	• Promote inter-regional exchanges. • Promote new-technology-linked activities. • Help research groups to join European networks	• Construction of technology platforms to facilitate participation in European projects. • RTDI diffusion measures for SMEs. • Development of own technologies in business services sector.	• 200,000,000 €
Ageing Academia 2 (Galicia, Asturias, Cantabria, La Rioja, Aragón, Comunidad Valenciana and Castilla León)	• Support increase in RDTI expenditure. • To support RDTI that structures essential applied research and transfer in activities linked to new technologies. • Support Creation of start-up in new tech activities.	• Creation of technology transfer structures. • Support for combined development projects between university and business. • Improvement of public administrations' technical capacity in RTDI policy administration.	• 370,000,000 €

Appendix A Methodological annex

A.1 Quantitative analysis of key knowledge economy indicators

A 1.1 Factor analysis

Table 1. Reduction of the dataset (215 EU-25 regions) into four factors by means of factor analysis

	The 4 factors			
	F1 'Public Knowledge'	F2 'Urban Services'	F3 'Private Technology'	F4 'Learning Families'
Higher education (HRSTE), 2003	**.839**	.151	.190	.184
Knowledge workers (HRSTC, core), 2003	**.831**	.164	.267	.327
High-tech services employment, 2003	**.575**	.367	.428	.323
Public R&D expenditures (HERD+GOVERD), 2002	**.543**	.431	.275	-.195
Value-added share services, 2002	.323	**.869**	.002	.121
Value-added share industry, 2002	-.265	**-.814**	.386	-.061
Employment government administration, 2003	-.217	**.745**	.124	-.175
Population density, 2002	.380	**.402**	.043	.038
High and Medium/high-tech manufacturing employment, 2003	-.073	-.331	**.873**	-.089
Value-added share agriculture, 2002	-.222	-.350	**-.672**	-.198
Business R&D expenditures, 2002	.335	-.050	**.664**	.267
S&T workers (HRSTO, occupation), 2003	.560	.178	**.589**	.382
Population share under 10, 2001	-.237	.060	-.015	**.868**
Life-long learning, 2003	.472	-.009	.165	**.703**
Activity rate females, 2003	.418	-.227	.281	**.620**

Note: Principal Component Analysis. Rotation Method: Equamax with Kaiser Normalization, a Rotation converged in 9 iterations. Main factor loadings are highlighted in bold. Source: MERIT, based on Eurostat data, mostly referring to 2002 or 2003

Based on the variable with the highest factor loadings we may characterise and interpret the four factors and give them a short symbolic name:

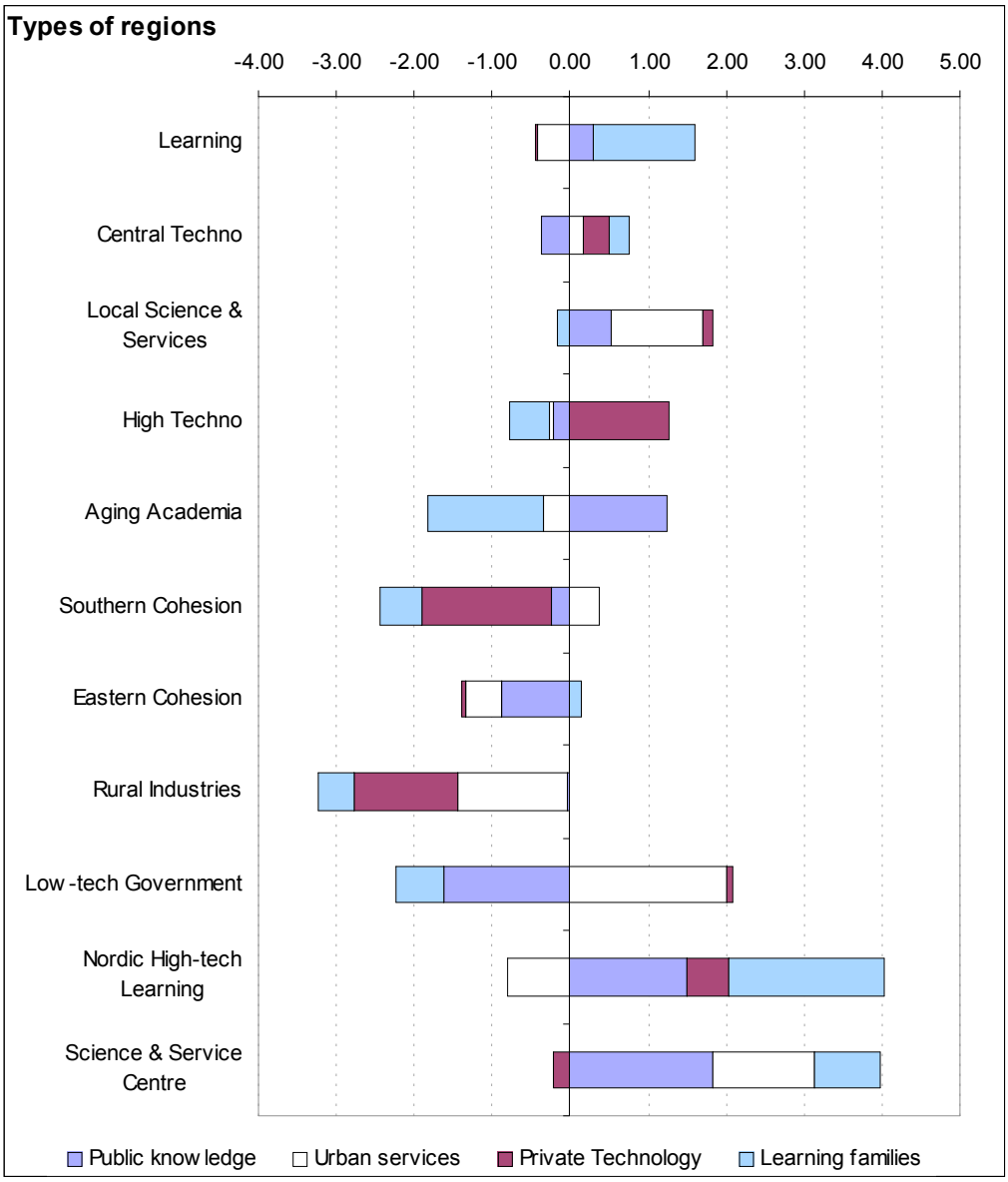
Public Knowledge (F1)
Human resources in Science and Technology (education as well as core) combined with public R&D expenditures and employment in knowledge intensive services is the most important or common factor hidden in the dataset. The most important variables in Public Knowledge are the education and human resource variables (HR S&T education and core). Cities with large universities will rank high on this factor. One interesting conclusion is that public and private knowledge are two different factors (F1 and F3 respectively), which for instance has implications for policy issues regarding science-industry links. Public R&D and higher education seems especially related to high-tech services, whereas Business R&D especially serves high- and medium-high-tech manufacturing.

Urban Services (F2)
This second factor contains information on the structure of the economy. It is common knowledge that industrial economies are quite different from service-based economies. It is not a matter of development per se, because in European regions the variety of economic structures is huge and to a large measure based on endowments and path-dependent developments such as the extent to which government administration is located in a region or not. This factor takes into account the differences between an industrial area and a service-based area including the public administration services of the government. Another observation is that there are two different 'urban' factors, indicating that academic centres do not necessarily co-locate with administration centres. What is probably less surprising is that the Urban Services factor is not associated with R&D, since R&D is more relevant for innovation in manufacturing than for service industries.

Private Technology (F3)
This factor contains business R&D, occupation in S&T activities, and employment in high- and medium-high-tech manufacturing industries. A counterbalance is the existence of agriculture in the region. One interpretation suggests that agricultural land-use reduces the possibilities for production site locations. Another interpretation is that agriculture is not an R&D-intensive sector.

Learning Families (F4)
The most important variable in this factor is the share of the population below the age of 10. Locations with relatively large shares of children are places that are attractive to start a family. Possibilities for Lifelong Learning in a region seem to be associated with the lively labour participation of the mothers of these youngsters. The Learning Families factor could also be interpreted as an institutional factor indicating a child-, learning- and participation-friendly environment, or even a 'knowledge-society-life-style' based on behavioural norms and values that are beneficial to a knowledge economy.

A 1.2 Description of the 11 types of EU regions



1 Learning

To begin with, Learning regions score highly on the 'Learning Families' factor, and the factor's three main components: lifelong learning, youth and female activity rate. On the other factors the regions are close to the regional average. Unemployment is on average lower than in the other EU regions. Employment in the government sector is limited. Per capita GDP is rather high. The regions are located in Austria, Ireland, the Netherlands, Sweden and the UK. There are many similarities with the Nordic high-tech Learning regions, but business sectors in the Nordic version invest more in R&D.

2 Central Techno

This is a rather large group of regions located mostly in Germany and France with close to average characteristics, although the share of high-tech manufacturing is

rather high. Factor scores as well as per head GDP is slightly above the regional average, except for the Public Knowledge factor which is slightly lower.

3 Local Science & Services
This group of regions from a range of member states consists mainly of capital cities, such as Madrid, Warsaw, Lisbon, Budapest and Athens. These urban areas serve as national centres for business services, government administration, public research institutes and universities. Urban Services and Public knowledge are therefore the strongest factors for this type of region. Per capita GDP is on average slightly below the EU25 average, but growing. The low score on lifelong learning is a weakness in most Local Science & Services regions, especially compared to the more wealthy and advanced Science & Service Centres.

4 High Techno
The High Techno regions host many high-tech manufacturing industries. They are mostly located in Germany (e.g. Bayern and Baden-Wurtemberg), some in Italy (e.g. Lombardia and Veneto) and two French regions. This type is very strong in Private Technology and has a high level of per capita GDP. The Public Knowledge and especially the Learning Family factors show a relative weakness, e.g. in lifelong learning. Growth in terms of per capita GDP has been low and unemployment rates did not improve improve much in recent years.

5 Ageing Academia
This group of regions is mostly located in East Germany and Spain and also includes the capital regions of Bulgaria and Romania. Strength in the Public Knowledge factor is mostly based on the high share of people with tertiary education. The low score on the Learning Family factor is due to little lifelong learning and hosting relatively few children. The unemployment situation has improved, but jobless levels are still very high.

6 Services Cohesion
Services cohesion regions are located in Southern Europe, consisting of many Greek, some Spanish and two Portuguese regions. The low score on the Private Technology factor is striking. There is virtually no high-tech manufacturing or business R&D. Services is the most important sector, but agriculture is still a rather large sector. The share of manufacturing industry in value added is very limited. Population density is low, but has increased on average.

7 Manufacturing Cohesion
Manufacturing industries is the dominant sector, whereas services and agriculture are rather small sectors. This type of region is mostly located in Poland, Czech Republic, Hungary and Slovak Republic. Two Portuguese regions are also included. The Public Knowledge factor is the main weakness of this type of regions. However, the score on the Private Technology factor is close to average, which means that it is much stronger in this respect than the Services Cohesion regions. Unemployment is high, even compared to Rural Industries and Services Cohesion regions.

8 Rural Industries
Besides low per capita GDP, Rural Industries regions share low scores for the Urban Services and Private Technology factors. Population density is very low. The service

sector is often very small. Relatively large sectors include agriculture, in particular, plus manufacturing industries. Some regions of Bulgaria and Romania.

9 Low-tech Government
This type of region, mostly located in southern Italy is characterised by a very low score on Public Knowledge combined with a high share of employment in the Government sector. Unemployment is severe, on average comparable to manufacturing cohesion regions. Per capita GDP is however close to the regional average.

10 Nordic High-tech Learning
The Nordic version of the learning regions are typically strong in the Learning Family factor, but this type also has by far the highest business R&D intensity. In contrast with the popular characterisation of Nordic societies, the size of the government administration is the lowest of all the types. The low score on Urban Services is also due to the low population density. A rather unique feature of this type of regional knowledge economy is the combined strength in the Public Knowledge and Private Technology factors.

11 Science & Service Centre
The main characteristics of this urban group of regions are the high scores in the Public Knowledge and Urban Services factors. Population density is very high. This type also has the highest per capita GDP and productivity. Variables captured by the Learning Families factor also score above the regional average, but the relatively low presence of high and medium-high-tech manufacturing and the business R&D intensity is disappointing.

A.2 Qualitative analysis and preparation of country reports

Briefly, country reports were prepared in the following stages:

A first country document was prepared by the core study team in the form of a **template country report**. This contained overall guidance for country experts and included a number of pre-filled tables, graphs and analysis sections based on information available at EU level.

Next, core team members and national experts involved in the pilot phase of the project commented on completed elements of the templates. Drafted elements and templates were completed and compiled into **first country briefings (draft pilot reports)** by the national experts involved in the pilot phase of the project. Experts from Belgium, Greece, Italy, France, and Poland prepared these pilot country reports.

Once the five first country briefings were completed, the core team prepared a **final set of guidelines**. These guidelines were agreed with the Commission services responsible for this evaluation. Prior to this, all first country briefings were reviewed during the January 2006 and presented to a first meeting of the scientific committee.

Work during the **country analysis phase** included:
A series of key interviews (KI) with policy decision makers;
A focus group (FG) with key national or regional RDTI stakeholders;
Additional information and finalization of short case studies; and
Synthesis notes for these activities.

This work served as qualitative data and allowed national experts to compile draft **country reports**. All reports were subsequently reviewed, checked and finalised by the core team and the consortium members. Once this first check was completed, the core team organised a final peer reading of the document to verify its overall consistency and to ensure a final English language editing of the document. The core team then completed the final editing and layout of the document with a view to publication.

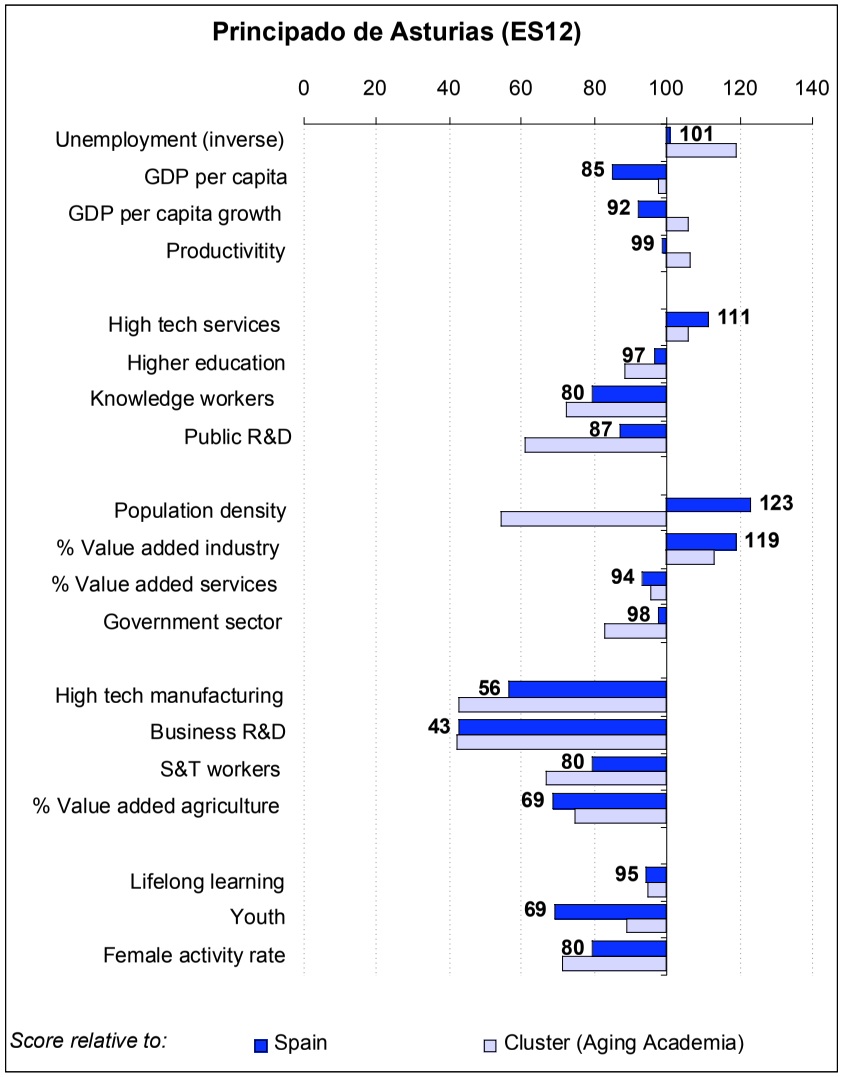
An overall synthesis report has been prepared and will be published by the European Commission providing an overview of the issues addressed in each of the 27 country reports produced by the evaluation team.

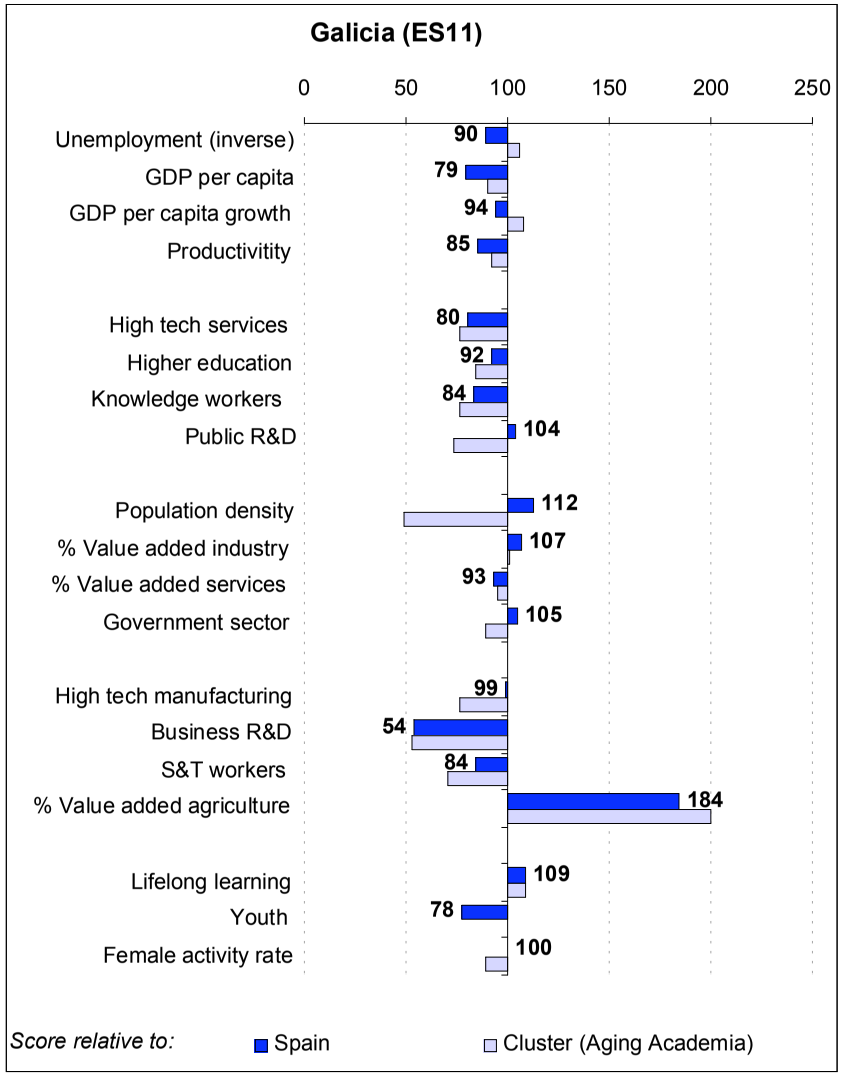
Appendix B Statistical tables and regional scorecards

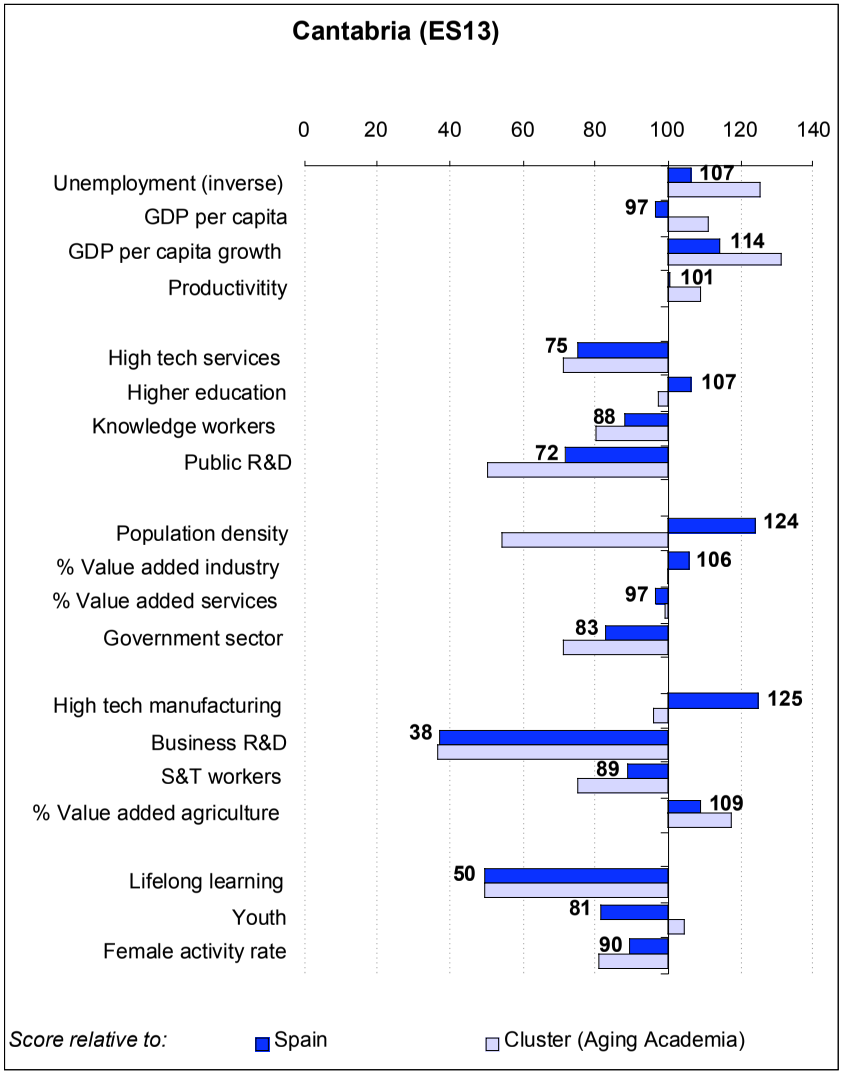
B.1 Overall quantitative analysis per region (SPAIN)

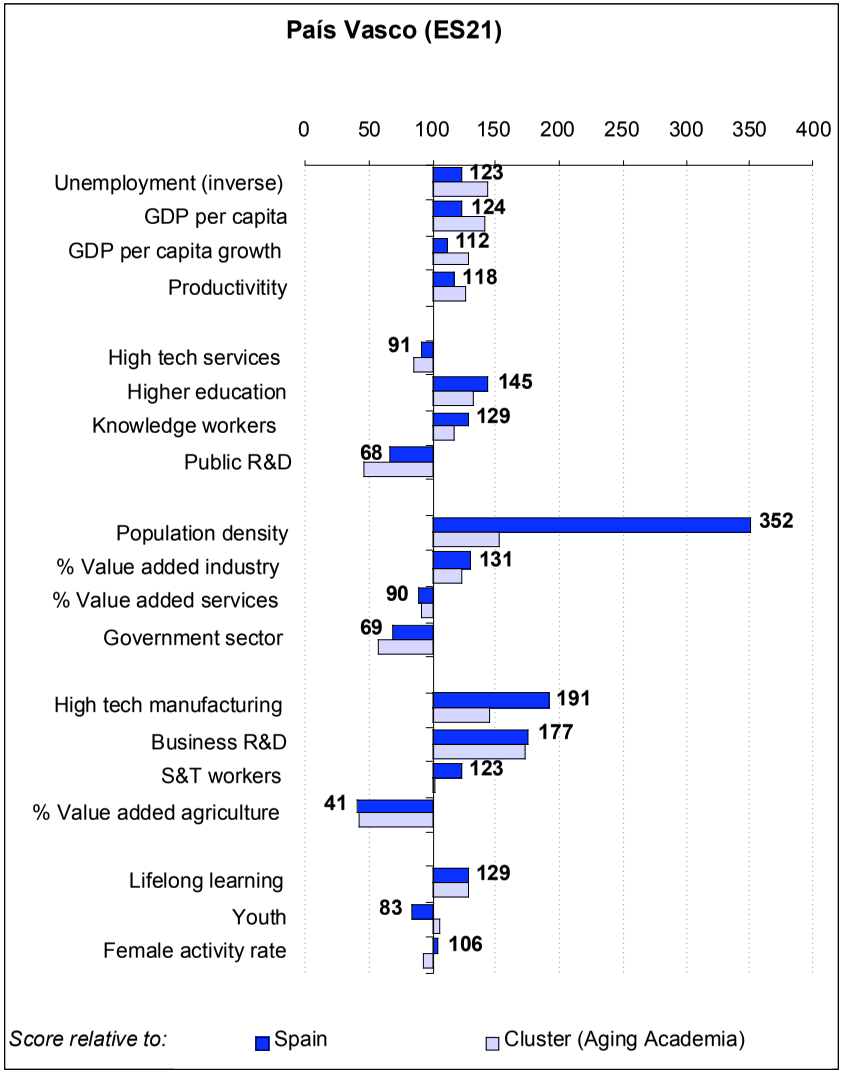
			Economic performance				Public knowledge				Urban services				Private technology				Learning families			Cluster factor scores			
		Cluster	Unemploymen t	GDP per capita	GDP per capita growth 1996-2002	Productivity	High tech services	Higher education	Knowledge workers	Public R&D	Population density	Value added industry	Value added services	Government sector	tech manufacturing	Business R&D	S&T workers	Value added agriculture	Lifelong learning	Youth	Female activity rate	Public knowledge	Urban services	Private Technology	Learning families
			2003	2002	2002	2002	2003	2003	2003	2002	2002	2002	2002	2003	2003	2002	2003	2002	2003	2001	2003				
EU25			9,2	21170	4,8	4556	3,2	20,7	11,6	0,69	117	27,0	70,9	7,5	6,6	1,24	20,7	2,1	8,7	10,8	48,3				
Regional average			9,4	18882	4,8	3914	2,8	18,9	10,7	0,49	294	28,9	66,6	7,6	6,5	0,80	19,5	4,3	7,1	10,5	47,2				
Spain	ES		11,3	20025	6,1	3951	2,4	25,0	12,0	0,47	82	28,5	68,3	6,5	5,2	0,56	15,8	3,2	4,8	9,5	41,3				
Relative to EU25			81	95	128	87	74	121	103	68	70	105	96	87	78	45	76	155	55	88	86				
Galicia	ES11	5	12,6	15811	5,7	3374	1,9	23,0	10,1	0,49	92	30,5	63,5	6,8	5,1	0,30	13,3	6,0	5,2	7,4	41,1	0,81	-0,61	-0,68	-1,52
Principado de Asturias	ES12	5	11,2	17086	5,6	3895	2,6	24,2	9,6	0,41	100	33,9	63,8	6,4	2,9	0,24	12,6	2,2	4,5	6,6	32,9	0,87	-0,48	-0,59	-1,96
Cantabria	ES13	5	10,6	19458	7,0	3975	1,8	26,8	10,6	0,34	101	30,1	66,4	5,4	6,4	0,21	14,1	3,5	2,4	7,8	37,2	0,84	-0,60	-0,52	-1,63
País Vasco	ES21	5	9,2	24798	6,8	4656	2,2	36,3	15,6	0,32	287	37,4	61,3	4,5	9,9	0,99	19,5	1,3	6,2	7,9	43,6	1,80	-1,50	0,26	-1,37
Comunidad Foral de Navarra	ES22	5	5,5	25326	6,0	4502	1,6	33,3	15,4	0,35	54	39,9	55,9	4,7	11,4	0,76	18,3	4,2	6,2	9,2	42,7	1,33	-1,79	0,25	-1,10
La Rioja	ES23	5	6,1	22595	5,8	4245	1,3	26,6	12,0	0,23	56	34,1	58,6	7,1	4,4	0,33	14,9	7,2	2,1	8,5	37,8	0,76	-0,93	-0,82	-1,38
Aragón	ES24	5	6,3	21538	5,9	4092	2,3	28,3	14,1	0,27	25	31,6	64,1	6,0	8,7	0,47	18,8	4,4	4,1	8,3	37,2	1,02	-0,77	-0,09	-1,37
Comunidad De Madrid	ES3	3	7,2	26822	6,4	4587	5,3	32,6	17,5	0,79	688	22,6	77,2	8,0	5,0	1,08	22,8	0,2	4,0	9,6	44,3	1,63	0,85	0,10	-0,66
Castilla y León	ES41	5	11,0	18583	5,7	4010	1,9	26,6	12,3	0,38	26	30,8	63,0	8,1	4,7	0,43	15,5	6,1	6,2	7,6	36,4	0,91	-0,46	-0,65	-1,49
Castilla-la Mancha	ES42	6	9,8	16094	5,6	3411	1,4	18,4	9,3	0,26	22	30,4	61,7	7,8	2,2	0,18	12,1	7,9	5,1	10,3	34,8	-0,26	-0,20	-1,14	-0,54
Extremadura	ES43	6	17,4	13033	6,5	3279	1,5	19,4	11,2	0,53	25	23,5	66,5	8,3	0,8	0,07	13,9	9,9	3,7	10,2	35,9	0,22	0,25	-1,58	-0,65
Cataluña	ES51	5	9,3	23780	5,4	4211	2,5	25,8	12,0	0,41	201	34,2	64,3	4,0	10,0	0,86	16,1	1,5	3,2	9,3	46,3	0,73	-1,02	0,30	-0,87
Comunidad Valenciana	ES52	5	10,8	19196	6,3	3626	1,4	21,4	10,6	0,54	181	31,1	66,6	4,6	3,6	0,26	14,5	2,3	6,7	9,6	43,5	0,59	-0,59	-0,81	-0,54
Illes Balears	ES53	6	9,3	24787	6,0	3995	1,4	18,3	8,8	0,21	171	16,1	82,4	5,4	1,1	0,05	14,0	1,5	4,5	10,7	47,8	-0,13	0,79	-1,42	0,41
Andalucía	ES61	6	18,6	15055	6,4	3553	1,6	20,8	10,2	0,40	85	23,0	70,5	8,3	2,4	0,22	13,3	6,5	4,5	11,2	38,0	-0,23	0,54	-1,15	-0,14
Región de Murcia	ES62	6	10,6	17172	6,7	3302	1,7	22,5	10,2	0,37	107	28,7	64,5	6,5	3,4	0,20	13,8	6,8	5,6	11,7	40,0	0,00	-0,24	-1,09	0,05
Ceuta y Melilla	ES63	--	9,1	17273	1,6	4511	1,0	13,3	#¡REF!		3766	8,1	91,6	32,2	#¡REF!	#¡REF!	#¡REF!	0,3	23,6	#¡REF!	27,0	--	--	--	--
Canarias	ES7	--	11,4	18847	5,8	3610	1,6	9,9	#¡REF!	0,46	237	19,4	78,6	8,0	0,5	0,14	#¡REF!	1,9	21,0	10,7	43,9	--	--	--	--
Learning		1	4,3	23139	4,7	4900	3,2	22,1	12,5	0,40	216	30,5	66,0	6,0	6,2	1,12	22,0	2,4	15,1	12,2	53,8	0,29	-0,41	-0,04	1,30
Central Techno		2	7,5	20700	4,0	4884	2,9	18,7	10,6	0,42	182	30,0	66,8	8,2	7,5	0,84	20,7	3,1	6,7	11,2	47,6	-0,38	0,16	0,36	0,25
Local Science & Services		3	9,2	19852	6,0	3780	4,3	23,6	13,7	0,88	389	22,0	76,2	9,8	4,6	0,79	22,4	1,8	5,9	10,4	46,9	0,52	1,19	0,12	-0,17
High Techno		4	6,1	25202	3,6	5591	3,1	17,5	10,3	0,58	288	31,7	66,7	7,3	11,9	1,31	22,8	1,6	5,6	9,7	46,4	-0,21	-0,05	1,27	-0,52
Aging Academia		5	13,3	17508	5,3	3649	2,5	27,4	13,2	0,67	185	30,1	66,9	7,6	6,7	0,57	18,8	3,0	4,8	7,4	46,0	1,24	-0,33	-0,02	-1,48
Southern Cohesion		6	10,7	16213	6,3	3082	1,2	14,7	8,2	0,37	66	19,9	70,0	7,5	1,5	0,11	11,2	10,2	3,1	10,0	38,2	-0,25	0,36	-1,66	-0,54
Eastern Cohesion		7	14,2	9776	5,3	1230	1,9	12,0	7,2	0,26	113	34,2	61,3	6,6	6,6	0,33	15,9	4,5	4,1	11,0	48,4	-0,88	-0,46	-0,06	0,15
Rural Industries		8	10,3	8204	5,6	1120	1,6	14,8	7,8	0,17	62	33,6	52,0	6,0	4,5	0,18	12,9	14,5	2,6	10,1	45,3	-0,03	-1,40	-1,33	-0,46
Low-tech Government		9	14,1	18553	4,1	4848	2,3	10,0	6,2	0,55	161	21,2	75,1	12,9	4,2	0,28	16,2	3,7	4,6	10,1	32,4	-1,62	2,00	0,08	-0,61
Nordic High-tech Learning		10	6,4	23323	4,7	5202	4,5	28,5	18,7	0,41	67	29,9	67,9	5,4	7,6	3,05	30,2	2,3	25,0	11,9	58,2	1,49	-0,82	0,54	1,98
Science & Service Centre		11	6,1	34489	5,3	6663	5,6	28,5	16,8	0,98	2118	16,8	81,2	7,4	3,8	1,00	30,5	0,8	12,8	11,4	55,5	1,82	1,31	-0,22	0,85

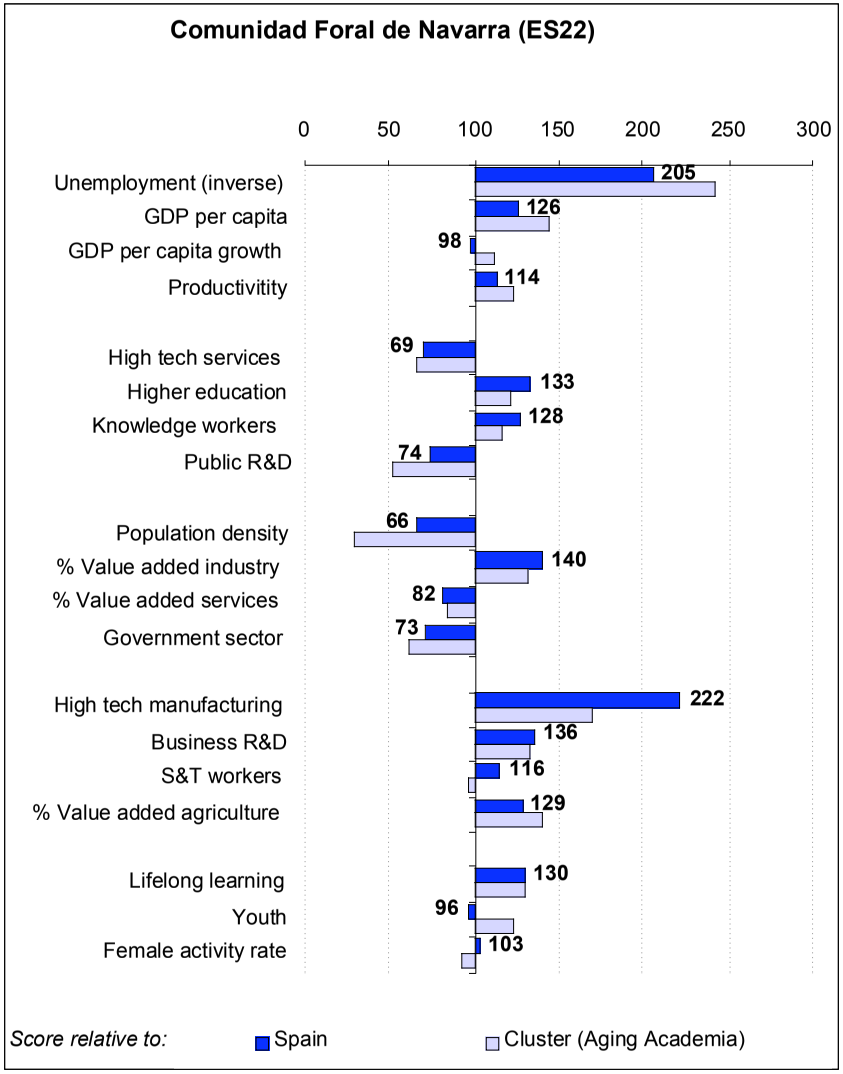
B.2 Regional Scorecards

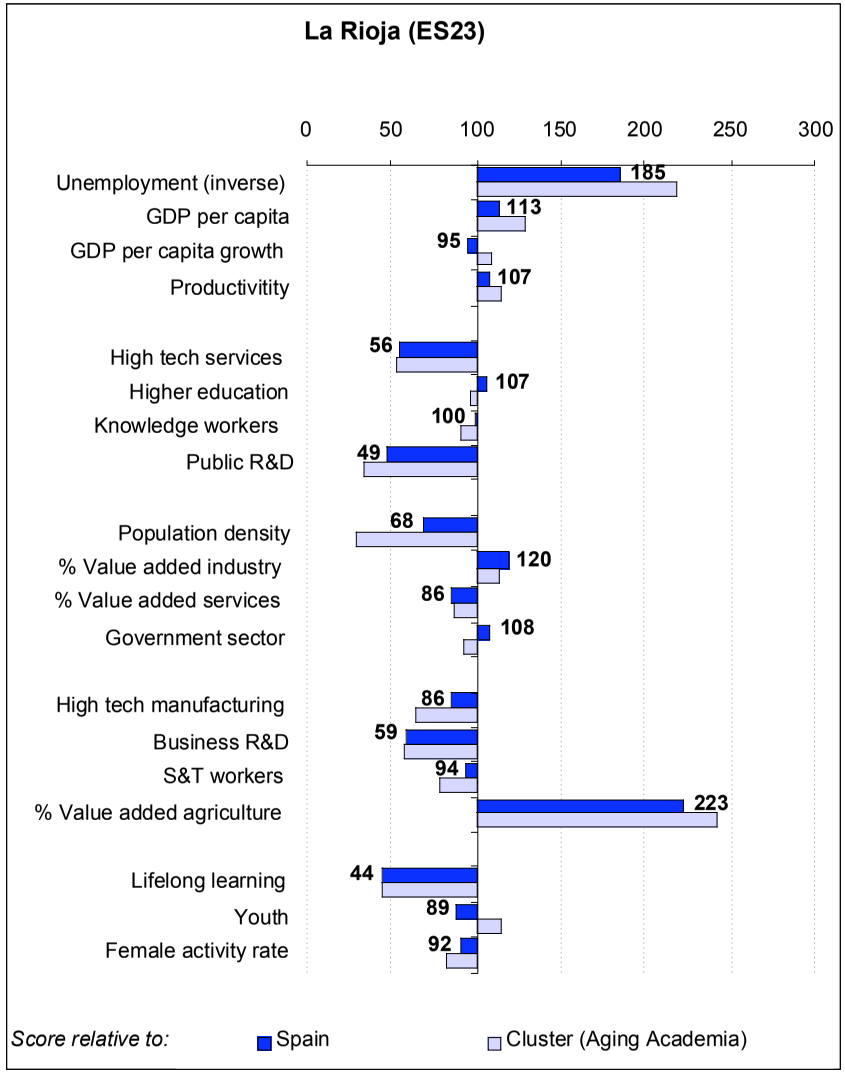


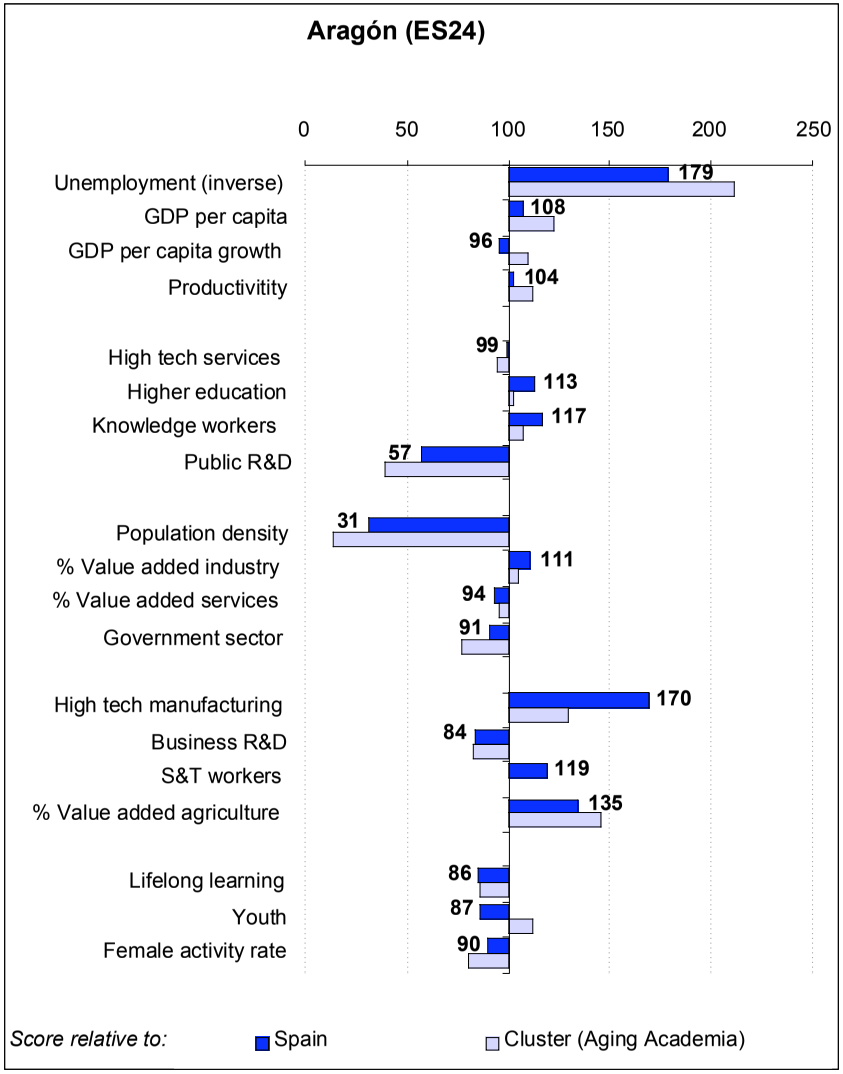


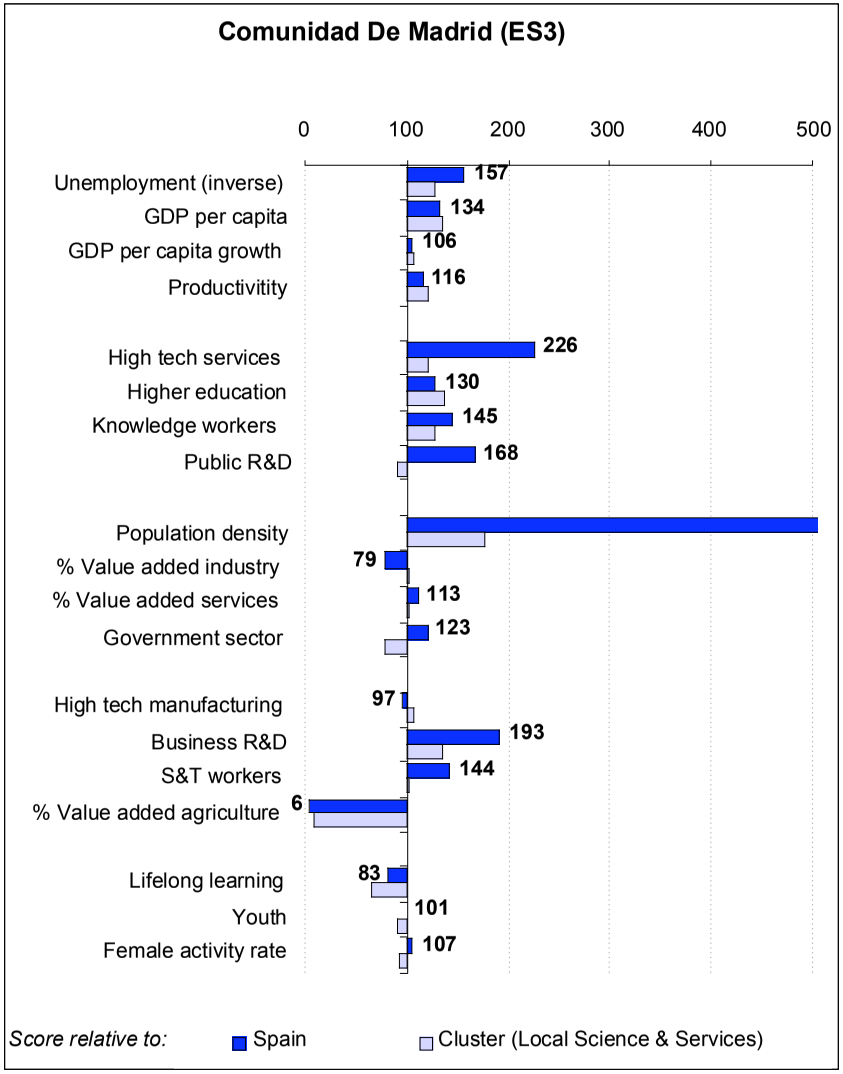

Cantabria (ES13)
0
20
40
60
80
100
120
140
Unemployment (inverse)
GDP per capita
GDP per capita growth
Productivitity
High tech services
Higher education
Knowledge workers
Public R&D
Population density
% Value added industry
% Value added services
Government sector
High tech manufacturing
Business R&D
S&T workers
% Value added agriculture
Lifelong learning
Youth
Female activity rate
107
97
114
101
75
107
88
72
124
106
97
83
125
38
89
109
50
81
90
Score relative to:
Spain
Cluster (Aging Academia)

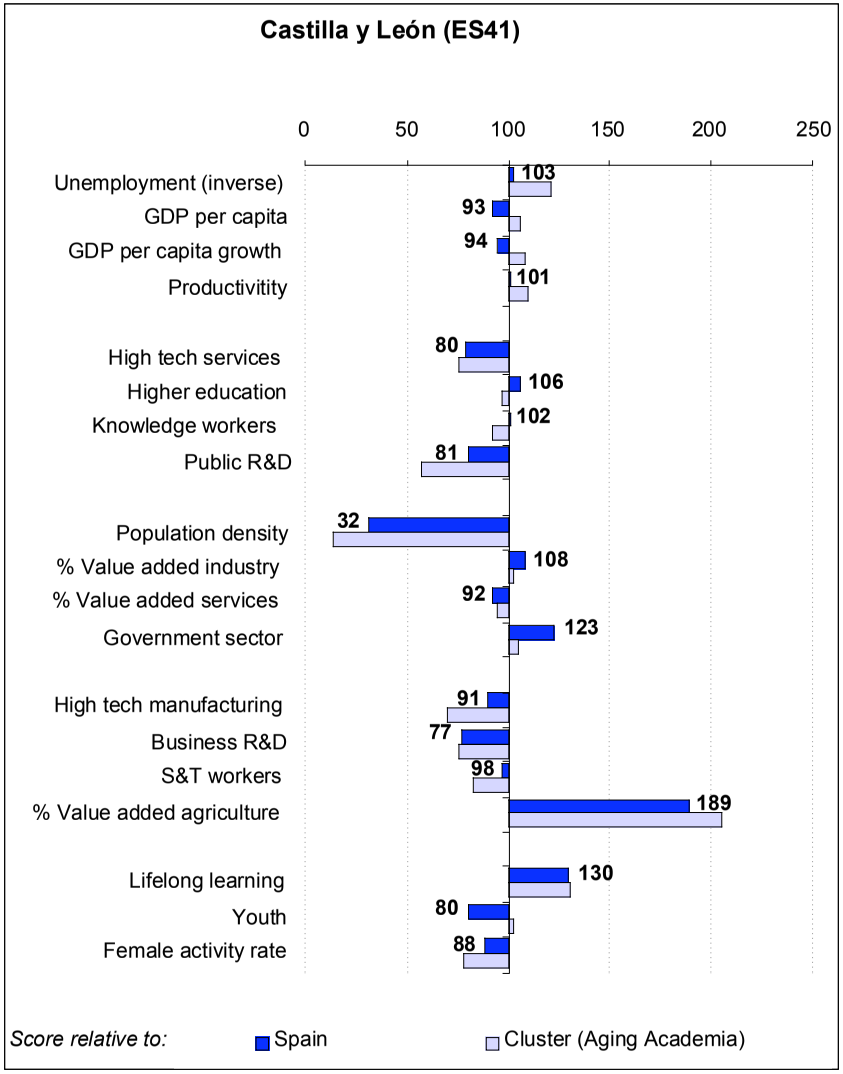

País Vasco (ES21)
0
50
100
150
200
250
300
350
400
Unemployment (inverse)
GDP per capita
GDP per capita growth
Productivitity
High tech services
Higher education
Knowledge workers
Public R&D
Population density
% Value added industry
% Value added services
Government sector
High tech manufacturing
Business R&D
S&T workers
% Value added agriculture
Lifelong learning
Youth
Female activity rate
123
124
112
118
91
145
129
68
352
131
90
69
191
177
123
41
129
83
106
Score relative to:
Spain
Cluster (Aging Academia)

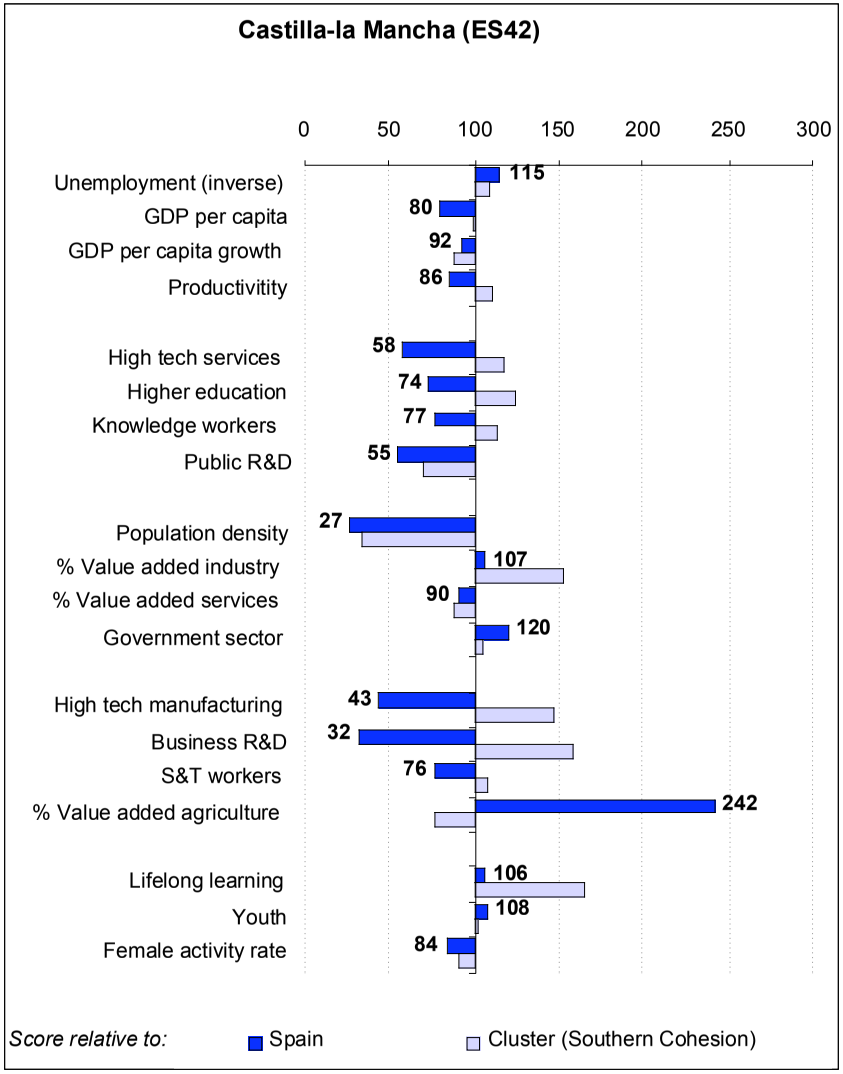

Comunidad Foral de Navarra (ES22)
0
50
100
150
200
250
300
Unemployment (inverse)
205
GDP per capita
126
GDP per capita growth
98
Productivitity
114
High tech services
69
Higher education
133
Knowledge workers
128
Public R&D
74
Population density
66
% Value added industry
140
% Value added services
82
Government sector
73
High tech manufacturing
222
Business R&D
136
S&T workers
116
% Value added agriculture
129
Lifelong learning
130
Youth
96
Female activity rate
103
Score relative to:
Spain
Cluster (Aging Academia)

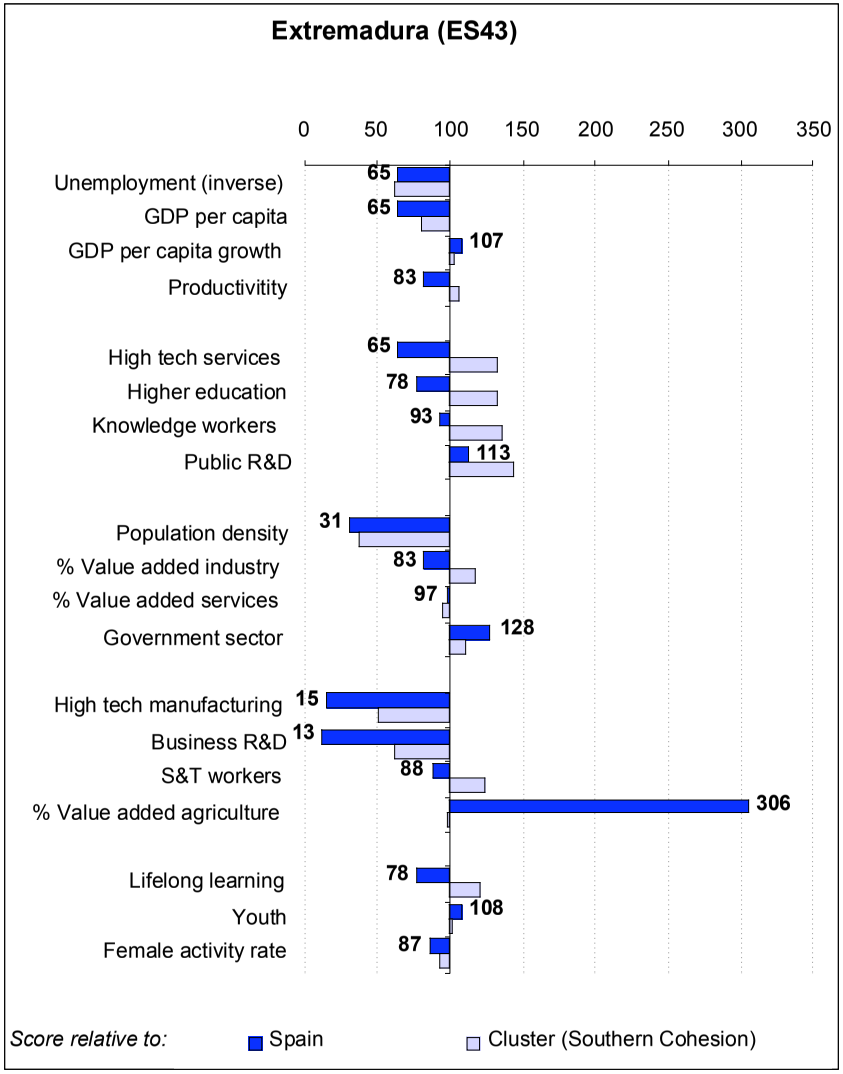

La Rioja (ES23)
0
50
100
150
200
250
300
Unemployment (inverse)
185
GDP per capita
113
GDP per capita growth
95
Productivitity
107
High tech services
56
Higher education
107
Knowledge workers
100
Public R&D
49
Population density
68
% Value added industry
120
% Value added services
86
Government sector
108
High tech manufacturing
86
Business R&D
59
S&T workers
94
% Value added agriculture
223
Lifelong learning
44
Youth
89
Female activity rate
92
Score relative to:
Spain
Cluster (Aging Academia)

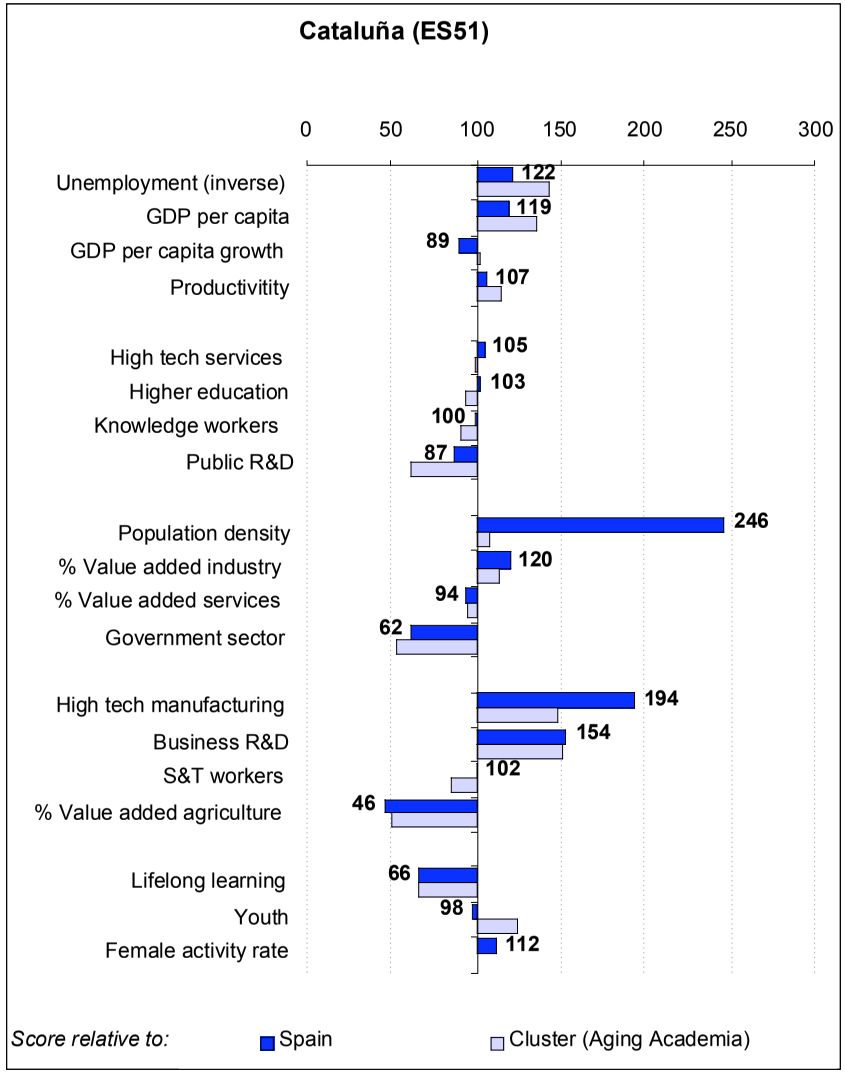

Aragón (ES24)
0
50
100
150
200
250
Unemployment (inverse)
GDP per capita
GDP per capita growth
Productivitity
High tech services
Higher education
Knowledge workers
Public R&D
Population density
% Value added industry
% Value added services
Government sector
High tech manufacturing
Business R&D
S&T workers
% Value added agriculture
Lifelong learning
Youth
Female activity rate
179
108
96
104
99
113
117
57
31
111
94
91
170
84
119
135
86
87
90
Score relative to:
Spain
Cluster (Aging Academia)

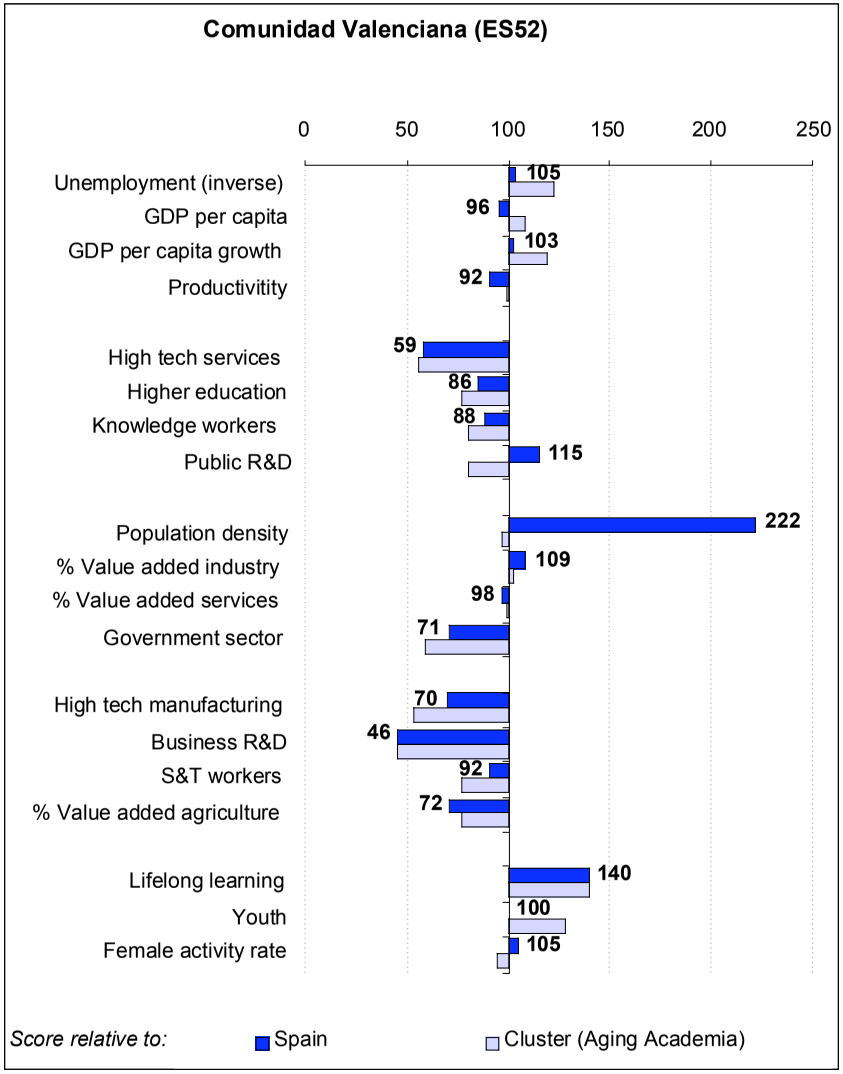

Comunidad De Madrid (ES3)
0
100
200
300
400
500
Unemployment (inverse)
GDP per capita
GDP per capita growth
Productivitity
High tech services
Higher education
Knowledge workers
Public R&D
Population density
% Value added industry
% Value added services
Government sector
High tech manufacturing
Business R&D
S&T workers
% Value added agriculture
Lifelong learning
Youth
Female activity rate
157
134
106
116
226
130
145
168
79
113
123
97
193
144
6
83
101
107
Score relative to:
Spain
Cluster (Local Science & Services)

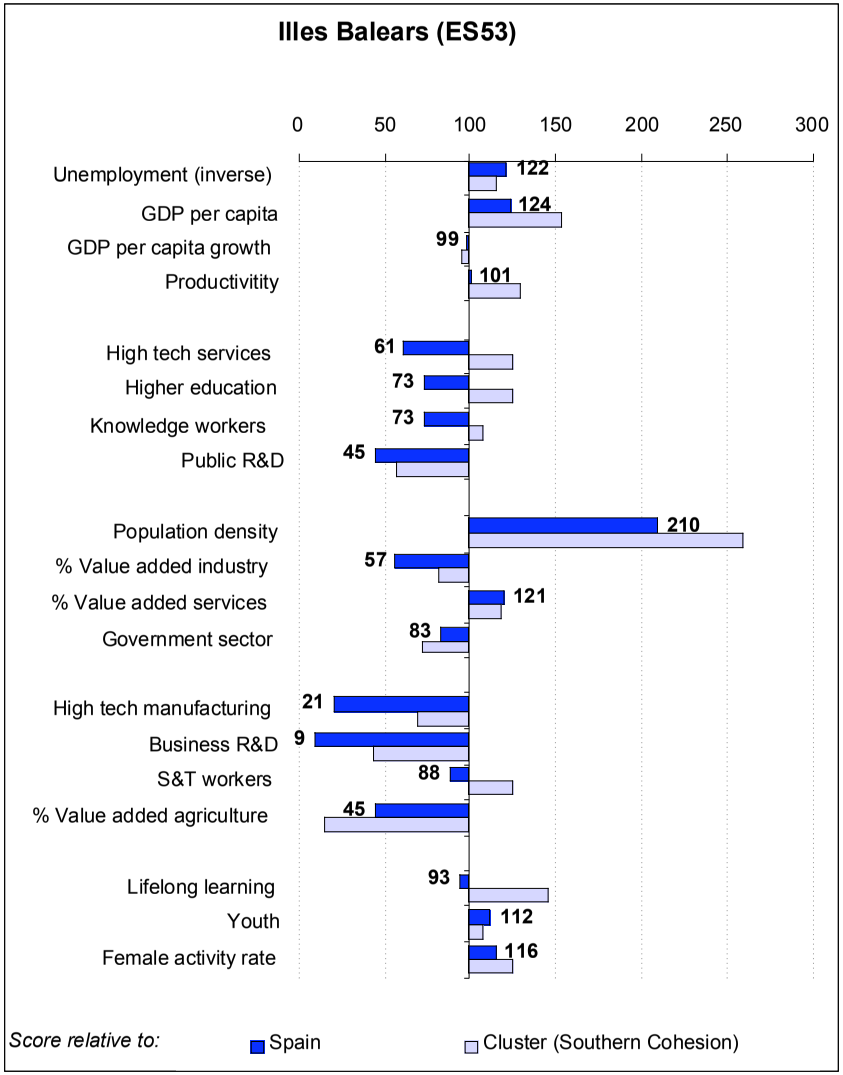

Castilla y León (ES41)
0
50
100
150
200
250
Unemployment (inverse)
GDP per capita
GDP per capita growth
Productivitity
High tech services
Higher education
Knowledge workers
Public R&D
Population density
% Value added industry
% Value added services
Government sector
High tech manufacturing
Business R&D
S&T workers
% Value added agriculture
Lifelong learning
Youth
Female activity rate
103
93
94
101
80
106
102
81
32
108
92
123
91
77
98
189
130
80
88
Score relative to:
Spain
Cluster (Aging Academia)

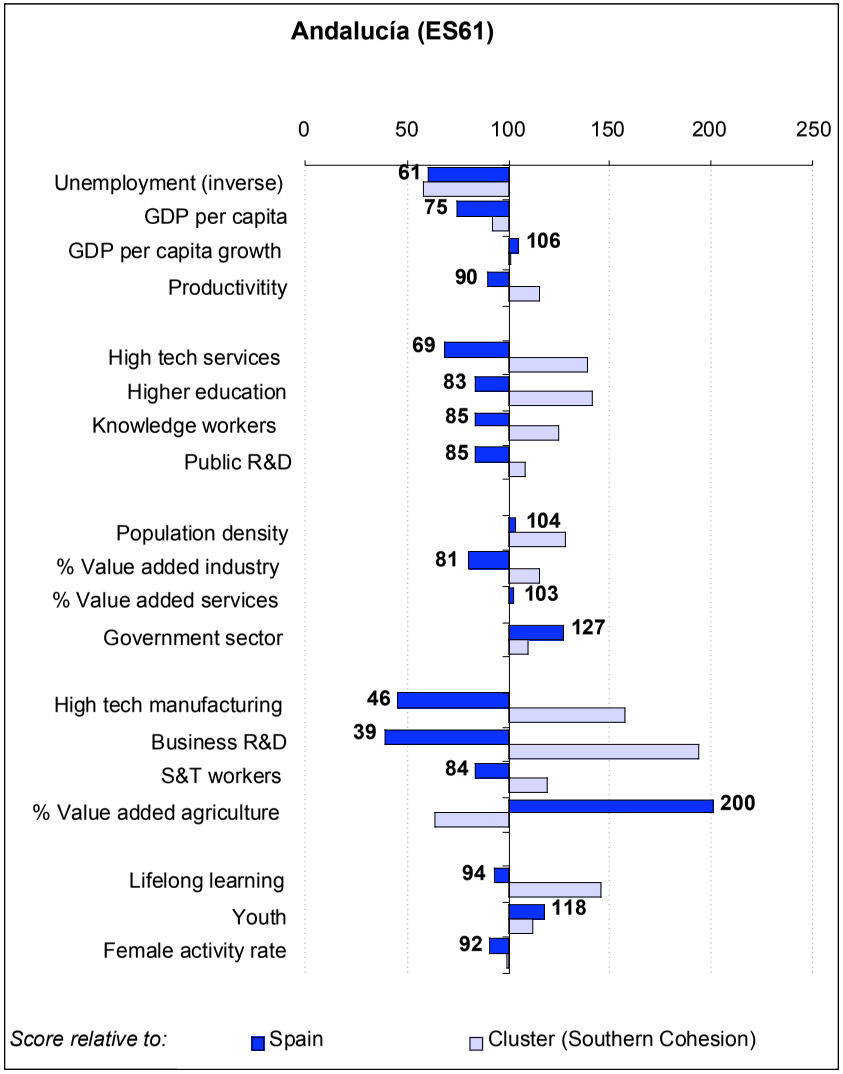

Castilla-la Mancha (ES42)
0
50
100
150
200
250
300
Unemployment (inverse)
GDP per capita
GDP per capita growth
Productivitity
High tech services
Higher education
Knowledge workers
Public R&D
Population density
% Value added industry
% Value added services
Government sector
High tech manufacturing
Business R&D
S&T workers
% Value added agriculture
Lifelong learning
Youth
Female activity rate
115
80
92
86
58
74
77
55
27
107
90
120
43
32
76
242
106
108
84
Score relative to:
Spain
Cluster (Southern Cohesion)

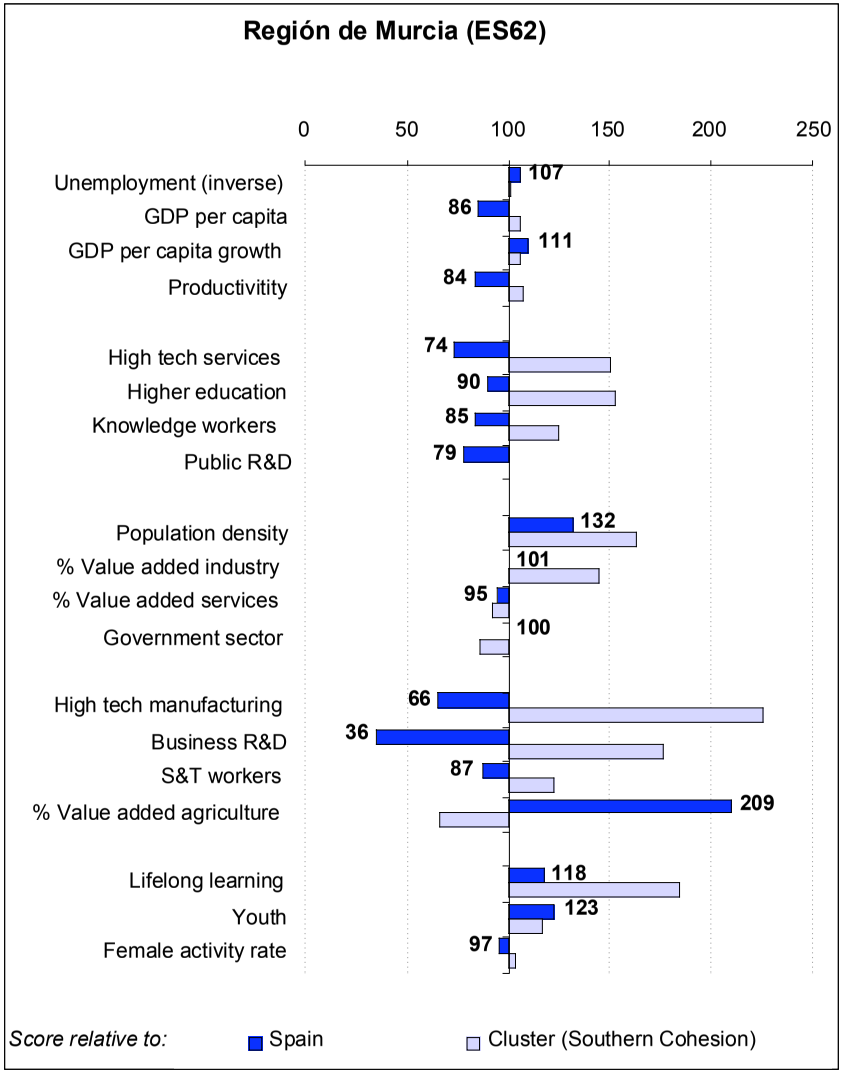

Extremadura (ES43)
0
50
100
150
200
250
300
350
Unemployment (inverse)
GDP per capita
GDP per capita growth
Productivitity
High tech services
Higher education
Knowledge workers
Public R&D
Population density
% Value added industry
% Value added services
Government sector
High tech manufacturing
Business R&D
S&T workers
% Value added agriculture
Lifelong learning
Youth
Female activity rate
65
65
107
83
65
78
93
113
31
83
97
128
15
13
88
306
78
108
87
Score relative to:
Spain
Cluster (Southern Cohesion)


Cataluña (ES51)
0
50
100
150
200
250
300
Unemployment (inverse)
GDP per capita
GDP per capita growth
Productivitity
High tech services
Higher education
Knowledge workers
Public R&D
Population density
% Value added industry
% Value added services
Government sector
High tech manufacturing
Business R&D
S&T workers
% Value added agriculture
Lifelong learning
Youth
Female activity rate
122
119
89
107
105
103
100
87
246
120
94
62
194
154
102
46
66
98
112
Score relative to:
Spain
Cluster (Aging Academia)


Comunidad Valenciana (ES52)
0
50
100
150
200
250
Unemployment (inverse)
105
GDP per capita
96
GDP per capita growth
103
Productivitity
92
High tech services
59
Higher education
86
Knowledge workers
88
Public R&D
115
Population density
222
% Value added industry
109
% Value added services
98
Government sector
71
High tech manufacturing
70
Business R&D
46
S&T workers
92
% Value added agriculture
72
Lifelong learning
140
Youth
100
Female activity rate
105
Score relative to:
Spain
Cluster (Aging Academia)


Illes Balears (ES53)
0
50
100
150
200
250
300
Unemployment (inverse)
122
GDP per capita
124
GDP per capita growth
99
Productivitity
101
High tech services
61
Higher education
73
Knowledge workers
73
Public R&D
45
Population density
210
% Value added industry
57
% Value added services
121
Government sector
83
High tech manufacturing
21
Business R&D
9
S&T workers
88
% Value added agriculture
45
Lifelong learning
93
Youth
112
Female activity rate
116
Score relative to:
Spain
Cluster (Southern Cohesion)


Andalucía (ES61)
0
50
100
150
200
250
Unemployment (inverse)
GDP per capita
GDP per capita growth
Productivitity
High tech services
Higher education
Knowledge workers
Public R&D
Population density
% Value added industry
% Value added services
Government sector
High tech manufacturing
Business R&D
S&T workers
% Value added agriculture
Lifelong learning
Youth
Female activity rate
61
75
106
90
69
83
85
85
104
81
103
127
46
39
84
200
94
118
92
Score relative to:
Spain
Cluster (Southern Cohesion)


Región de Murcia (ES62)
0
50
100
150
200
250
Unemployment (inverse)
GDP per capita
GDP per capita growth
Productivitity
High tech services
Higher education
Knowledge workers
Public R&D
Population density
% Value added industry
% Value added services
Government sector
High tech manufacturing
Business R&D
S&T workers
% Value added agriculture
Lifelong learning
Youth
Female activity rate
107
86
111
84
74
90
85
79
132
101
95
100
66
36
87
209
118
123
97
Score relative to:
Spain
Cluster (Southern Cohesion)

Absorption capacity of RTDI interventions: enlarged definition of RDTI and Information Society

OBJECTIVES	ALLOCATED	DISBURSED TOTAL SF	EXPENDITURE CAPACITY
Objective 1	3,463,354,768.19	1,954,708,108.62	56.4%
Objective 2	1,200,109,079.19	755,326,959.88	62.9%

This third calculation adds RTDI plus business (innovation & technology) support plus information society. As D.1.1 plus:
322 Information and Communication Technology (including security and safe transmission measures)
324 Services and applications for SMEs (electronic commerce and transactions, education and training, networking)

Appendix C Categories used for policy-mix analysis

C.1 Classification of policy areas

Policy area	Short description
Improving governance capacities for innovation and knowledge policies	Technical assistance type funding used by public authorities, regional agencies and public-private partnerships in developing and improving policies and strategies in support of innovation and knowledge. This could include past ERDF innovative action programmes as well as, for instance, support for regional foresight, etc.
Innovation-friendly environment;	This category covers a range of actions which seek to improve the overall environment in which enterprises innovate, and notably three sub groups: innovation financing (in terms of establishing financial engineering schemes, etc.); regulatory improvements and innovative approaches to public services and procurement (this category could notably capture certain e-government investments related to provision of services to enterprises) ; Developing human capital for the knowledge economy. This category will be limited to projects in higher education aimed at developing industry orientated courses and post-graduate courses; training of researchers in enterprises or research centres[21];
Knowledge transfer and technology diffusion to enterprises	Direct or indirect support for knowledge and technology transfer: direct support: aid scheme for using technology-related services or for implementing technology transfer projects, notably environmentally friendly technologies and ITC; indirect support: delivered through funding of infrastructure and services of technology parks, innovation centres, university liaison and transfer offices, etc.
Innovation poles and clusters	Direct or indirect support for creation of poles (involving public and non-profit organisations as well as enterprises) and business clusters direct support: funding for business-level cluster activities, etc. indirect support through funding for regrouping R&D infrastructure in poles, infrastructure for clusters, etc.
Support to creation and growth of innovative enterprises	Direct or indirect support for creation and growth of innovative firms: direct support: specific financial schemes for spin-offs and innovative start-ups, grants to SMEs related to improving innovation management, marketing, industrial design, etc.; indirect support through funding of incubators, training related to entrepreneurship, etc.
Boosting applied research and product development	Funding of "Pre-competitive development" and "Industrial research" projects and related infrastructure. Policy instruments include: aid schemes for single beneficiary or groups of beneficiaries (including IPR protection and exploitation); Research infrastructures for non-profit/public organisations and higher education sector directly related to universities.

[21] This is part of the wider area of in-house training, but in the present study only interventions targeted to researchers or research functions are analysed.

C.2 Classification of Beneficiaries:

Beneficiaries	Short description
Public sectors	Universities National research institutions and other national and local public bodies (innovation agencies, BIC, Chambers of Commerce, etc.) Public companies
Private sectors	Enterprises Private research centres
Networks	cooperation between research, universities and businesses cooperation between businesses (*clusters of SMEs)* other forms of cooperation among different actors

C.3 Classification of instruments:

Instruments	Short description
Infrastructures and facilities	Building and equipment for laboratories or facilities for university or research centres, Telecommunication infrastructures, Building and equipment for incubators and parks for innovative enterprises
Aid schemes	Grants and loans for RTDI projects Innovative finance (venture capital, equity finance, special bonds, etc.) for innovative enterprises
Education and training	Graduate and post-graduate University courses Training of researchers

Appendix D Financial and policy measure tables

D.1 Additional financial tables

D 1.1 RTDI plus business (innovation technology) support

Overall allocation of resources at an objective 1 and 2 level (allocated Euro): enlarged definition of RDTI

Objectives	Total cost	SF			NF	
		Total	ERDF	ESF	Public	Private
RTDI INTERVENTIONS						
Objective 1	4.736.318.476,50	3.268.640.815,27	3.092.327.389,27	-	1.459.046.061,22	8.631.600,00
Objective 2	2.417.447.709,25	1.177.790.635,13	1.177.790.635,13	-	1.239.238.304,73	418.769,40
TOTAL COHESION POLICY						
Objective 1	63.984.867.725,00	41.263.277.733,00	25.315.803.145,00	9.143.822.543,00	21.371.658.280,00	1.349.931.712,00
Objective 2	6.168.805.714,00	2.866.760.525,00	2.551.478.500,00	315.282.025,00	3.148.531.356,00	153.513.833,00

* the two digit code 15 was not taken into accout to avoid overestimate (Castilla y León) .
** the two digit code 16 was not taken into accout to avoid overestimate (Castilla y León, Castilla-La Mancha, Ceuta, Melilla) .

Source: Ismeri Europa elaboration on EC data

Regional allocation resources (Euro): enlarged definition of RDTI

Programs	RTDI INTERVENTIONS			TOTAL		
	Total SF	ERDF	ESF	Total SF	ERDF	ESF
OBJECTIVE 1						
Andalucia Ob.1	661.186.911,15	519.673.238,15	-	8.186.021.509,00	6.427.411.070,00	971.354.167,00
Asturias Ob.1	51.299.273,00	51.299.273,00	-	1.397.911.755,00	1.079.307.156,00	106.175.000,00
Canarias Ob.1	58.254.705,00	58.254.705,00	-	1.927.504.763,00	1.510.266.778,00	262.307.908,00
Cantabria Ob.1	18.532.484,30	18.532.484,30	-	309.609.149,00	206.960.221,00	34.776.000,00
Castilla y Leòn Ob.1	85.286.014,00	50.486.261,00	-	3.294.657.914,00	2.301.773.395,00	322.368.866,00
Castilla La Mancha Ob.1	85.006.148,45	85.006.148,45	-	2.199.563.890,00	1.528.026.050,00	242.200.000,00
Ceuta Ob. 1	1.232.217,00	1.232.217,00	-	80.499.632,00	64.899.632,00	15.600.000,00
Communidad Valenciana Ob.1	282.073.922,00	282.073.922,00	-	2.865.472.017,00	2.145.792.712,00	497.504.245,00
Extremadura Ob.1	104.586.970,84	104.586.970,84	-	2.225.177.267,00	1.579.118.955,00	363.573.000,00
Galicia Ob.1	103.767.368,12	103.767.368,12	-	3.581.255.858,00	2.438.658.270,00	409.279.463,00
Melilla Ob.1	-	-	-	60.974.287,00	50.324.668,00	10.649.619,00
Murcia Ob.1	55.098.187,00	55.098.187,00	-	1.187.426.218,00	967.416.939,00	109.551.852,00
OBJECTIVE 2						
Aragon Ob.2	91.166.184,00	91.166.184,00	-	319.531.004,00	306.886.285,00	12.644.719,00
Baleares Ob.2	31.728.633,50	31.728.633,50	-	94.337.162,00	92.553.030,00	1.784.132,00
Cataluña Ob.2	544.532.285,42	544.532.285,42	-	1.289.001.347,00	1.036.375.488,00	252.625.859,00
La Rioja Ob.2	15.898.677,07	15.898.677,07	-	44.286.794,00	43.596.427,00	690.367,00
Madrid Ob.2	180.918.668,87	180.918.668,87	-	411.993.189,00	390.721.011,00	21.272.178,00
Navarra Ob.2	53.974.884,00	53.974.884,00	-	94.499.952,00	92.724.696,00	1.775.256,00
País Vasco Ob.2	259.571.302,27	259.571.302,27	-	613.111.077,00	588.621.563,00	24.489.514,00
Total Regional OPs	**2.684.114.835,99**	**2.507.801.409,99**	**0,00**	**30.182.834.784,00**	**22.851.434.346,00**	**3.660.622.145,00**
Local Ob.1	42.859.115,30	42.859.115,30	-	1.120.298.122,00	1.120.298.122,00	-
Fisheries Ob.1	-	-	-	1.570.925.014,00	-	-
Fomento del Empleo Ob.1	-	-	-	3.581.936.017,00	-	3.581.936.017,00
Iniciativa empresarial y Formación Continua Ob.1	-	-	-	1.626.617.037,00	-	1.626.617.037,00
Lucha contra la Discriminación Ob.1	-	-	-	339.637.592,00	99.815.195,00	239.822.397,00
Sistemas de Produccion Agrarios y Medioambientales Ob.1	-	-	-	1.554.813.004,00	-	-
Investigación, Desarrollo e Innovación Ob.1	1.477.023.874,00	1.477.023.874,00		1.693.316.041,00	1.477.443.874,00	215.872.167,00
Technical Assistence Ob.1	-	-	-	17.042.734,00	7.640.000,00	2.267.000,00
Competitividad y desarollo del Tejido Productivo Ob.1	242.433.625,11	242.433.625,11	-	1.864.082.108,00	1.864.082.108,00	-
Sistema de Formacion Profesional Ob.1	-	-	-	131.967.805,00	-	131.967.805,00
Information Society Ob.1	-	-	-	446.568.000,00	446.568.000,00	-
Total Multiregional OPs	**1.762.316.614,41**	**1.762.316.614,41**	**0,00**	**13.947.203.474,00**	**5.015.847.299,00**	**5.798.482.423,00**

Source: Ismeri Europa elaboration on EC data

Absorption capacity of RTDI interventions: enlarged definition of RDTI

OBJECTIVES	ALLOCATED	DISBURSED TOTAL SF	EXPENDITURE CAPACITY
Objective 1	3,268,640,815.27	1,860,499,699.67	56.9%
Objective 2	1,177,790,635.13	741,777,892.21	63.0%

Categories 181 to 184 plus:
152 Environment-friendly technologies, clean and economical energy technologies
153 Business organisation advisory services (including internationalisation, exporting and environmental management, purchase of technology)
155 Financial engineering
162 Environment-friendly technologies, clean and economical energy technologies
163 Enterprise advisory services (information, business planning, consultancy services, marketing, management, design, internationalisation, exporting, environmental management, purchase of technology)
164 Shared business services (business estates, incubator units, stimulation, promotional services, networking, conferences, trade fairs)
165 Financial engineering

D 1.2 Broad innovation and knowledge economy funding

Overall allocation of resources at an objective 1 and 2 level (allocated Euro): enlarged definition of RDTI and Information Society

Objectives	Total cost	SF			NF	
		Total	ERDF	ESF	Public	Private
RTDI INTERVENTIONS						
Objective 1	5.075.543.084,72	3.463.354.768,19	3.287.041.342,19	-	1.603.556.716,53	8.631.600,00
Objective 2	2.462.084.597,39	1.200.109.079,19	1.200.109.079,19	-	1.261.556.748,79	418.769,40
TOTAL COHESION POLICY						
Objective 1	63.984.867.725,00	41.263.277.733,00	25.315.803.145,00	9.143.822.543,00	21.371.658.280,00	1.349.931.712,00
Objective 2	6.168.805.714,00	2.866.760.525,00	2.551.478.500,00	315.282.025,00	3.148.531.356,00	153.513.833,00

Regional allocation resources (Euro): enlarged definition of RDTI and Information Society

Programs	RTDI INTERVENTIONS			TOTAL		
	Total SF	ERDF	ESF	Total SF	ERDF	ESF
OBJECTIVE 1						
Andalucia Ob.1	669.011.739,58	527.498.066,58	-	8.186.021.509,00	6.427.411.070,00	971.354.167,00
Asturias Ob.1	51.299.273,00	51.299.273,00	-	1.397.911.755,00	1.079.307.156,00	106.175.000,00
Canarias Ob.1	74.138.355,03	74.138.355,03	-	1.927.504.763,00	1.510.266.778,00	262.307.908,00
Cantabria Ob.1	21.254.329,10	21.254.329,10	-	309.609.149,00	206.960.221,00	34.776.000,00
Castilla y Leòn Ob.1	85.286.014,00	50.486.261,00	-	3.294.657.914,00	2.301.773.395,00	322.368.866,00
Castilla La Mancha Ob.1	85.659.635,39	85.659.635,39	-	2.199.563.890,00	1.528.026.050,00	242.200.000,00
Ceuta Ob. 1	1.432.217,00	1.432.217,00	-	80.499.632,00	64.899.632,00	15.600.000,00
Communidad Valenciana Ob.1	327.350.367,92	327.350.367,92	-	2.865.472.017,00	2.145.792.712,00	497.504.245,00
Extremadura Ob.1	104.586.970,84	104.586.970,84	-	2.225.177.267,00	1.579.118.955,00	363.573.000,00
Galicia Ob.1	126.864.951,72	126.864.951,72	-	3.581.255.858,00	2.438.658.270,00	409.279.463,00
Melilla Ob.1	135.824,50	135.824,50	-	60.974.287,00	50.324.668,00	10.649.619,00
Murcia Ob.1	64.935.430,00	64.935.430,00	-	1.187.426.218,00	967.416.939,00	109.551.852,00
OBJECTIVE 2						
Aragon Ob.2	102.696.062,00	102.696.062,00	-	319.531.004,00	306.886.285,00	12.644.719,00
Baleares Ob.2	31.728.633,50	31.728.633,50	-	94.337.162,00	92.553.030,00	1.784.132,00
Cataluña Ob.2	544.532.285,42	544.532.285,42	-	1.289.001.347,00	1.036.375.488,00	252.625.859,00
La Rioja Ob.2	16.690.220,20	16.690.220,20	-	44.286.794,00	43.596.427,00	690.367,00
Madrid Ob.2	182.713.001,73	182.713.001,73	-	411.993.189,00	390.721.011,00	21.272.178,00
Navarra Ob.2	53.974.884,00	53.974.884,00	-	94.499.952,00	92.724.696,00	1.775.256,00
País Vasco Ob.2	267.773.992,35	267.773.992,35	-	613.111.077,00	588.621.563,00	24.489.514,00
Total Regional OPs	**2.812.064.187,27**	**2.635.750.761,27**	**0,00**	**30.182.834.784,00**	**22.851.434.346,00**	**3.660.622.145,00**
Local Ob.1	42.859.115,30	42.859.115,30	-	1.120.298.122,00	1.120.298.122,00	-
Fisheries Ob.1	-	-	-	1.570.925.014,00	-	-
Fomento del Empleo Ob.1	-	-	-	3.581.936.017,00	-	3.581.936.017,00
Iniciativa empresarial y Formación Continua Ob.1	-	-	-	1.626.617.037,00	-	1.626.617.037,00
Lucha contra la Discriminación Ob.1	-	-	-	339.637.592,00	99.815.195,00	239.822.397,00
Sistemas de Produccion Agrarios y Medioambientales Ob.1	-	-	-	1.554.813.004,00	-	-
Investigación, Desarrollo e Innovación Ob.1	1.477.023.874,00	1.477.023.874,00	-	1.693.316.041,00	1.477.443.874,00	215.872.167,00
Technical Assistence Ob.1	-	-	-	17.042.734,00	7.640.000,00	2.267.000,00
Competitividad y desarollo del Tejido Productivo Ob.1	242.433.625,11	242.433.625,11	-	1.864.082.108,00	1.864.082.108,00	-
Sistema de Formacion Profesional Ob.1	-	-	-	131.967.805,00	-	131.967.805,00
Information Society Ob.1	89.083.045,70	89.083.045,70	-	446.568.000,00	446.568.000,00	-
Total Multiregional OPs	**1.851.399.660,11**	**1.851.399.660,11**	**0,00**	**13.947.203.474,00**	**5.015.847.299,00**	**5.798.482.423,00**

Absorption capacity of RTDI interventions: enlarged definition of RDTI and Information Society

OBJECTIVES	ALLOCATED	DISBURSED TOTAL SF	EXPENDITURE CAPACITY
Objective 1	3,463,354,768.19	1,954,708,108.62	56.4%
Objective 2	1,200,109,079.19	755,326,959.88	62.9%

This third calculation adds RTDI plus business (innovation & technology) support plus information society. As D.1.1 plus:
322 Information and Communication Technology (including security and safe transmission measures)
324 Services and applications for SMEs (electronic commerce and transactions, education and training, networking)

D.2 Summary of key policy measures per programme

Exhibit 5: main measures in favour of innovation and knowledge

Region	Measure	Focus of intervention (policy area classification)	Main instruments	Main Beneficiaries
Andalusia (Obj. 1)	Measure 2.1. Support investment in human capital in research, science and technology environment	Improving governance capacities for innovation and knowledge policies	Other	Public and private sector
	Measure 2.2. Research, innovation and technological development projects	Improving governance capacities for innovation and knowledge policies	Other	Public and private sector
	Measure 2.3. Scientific-technological Equipment	Knowledge transfer and technology diffusion to enterprises	Other	Public and private sector
	Measure 2.4. Technology Transfer	Knowledge transfer and technology diffusion to enterprises	Other	Public Sector
	Measure 2.5. Public research and Technology Centres	Support to creation and growth of innovative enterprises	Infrastructures and facilities	Public and private sector
	Measure 2.7. Digital society	Innovation-friendly environment	Aid schemes	Public and private sector
Asturias (Obj. 1)	Measure 2.2. Research, innovation and technological development project	Improving governance capacities for innovation and knowledge policies	Other	Private Sector
	Measure 2.3. Scientific-technological Equipment	Knowledge transfer and technology diffusion to enterprises / Boosting applied research and product development	Other	Public Sector / Private Sectors
	Measure 2.5. Public research and Technology Centres	Innovation poles and clusters	Infrastructures and facilities	Public Sector / Private Sector
	Measure 2.7. Digital society	Innovation-friendly environment	Infrastructures and facilities	Public Sector / Private Sector / Network
Canaries (Obj. 1)	Measure 2.1. Support investment in human capital in research, science and technology environment	Improving governance capacities for innovation and knowledge policies	Aid schemes	Private Sector
	Measure 2.2. Research, innovation and technological development project	Support to creation and growth of innovative enterprises / Boosting applied research and product development	-	Public Sector / Private Sector
	Measure 2.3. Scientific-technological Equipment	Knowledge transfer and technology diffusion to enterprises	-	Public Sector
	Measure 2.4. Technology transfer	Knowledge transfer and technology diffusion to enterprises	-	Public Sector / Private Sector
	Measure 2.5. Public research and Technology Centres	Support to creation and growth of innovative enterprises / Boosting applied research and product development	-	Public Sector / Private Sector
	Measure 2.7. Digital society	Innovation-friendly environment	-	Public Sector / Private Sector

Region	Measure	Focus of intervention (policy area classification)	Main instruments	Main Beneficiaries
Cantabria (Obj. 1)	Measure 2.3. Scientific-technological Equipment	Support to creation and growth of innovative enterprises / Boosting applied research and product development	Other	Public Sector / Private Sector
	Measure 2.7. Digital society	Innovation-friendly environment	Infrastructures and facilities	Public Sector / Private Sector
Castilla-La Mancha (Obj. 1)	Measure 2.1. Support investment in human capital in research, science and technology environment	Improving governance capacities for innovation and knowledge policies	-	Public Sector / Private Sector
	Measure 2.2. Research, innovation and technological development project	Improving governance capacities for innovation and knowledge policies	Aid schemes	Public Sector / Private Sector
	Measure 2.4. Technology transfer	Knowledge transfer and technology diffusion to enterprises	Aid schemes	Public Sector / Private Sector
	Measure 2.5. Public research and Technology Centres	Support to creation and growth of innovative enterprises	Infrastructures and facilities/ Aid schemes	Public Sector / Private Sector
	Measure 2.7. Digital society	Innovation-friendly environment	Infrastructures and facilities/ Aid schemes	Public Sector / Private Sector
Castilla y León (Obj. 1)	Measure 2.1. Support investment in human capital in research, science and technology environment	Improving governance capacities for innovation and knowledge policies	-	Public Sector /
	Measure 2.2. Research, innovation and technological development project}	Support to creation and growth of innovative enterprises	Other	Public Sector / Private Sector
	Measure 2.2. Research, innovation and technological development project} (Subvention Global)	Boosting applied research and product development	Aid schemes	Public Sector
	Measure 2.3. Scientific-technological Equipment	Boosting applied research and product development / Knowledge transfer and technology diffusion to enterprises	Aid schemes/Other	Public Sector
	Measure 2.7. Digital society	Innovation-friendly environment	Infrastructures and facilities	Public Sector
ad Valencia na (Obj.	Measure 2.1. Support investment in human capital in research, science and technology environment	Improving governance capacities for innovation and knowledge policies	-	Public Sector / Private Sector

Region	Measure	Focus of intervention (policy area classification)	Main instruments	Main Beneficiaries
	Measure 2.2. Research, innovation and technological development project	Improving governance capacities for innovation and knowledge policies / Boosting applied research and product development	Infrastructures and facilities/ Aid schemes	Public Sector / Private Sector
	Measure 2.3. Scientific-technological Equipment	Knowledge transfer and technology diffusion to enterprises	Infrastructures and facilities	Public Sector / Private Sector
	Measure 2.4. Technology transfer	Knowledge transfer and technology diffusion to enterprises	Aid schemes	Public Sector / Private Sector
	Measure 2.5. Public research and Technology Centres	Boosting applied research and product development	Infrastructures and facilities	Public Sector / Private Sector
	Measure 2.7. Digital society	Innovation-friendly environment	Infrastructures and facilities/Aid schemes	Public Sector / Private Sector
Extremadura (Obj. 1)	Measure 2.1. Support investment in human capital in research, science and technology environment	Improving governance capacities for innovation and knowledge policies	-	Public Sector / Private Sector
	Measure 2.2. Research, innovation and technological development project	Boosting applied research and product development / Knowledge transfer and technology diffusion to enterprises	Aid schemes	Public Sector / Private Sector
	Measure 2.3. Scientific-technological Equipment	Innovation poles and clusters / Knowledge transfer and technology diffusion to enterprises	Infrastructures and facilities	Public Sector / Private Sector / Network
	Measure 2.4. Technology transfer	Knowledge transfer and technology diffusion to enterprises	Other	Public Sector / Private Sector
	Measure 2.5. Public research and Technology Centres	Boosting applied research and product development	Other	Public Sector / Private Sector
	Measure 2.7. Digital society	Innovation-friendly environment	Aid schemes	Public Sector / Private Sector
Galicia (Obj. 1)	Measure 2.1. Support investment in human capital in research, science and technology environment	Improving governance capacities for innovation and knowledge policies	-	Public Sector / Private Sector

Region	Measure	Focus of intervention (policy area classification)	Main instruments	Main Beneficiaries
	Measure 2.2. Research, innovation and technological development project	Boosting applied research and product development / Support to creation and growth of innovative enterprises	Aid schemes	Public Sector / Private Sector
	Measure 2.3. Scientific-technological Equipment	Knowledge transfer and technology diffusion to enterprises	Infrastructures and facilities	Public Sectors / Private Sectors
	Measure 2.5. Public research and Technology Centres	Knowledge transfer and technology diffusion to enterprises / Boosting applied research and product development	Infrastructures and facilities	Private Sectors
	Measure 2.6. Big infrastructures	Innovation-friendly environment	-	Public Sector / Private Sector
	Measure 2.7. Digital society	Innovation-friendly environment	Infrastructures and facilities	Private Sector
Murcia (Obj. 1)	Measure 2.1. Support investment in human capital in research, science and technology environment	Improving governance capacities for innovation and knowledge policies	-	Public Sector / Private Sector
	Measure 2.2. Research, innovation and technological development project	Support to creation and growth of innovative enterprises	Other	Private Sector
	Measure 2.2. Research, innovation and technological development project} (Global subvention)	Support to creation and growth of innovative enterprises	Other	Public Sector / Private Sector
	Measure 2.3. Scientific-technological Equipment	Knowledge transfer and technology diffusion to enterprises	Other	Public Sector / Private Sector
	Measure 2.4. Technology transfer (Global Subvention)	Knowledge transfer and technology diffusion to enterprises	Other	Public Sector / Private Sector
	Measure 2.5. Public research and Technology Centres (Global Subvention)	Knowledge transfer and technology diffusion to enterprises	Infrastructures and facilities	Public sector
	Measure 2.7. Digital society	Innovation-friendly environment	Other	Public Sector / Private Sector

Region	Measure	Focus of intervention (policy area classification)	Main instruments	Main Beneficiaries
Ceuta (Obj. 1)	Doesn't have			
Melilla (Obj. 1)	Measure 2.7. Digital society	Innovation-friendly environment	Infrastructures and facilities	Public Sector / Private Sector
Aragon (Obj. 2)	Measure 3.1. Strengthening human potential in research, science and technology	Improving governance capacities for innovation and knowledge policies	-	Public Sector / Private Sector
	Measure 3.2. Research, innovation and technological development project	Boosting applied research and product development	-	Public Sector / Private Sector
	Measure 3.3. Scientific-technological Equipment	Knowledge transfer and technology diffusion to enterprises	-	Public Sector / Private Sector
	Measure 3.4. Technology transfer and dissemination	Knowledge transfer and technology diffusion to enterprises	Aid schemes/Other	Private Sector
	Measure 3.5. Public research and Technology Centres	Improving governance capacities for innovation and knowledge policies	Infrastructures and facilities /Other	Public Sector / Private Sector
	Measure 3.6. Digital society	Innovation-friendly environment	Infrastructures and facilities/Other/Aid Schemes	Public Sector / Private Sector
Catalonia (Obj. 2)	Measure 3.1. Strengthening human potential in research, science and technology	Improving governance capacities for innovation and knowledge policies	-	Public Sector / Private Sector
	Measure 3.2. Research, innovation and technological development project	Boosting applied research and product development	-	Public Sector / Private Sector
	Measure 3.3. Technological Equipment	Knowledge transfer and technology diffusion to enterprises	-	Public Sector / Private Sector
	Measure 3.4. Technology transfer and dissemination	Knowledge transfer and technology diffusion to enterprises / Boosting applied research and product development	-	Public Sector / Private Sector
	Measure 3.5. Public research and Technology Centres	Knowledge transfer and technology diffusion to enterprises	-	Public Sector / Private Sector
	Measure 3.6. Digital society	Innovation-friendly environment	-	Public Sector / Private Sector

Region	Measure	Focus of intervention (policy area classification)	Main instruments	Main Beneficiaries
Baleares (Obj. 2)	Measure 3.1. Strengthening human potential in research, science and technology	Improving governance capacities for innovation and knowledge policies	-	Public Sector / Private Sector
	Measure 3.2. Research, innovation and technological development project	Boosting applied research and product development	-	Public Sector / Private Sector
	Measure 3.3. Technological Equipment	Knowledge transfer and technology diffusion to enterprises	-	Public Sector / Private Sector
	Measure 3.4. Technology transfer and dissemination	Knowledge transfer and technology diffusion to enterprises / Boosting applied research and product development	-	Public Sector / Private Sector
	Measure 3.5. Public research and Technology Centres	Knowledge transfer and technology diffusion to enterprises	-	Public Sector / Private Sector
	Measure 3.6. Digital society	Innovation-friendly environment	-	Public Sector / Private Sector
Madrid (2)	Measure 3.1. Strengthening human potential in research, science and technology	Improving governance capacities for innovation and knowledge policies	-	Public Sector / Private Sector
	Measure 3.2. Research, innovation and technological development project}	Boosting applied research and product development	-	Public Sector / Private Sector
	Measure 3.3. Technological Equipment	Knowledge transfer and technology diffusion to enterprises	-	Public Sector / Private Sector
	Measure 3.4. Technology transfer and dissemination	Knowledge transfer and technology diffusion to enterprises / Support to creation and growth of innovative enterprises	-	Public Sector / Private Sector
	Measure 3.5. Public research and Technology Centres	Knowledge transfer and technology diffusion to enterprises	-	Public Sector / Private Sector

Region	Measure	Focus of intervention (policy area classification)	Main instruments	Main Beneficiaries
	Measure 3.6. Digital society	Innovation-friendly environment	-	Public Sector / Private Sector
Navarra (Obj. 2)	Measure 3.1. Strengthening human potential in research, science and technology	Improving governance capacities for innovation and knowledge policies	Aid schemes	Public Sector / Private Sector
	Measure 3.2. Research, innovation and technological development project	Boosting applied research and product development	-	Public Sector / Private Sector
	Measure 3.3. Technological equipment	Knowledge transfer and technology diffusion to enterprises	-	Public Sector / Private Sector
	Measure 3.4. Technology transfer and dissemination	Knowledge transfer and technology diffusion to enterprises / Boosting applied research and product development	-	Public Sector / Private Sector
	Measure 3.5. Public research and Technology Centres	Knowledge transfer and technology diffusion to enterprises / Boosting applied research and product development	-	Public Sector / Private Sector
	Measure 3.6. Digital society	Innovation-friendly environment	-	Public Sector / Private Sector
Basque Country (Obj. 2)	Measure 3.1. Strengthening human potential in research, science and technology	Improving governance capacities for innovation and knowledge policies	-	Public Sector / Private Sector
	Measure 3.2. Research, innovation and technological development project	Boosting applied research and product development	-	Public Sector / Private Sector
	Measure 3.3. Technological equipment	Knowledge transfer and technology diffusion to enterprises	-	Public Sector / Private Sector
	Measure 3.4. Technology transfer and dissemination	Knowledge transfer and technology diffusion to enterprises / Boosting applied research and product development	-	Public Sector / Private Sector
	Measure 3.5. Public research and Technology Centres	Improving governance capacities for innovation and knowledge policies / Knowledge transfer and technology diffusion to enterprises	-	Public Sector / Private Sector
	Measure 3.6. Digital society	Innovation-friendly environment	-	Public Sector / Private Sector /

Region	Measure	Focus of intervention (policy area classification)	Main instruments	Main Beneficiaries
La Rioja (Obi. 2)	Measure 3.1. Strengthening human potential in research, science and technology	Improving governance capacities for innovation and knowledge policies.	-	Public Sector / Private Sector
	Measure 3.2. Research, innovation and technological development project	Boosting applied research and product development	-	Public Sector / Private Sector
	Measure 3.3. Technological Equipment	Knowledge transfer and technology diffusion to enterprises	-	Public Sector / Private Sector
	Measure 3.4. Technology transfer and dissemination	3 / Boosting applied research and product development	-	Public Sector / Private Sector
	Measure 3.5. Public research and Technology Centres	Knowledge transfer and technology diffusion to enterprises	-	Public Sector / Private Sector
	Measure 3.6. Digital society	Boosting applied research and product development	-	Public Sector / Private Sector

* Classification of RTDI interventions: Improving governance capacities for innovation and knowledge policies; Innovation-friendly environment; Knowledge transfer and technology diffusion enterprises; Innovation poles and clusters; Support to creation and growth of innovative enterprises; Boosting applied research and product development (see appendix).
**Classification of instruments: Infrastructures and facilities; Aid schemes; Education and training.
***Classification of Beneficiaries: Public sectors; Private sectors; Networks

Appendix E Case studies

Name of Case (related policy measure or action)
Title of measure/project: (***IMPULSO***) Description: development of innovative policies from a regional perspective, applied to the technology strategy in two specific sectors, agriculture and automotive suppliers. Zone: Objective 1 (phasing out) Policy framework innovative actions
Brief history and main features
The initiative belongs to the area of Knowledge and Technological Innovation-Based Regional Economy. The initiative's main instrument is cooperation between innovation-related regional players. Businesses were the main beneficiaries. The initiative is inspired by previous experiences, such as the Regional Innovation Strategy RIS-CANTABRIA and the Strategic Technological Development Plan in Cantabria. A wide variety of players took part in the project: Regional Government of Cantabria, the Chamber of Commerce, the University of Cantabria, the CEOE business confederation and the Society for the Regional Development of Cantabria (SODERCAN). When a technology transfer strategy is applied in specific sectors at regional level, the initiative becomes a creative experience.
Main results
The main results were: The creation of an innovation club in the supply automotive industry and in agricultural industry. The transfer of knowledge from the Oceanographic Institute of Santander to the regional entrepreneurial network of agro industry enterprises. · The development of new innovative products, as bluefish and fish substitutes. · The creation of the Forum of the Supply Automotive Industry. · Pilot Action Plan to transfer knowledge from tractor enterprises to strategic suppliers. · Organization of the first Competition for the creation of new technology-based enterprises.
Reasons of success and conditions for repeatability
The IMPULSO programme provided good practice, particularly in view of its capacity to energize the agricultural and automotive supplier industries. Other benefits deriving from the IMPULSO experience included integration in interregional cooperation networks, especially for the exchange of information and related experiences. Socio-economic and institutional factors included the process of inter-institutional cooperation and the joint efforts of public and private regional players to achieve the objective of improving innovation capacity in industrial networks in Cantabria. Nevertheless, the lack of regional experience with regards to innovation and knowledge transfer was the main obstacle from the socio-economic and institutional point of view, particularly as regards integrating players in a common strategy. The main lesson learnt from the IMPULSO programme was that strengthening innovation in certain sectors can significantly affect the specialization and the diversification of the production structure. One major advantage of the IMPULSO programme was its capacity to identify potential in specific sectors transferable to other production sectors. Strengthening innovation in certain sectors can positively affect other industrial activity.

Name of Case (related policy measure or action)
Title of measure/project: (Regional Innovation Agents Network of Castilla y León). Description: Action to stimulate the demand of innovation. Zone: Objective 1 Policy framework innovative actions
Brief history and main features
Excellence and the Generalization of Business Innovation in Castilla y León. LEGITE (CCI 2001 ES 16 0 PP 108), was a Pilot Action designed to create a Network of Agents to facilitate access to innovation for businesses located in the most disadvantaged areas of Castilla y León (rural areas, especially those on the peripheral areas), the way was to promote on-site cooperation with existing interface and technological structures, in more developed areas. The network was formed by 12 professionals operating at a provincial level, with a wide academic profile that gave the team a very interesting multidisciplinary character. It also guaranteed an appropriate answer to each type of necessity, enhancing the combined work. The Programme introduces a new vision of innovation as an effective tool for integration and territorial structuring, experimenting with the introduction of innovative products and processes in isolated and depressed geographical areas as a factor for encouraging competitive entrepreneurial development. The agents are conceived as global development promoters, since they act as specialists in the administration of innovation while encouraging and enlivening the social and enterprise networks in these areas, by promoting new attitudes and business cooperation on continuous improvement. Besides the network of agents and enterprises, Chambers of Commerce, unions, and other interface structures linked to the regional and local development were also involved.
Main results
The main result was the creation of the network of agents. All outlined objectives in the project were covered, together with a number of others not initially outlined such as 1,181 organizations and bodies visited (including 969 businesses) and 63 projects of innovation led.
Reasons of success and conditions for repeatability
Previous work by the Regional Administration with European co-financing (RIS+ INNORED) detected the existence of a group of enterprises in the outlying areas of the region that, if given access to technical and innovative processes, could become a driving force for sustainable development in these areas, as well as helping to stem population drift. The action was designed to fill this gap, by generating new drive and dynamism in traditionally depressed areas Unlike other interventions on the ground, the network of agents did not duplicate efforts, even though its basic functions were animating and orienting businesses. It became a major player in the intermediation between enterprises and technological infrastructures. The experience and added value arising from the multifunctional nature of the innovation agents, the fact that they were part of the socio-economic context, and the work done with other support structures in the territory (Leader, Proder...), could be transferable to other regions, in particular similar ones where access to innovative processes in isolated geographical areas is insufficient.

Name of Case (related policy measure or action)
Title of measure/project: innovation for diversification and sustainability in the Balearic Islands (INNOBAL XXI) Description: Innovation in business sector promoting the use of ITC Zone: Objective 2 Policy framework innovative actions
Brief history and main features
The INNOBAL XXI Innovative Actions Programme co-financed by DG Region was part of the Balearic Islands Innovation Strategy 2001-2004. The Balearic economy is hugely dependent on tourism, which explains why innovation is very different from the kind achieved in an industrial economy. The most important issue of INNOBAL XXI was to accept that innovation in the Balearic economy would have to be very different from traditional text-book innovation. The methodology involved two complementary approaches: 1. Innovation in the tourist industry. 2. The consideration of tourism as the most important "pulling industry" in the Balearic economy. This action started with the analysis of the tourism industry's problems in the Balearic Islands. The most crucial problem was the need for the Balers to maintain its competitive situation in the face of the new global and Mediterranean competitors, as well as the need to maintain the region's attractiveness for the new e-generation (people that live in the internet era). At present around 10% of tourists make online reservations. In less than 20 years' time, forecasts suggest that more than 50% of reservations will be made online. To prepare business for this change, two lines of actuation were defined: a) To diffuse and increase the use of new technologies in the hotel industry and b) To encourage the conception of new and more sophisticated tourist products. The key idea is to apply methodologies, such as the supply chain concept, used in other productive sectors to the tourist industry, as a way of increasing added value and output quality, while minimizing costs. The main sub-action encouraged technological innovation in the tourist industry, incorporating new IT and communications technologies.
Main results
The AVANTHOTEL Project was designed to market the hotel product directly on the Internet (this measure has been implemented in Minorca, Playa de Palma, Ibiza, Fomentera and Playa de Moro). Access to the hotel supply is made through a B2C website which combines all the information about all the hotels, basically offering a directory of services and providing a wide range of ways of consulting establishments (by location, category, name, offers and services). In addition, the management tool provides each hotel with the possibility of administering its own information in real time. Finally, there is a virtual TPV module for each hotel to accept payment for its reservations.
Reasons for success and conditions for repeatability
Since the use of internet tools depends on personnel capacity, support was provided for hotel management personnel to adapt to the new technologies. The development of this internet platform has opened up new possibilities for the competitive development of SME tourist enterprises. The number of direct reservations increased substantially, allowing the retention of a bigger share of value added by the hotels themselves. Major difficulties arose from the absence of theoretical references, and even of reliable statistical data to measure the degree of innovative activity in the sector. To promote innovation in the services sector, in particular in the tourist industry, a close understanding is required of the characteristics and needs of the specific economic activity and the context of the place where the innovative activity is to be developed. For this, it is necessary to work closely with entrepreneurs and sector associations. This enables a better understanding of their particular problems and the way they think. In this case, the partnership with business associations was a milestone in the success of the activity.

Appendix F Further reading

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Appendix G Stakeholders consulted

List of all individuals interviewed

Name	Position	Organisation
D. Pedro Fernández González	Subdirector Gral. Gestión Económica y de Fondos Estructurales Comunitarios	Ministerio de Educación y Ciencia
Dª Estela Gallego	Subdirección Gral de Desarrollo Industrial – Subdirección General de Fomento de la Innovación Industrial	Ministerio de Industria, Comercio y Turismo
D. Daniel González de la Rivera	Subdirector General de Creación de Empresas Dirección Gral de Política de PYMES	Ministerio de Industria, Comercio y Turismo
D. Enrique Martínez	Director	Red2Red
D. Pedro Redrado	Director Departamento de Promoción e Innovación	CDTI – Centro para el Desarrollo Tecnológico Industrial
D. Jesús de Andrés	Director	Agencia de Desarrollo de Castilla y León
D. Emilio Cubel	Director del Departamento de Documentación & Analisis	IMPIVA- Instituto de la Pequeña y Mediana Industria Valenciana
Dº Belén Goñi Dª Maria Beunza	Directora General Directora de Proyectos	Agencia Navarra de Innovación y Tecnología
D. Manuel Muniesa	Director	Instituto Tecnológico de Aragón
D. Xavier Nadal	Técnico de la Dirección General de Investigación, Desarrollo e Innovación	Gobierno Balear Consejería de Economía y Hacienda
D. Gregorio Muñoz	Jefe de Servicio de Innovación Tecnológica	Junta de Castilla y León Consejería de Economía y Emplo – Dirección Gral Industria e Innovación Tecnológica

Focus group members

Name	Position	Organisation
D. Gervasio Cordero	Subdirector Dirección General de Fondos Comunitarios	Ministerio de Economía y Hacienda
D. Daniel González de la Rivera	Subdirector General de Creación de Empresas Dirección Gral de Política de PYMES	Ministerio de Industria, Comercio y Turismo
D. Enrique Martínez	Director	Red2Red
D. Angel Prieto Sotos	Director General	European Centre of Innovation Enterprises of Albacete
D. Emilio Cubel	Director del Departamento de Documentación & Analisis	IMPIVA - Instituto de la Pequeña y Mediana Industria Valenciana
D. Gregorio Muñoz	Jefe de Servicio de Innovación Tecnológica	Junta de Castilla y León Consejería de Economía y Emplo – Dirección Gral Industria e Innovación Tecnológica
Dª Carmén Ayllón	Directora	Consejo Superior de Cámaras Oficiales de Comercio
D. Nicolás Enriquez	Director	Fundación INCIDE
D. Jaime del Castillo	Presidente	Infyde
D. Jose Moreno	Colaborador de Infyde Profesor de la Universidad de País Vasco	Infyde
Dª Belén Barroeta	Consultor Señor	Infyde