ESPON

AMCER

ADVANCED MONITORING AND COORDINATION OF EU R&D POLICIES AT REGIONAL LEVEL

Targeted Analysis 2013/2/18

Comparative analysis and synthesis

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This report presents the interim results of a Targeted Analysis conducted within the framework of the ESPON 2013 Programme, partly financed by the European Regional Development Fund.

The partnership behind the ESPON Programme consists of the EU Commission and the Member States of the EU27, plus Iceland, Liechtenstein, Norway and Switzerland. Each partner is represented in the ESPON Monitoring Committee.

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This basic report exists only in an electronic version.

List of authors

Project Coordinator:

INNOVA Europe sarl, Belgium

Partners:

Technopolis, France

Centro di Risonanze Magnetiche CERM, Italy

TASO Desarollos, Spain

Vaasan Yliopisto, Finland

Gottfried Wilhelm Leibniz Universität Hannover, Germany

University of Sheffield, UK

Fundaction Deusto-Deusto Fundazioa, Spain

Chambre de Commerce et d'Industrie de Paris (CCIP) ESIEE Paris, France

Universita della Svizzera Italiana, Switzerland

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ESPON AMCER

Comparative analysis and synthesis

This report provides a comparative analysis and synthesis at horizontal level between the nine AMCER participating regions in a horizontal manner taking all R&D sectors together.

Comparison at theme level is provided to some extend as the number of regions considered in the AMCER project is rather small and does not allow developing a full typology and cross-case analysis. Nevertheless, it is possible to provide some general considerations in terms of specialisation, as well as networking.

1. Comparison of general factors and indicators related to RDI development in AMCER Regions

a. Economic factors related to RDI

Regarding ***economic output,*** the strongest regions are Flanders and Ostrobothnia, followed by Tuscany, PACA, East of England, Catalunya, Lower Saxony, Brittany, and Andalusia. Except for Andalusia, all regions are above the EU-27 per capita GDP average.

The regional ***economic structures*** and their specialisations vary. Although all regions are shaped by service activities, in some cases industrial sectors or industry-related services play a more significant role. This is the case for Catalunya, Ostrobothnia, Tuscany, Lower Saxony, Flanders and the East of England. Other regions are focussed rather on agriculture, tourism and related activities, and have little industrial tradition (e.g. Andalusia, Brittany, PACA).

Except of Lower Saxony, all regions suffer from the rise of ***unemployment*** rates due to the ongoing economic and financial crisis. However, even though much of this increase arose from effects of the crisis, more specific unemployment figures such as long-term and youth unemployment suggest that in most regions there would be an urgent need to apply structural reforms.

b. RDI Indicators

R&D-related indicators indicate that East of England currently is the region where the R&D activity is most intensive among the AMCER regions. Other regions that are relatively active and above, or at least in line with, the EU average are Ostrobothnia, Lower Saxony, Flanders, and PACA. These

regions already put a relatively strong emphasis on knowledge-driven development, at least in some key sectors. Brittany and Catalunya increasingly trying to foster their regional potentials, but suffer from structural weaknesses. Tuscany and Andalusia are the regions with the lowest R&D performance; even though also these regions have existing potentials (see App. Tab. 6). Moreover, East of England is by far the most *technologically sophisticated* region, followed by Flanders. Catalunya, Ostrobothnia, Brittany, PACA, and Lower Saxony are relatively medium-high to high-tech oriented. Tuscany and Andalusia have few technologically exposed sectors; however, most activities are in low-tech fields.

The education of the ***human capital*** forms the basis for productive and innovative activities. In general, there is not much difference in the relative numbers of tertiary level students. However, Ostrobothnia has a very marked advantage regarding the number of higher education students, whereas Lower Saxony has by far the lowest figures. Despite East of England´s rather average values in terms of human capital, the region benefits i.a. from the presence of an excellent HES (i.e. Cambridge University). The figures for early leavers generally show positive development. The Spanish regions have by far the highest share. Flanders and Brittany have the lowest figures. In addition, the further education of adults plays an important role. In this area, most regions have values below the European mean. The French regions PACA and Brittany have the lowest figures; whereas Ostrobothnia and East of England show by far the highest participation share.

Potentials for innovation are very unevenly distributed between the regions. The highest relative values are held by Ostrobothnia, Lower Saxony, Flanders, and East of England. Andalusia´s figures are very low, reflecting the region´s weaknesses in knowledge and technology creation, although some significant efforts have been undertaken. However, the productivity of R&D shows a more mixed picture: Brittany and Lower Saxony seem to have the most effective R&D system, whereas East of England´s and Andalusia´s R&D systems are relatively ineffective.

c. Governance

The nine AMCER regions display an interesting variety of types of governance structures.

Lower Saxony and Flanders have strong federal features and a quite high degree of autonomy and self-responsibility concerning their influence on the regional economy or their freedom in designing and applying regional innovation policy measures. With respect to their governance structures, these regions are rather characterised by attributes of what Cooke calls network systems.

In Lower Saxony and Flanders, RTDI support takes place on different levels, e.g. local, regional, or federal as appropriate. In the manner of a network system funding is guided and assessed by public and private regional banks, government, semi-state-owned, and private agencies or firms as well as regional research institutes.

With respect to their governance structures, Tuscany, Andalusia and Catalunya are a mixture of both federal and centrally-led regions. In terms of Cooke´s typology, Tuscany´s governance dimension could quite clearly be assessed as a *grassroots R&D system*. The innovation system as well as knowledge and technology transfer processes are generated and organized mainly on the local level. Local development agencies and local institutional actors play a predominant role. In the manner of a grassroots system funding is highly diffuse in origin and shaped by a very low supra local or national coordination.

Major funding channels are social networks, local banks and funds, and regional support programmes. In turn, Andalusia and Catalunya have features of a network system, even though, simultaneously, some grass root tendencies are discernible. Support of RTDI projects happens on regional or national levels, although the regional level has the most competences due to their Autonomous Community status with strong devolved powers.

Ostrobothnia, Brittany, PACA, and East of England are more centrally-led regions. In terms of Cooke´s typology, even though these regions have developed network governance characteristics, their systems still have *dirigiste* features due to their respective strong central state, meaning that the influence of organizations and institutions of the central state on decision making processes related to the regional economy and/or regional innovation policies remains comparatively strong.

By dependence on these structures and the different RIS approaches, all regions follow some kind of RTDI policy support programmes. Moreover, the different regional structures are accompanied with specific characteristics as well as related trends and challenges.

The share of ***public and private actors*** participation within the R&D systems varies, generally reflecting different economic or research setups (see App. Tab. 6). With regard to the innovation system approach, the proportion of R&D performed by the business sector (BERD) is an indicator of the overall innovative capacity of a region. The regions Ostrobothnia, East of England, Lower Saxony, Flanders, Brittany, Catalunya, and PACA are dominated by the business sphere. Nonetheless, also there the public sphere plays an important, often complementary role. Tuscany and Andalusia are much more shaped by the public sphere, as the business sector there is sufficient initiate and carry out RTDI activities by itself.

Within the business sector, ***large foreign and national companies*** often play a major role in the RTDI processes, although all the regional economies are ***greatly characterised by SMEs***. This is mainly due to underdeveloped business innovation cultures, limited absorptive capacities, and low emphases on technological aspects as well as other barriers limiting the efforts of SMEs to conduct R&D. This gap is problematic since SMEs are significant providers of employment and their RTDI activities can have a sustainable impact on

regional competitiveness and wealth. In turn, in regions that are highly dependent on RTDI activities of MNEs and large national players (e.g. PACA, East of England, Lower Saxony, Ostrobothnia, Brittany, Flanders), this situation could lead to regional dependencies on location decisions of often globally (re-)acting companies. Additionally, some regions such as Brittany, PACA, Catalunya, and Andalusia are likely to suffer more from *headquarter bias* because big companies and research organisation often do not have their headquarters in these regions.

d. Trends and challenges

Despite the current economic and financial crisis, the regions which have already managed to build up a knowledge-driven regional economy (at least to a certain degree) are likely to have better, more sustainable, and less volatile growth perspectives (e.g. Ostrobothnia, East of England, etc).

A further challenge is the rise of general unemployment and the long-term and youth unemployment figures that remain high in most of the regions (e.g. Catalunya, Andalusia, etc.). The population development and the Demographic Change are challenging all the regions studied. The regions are facing lower population growth, demographic ageing, and outmigration. The availability of human capital (secondary and tertiary education) is often satisfactory. However most regions are confronted with high numbers of early leavers and a low participation rate of adults in further education (e.g. Tuscany, PACA).

Furthermore, except East of England, all regions need to increase their R&D capabilities (some most urgently, such as Andalusia, Tuscany, Catalunya, and Brittany). Additional spending and personnel will help to strengthen the competitiveness of the regions in terms of knowledge and technology production. Moreover, in some regions (e.g. Andalusia, Tuscany, Lower Saxony) the structural change towards a more diversified and knowledge based economy has to be fostered. Existing potentials in high-tech sectors have to be strengthened. For this, SMEs play a crucial role. But so far, SMEs in the AMCER regions are not so strongly involved in innovation activities. Additionally, the link between businesses and research institutions is in some cases rather weak (e.g. Tuscany, Catalunya, Brittany, PACA, and Andalusia). More support is needed to support and encourage SMEs to conduct R&D.

2. Participation in EU programmes

a. Analysis on EU R&D budget and projects breakdown (ERDF, FP and CIP) for each region

Regional participations and budgets for FP, CIP, and SF are distributed into R&D sectors (an adapted FP7 taxonomy has been used) at intra-regional level (NUTS 3 generally) in order to obtain a first set of comprehensive and aggregated indicators, notably concerning:

- The number of projects and the stakeholders funded in the regions involved in the project through the EU regional policy, the FP and the CIP.
- The total EU R&D budgets invested through the EU regional policy, the FP and the CIP in the regions involved in the project
- The typology of the participants in each region (Higher education, research, company, SME…)
- The breakdown of the projects funded through the EU regional policy, the FP and the CIP, and of their aggregated budgets into scientific fields, at regional and infra-regional levels, in the regions involved in the project
- The collaborative links developed by the stakeholders involved in the projects funded by FP and CIP

Collaborative links – ***Social Network Analysis***: Analysis of the collaborative links was carried on the basis of the data resulting from the matching phase. In this context a preliminary Social Network Analysis has been performed for one indicative theme for each region for demonstration purposes.

b. Influence of Headquarters effects

In the context of monitoring the EU R&D programme, the information concerning effective localisation of project beneficiaries is in some cases biased by the fact that the projects are allocated to national R&D organisations or companies which Headquarters are located in regions which are different from those were effectively and ultimately the RDI activity is performed.

This effect can in some cases significantly distort the image of the overall RDI activity performed in a given region for the purpose of monitoring, allocation of support resources, prioritisation of public support actions, avoidance of duplication of resources, etc. that the regional authorities should be carrying out in the context of their normal monitoring and strategic planning actions.
Regarding the headquarters effect, three cases can be distinguished:

1. There is no headquarters effect. The participation reported in the EC database is located on the same territory where the research is performed.
2. The participation reported in the EC contracts database is not located on the territory where the research is performed but on the territory where the headquarters of the company or research organisation is located. This is the most frequent case and happens mostly in the centralized countries with large national public research organisms (i.e. France, Italy or Spain). Participations located out of the territory by mistake are added to the other regional participation. This participation flow is called inflow participations, which automatically implies an outflow participation from another region.
3. The participation reported in the EC contracts database is located on the territory although it should not be. This case happens when a headquarters of a company or research organisation is located on the territory but the research in performed outside of it. The regional participation must then be subtracted. This participation flow is called outflow participation. This case is directly linked to the country organisation: In centralized countries such as France, the outflows participation happens for the region where the capital city is. In regionalised countries such as Germany, this case can happen for all the regions (Länder)

At the end, if the inflow is larger than the outflow, a positive value is obtained and the region increases its participation number. Category can be created according the difference between inflow and outflow.

The following exhibit shows the number of participations counted for each of the 9 regions according the headquarters localisation (column v) and the number of participations according participant department localisation (column vi). The expected headquarters effect is foreseen in relation to the structure of national research systems. It should be noted that the total number of participations of the 9 regions represents 7,5 % of the total FP participations with headquarters effect (5 590 over 74 460).

Exhibit 1: FP7 participations according to the contracts database

Region	Country (i)	Expected headquarters effect (ii)	Nuts Code (iii)	Nuts Level (iv)	Number of participations according to the headquarter localisation (v)	Number of participations according to the participant department localisation (vi)	Headquarters effect in %[1] Not checked by stakeholders (vii)
ANDALUSIA	ES	Strong	ES61	2	238	309	22,9%
BRETAGNE	FR	Strong	FR52	2	136	209	34%
CATALUNIA	ES	Strong	ES51	2	1351	1439	6,1%
EAST of ENGLAND	UK	Minor	UKH	1	962	1030	7 %
West Finland (OSTROBOTHIA)	FI	Minor	FI19	2	171	212	19,3%
FLANDERS	BE	Minor	BE2	1	1340	1408	4,8%
NIEDERSACHSEN	DE	Strong	DE9	1			
PROVENCE ALPES COTE DAZUR	FR	Strong	FR82	2	321	413	22,2%
TUSCANY	IT	Strong	ITE1	2	591	645	8,3%

The analysis of the headquarter effect in each of the regions considered in the AMCER project revealed a number of commonalities. Firstly, in most regions the number of ingoing participations identified is considerably higher than that of outgoing participations. The analysis of the headquarter effect thus allowed to identify a high number of participations that would have been otherwise been attributed to other regions in their country. In Brittany for example, the analysis revealed 101 ingoing participations and no outgoing participations.

In addition to this, ingoing participations mainly concern research organisations; while private commercial and public organisation are less prone to generate a headquarter effect.

The intensity of the headquarter effect varies considerably among each of the regions analysed. While it is safe to say that all regions are impacted by the headquarter effect, the number of participations concerned is not always equal. In Brittany for example, a headquarter effect was identified for 43% of the total number of participations; while in Catalunya this was the case for only 9% of participations.

1 ((column vi)-(column v))/(column vi)

c. Comparison of participation of AMCER regions in FP7

The analysis of regional participation FP7 showed that the weight of each region in total national FP7 is generally lower or equal to that of their weight in gross domestic expenditure on R&D. Tuscany and Catalunya are the only two exceptions to this.

The leadership rate of the regions analysed also varies. In six out of the nine regions, the leadership rate is higher than the European average. This is notably the case of Catalunya and East of England. The average funding received per European project is either equal or higher to the European average. Ostrobotnia and Britanny however display lower averages in this field.

There is no general trend with regards to the structure of participation by type of participant (research organisations, private commercial, higher of secondary, public). In some cases, the structure and distribution of participation is similar to that of the national level (e.g. Andalusia), while in other it varies significantly (e.g. Brittany).

The same applies to the distribution among public and private participants. In approximately half of the regions analysed, the share of participations coming from private organisations is higher than that of public organisations. In most regions (six out of nine), research organisations tend to outperform other types of organisation in terms of volumes of funding attracted. This is illustrated by the gap between the share of funding received and the share participations.

SME in the regions analysed account for an average of 15% of FP7 funding. However, there are considerable differences among them. In Flanders for example, SME account for 43% of regional funding, while in Brittany SME participation represents only 4%.

3. Comparison of RDI Themes specialisation

The analysis of the volumes of funding attracted by the regions for each of the programme subthemes, compared to the national and European level, allowed to reveal a first level of thematic specialisation. The following table presents an overview of the main specialisation themes for each of the regions analysed, for the COOPERATION programme.

Exhibit 2: Specialisation of AMCER Regions in research themes of the FP7 Cooperation programme.

	Research areas in which the regions have a strong specialisation	**Research areas in which the regions do not show a specific specialisation**	**Research areas in which the regions are clearly under-specialised**
Catalunya	• Health • Environment • Socio-economic sciences • Environment • Socio-economic sciences and humanities	• Food, agriculture and biotechnology • Nanosciences, Nanotechnologies, Materials and new production technologies • ICT • Transport • Space	• Energy • Security
Ostrobotnia	• Nanosciences, Nanotechnologies, Materials and new production technologies • Energy • Socio-economic sciences and humanities • Space	• Health • Transport	• Food, agriculture and biotechnology • ICT • Environment • Security • General Activities
PACA	• Space	• ICT • Security • Nanosciences, Nanotechnologies, Materials and new production technologies • Energy • Security	• Health • Food, agriculture and biotechnology • Environment • Transport • Socio-economic sciences and humanities
Flanders	• Food, agriculture and biotechnology • ICT • Nanosciences, Nanotechnologies, Materials and new production technologies • Energy	• Health • Environment • Transport • Socio-economic sciences and humanities • Security	• Space • General Activities
Tuscany	• Health • ICT • Nanosciences, Nanotechnologies, Materials and new production technologies • Energy • Socio-economic sciences and humanities • Space	• Environment • Security • Food, Agriculture and Biotechnology • Transport • Security	• General Activities
Lower Saxony	• Transport	• Health • Food, Agriculture and Biotechnology • ICT • Nanosciences, Nanotechnologies, Materials and new production technologies • Energy • Socio-economic sciences and humanities	• Environment • Security • Space • General Activities
East of England	• Health • Food, Agriculture, and Biotechnology	• ICT • Transport • Space • Nanosciences, Nanotechnologies, Materials and new production technologies • Environment	• Energy • Security • General Activities

		• Transport • Socio-economic sciences and humanities • Space	
Andalusia	• General Activities	• Energy	• Health • Food, Agriculture and Biotechnology • ICT • Nanosciences, Nanotechnologies, Materials and new production technologies • Environment • Transport • Socio-economic sciences and humanities • Security • Space
Bretagne	• Food, Agriculture and Biotechnology	• Environment	• Health • ICT • Nanosciences, Nanotechnologies, Materials and new production technologies • Energy • Transport • Socio-economic sciences and humanities • Security • Space • General Activities

All regions have benefitted of the contributions provided by EU programs, but they differ to a large extent as to the capability to attract funds and field specialization. On the one hand, the absolute value of the allocation is strongly influenced by the sum allocated to each theme, so that almost everywhere the most attractive fields are "Health", "Information and communication technology", "Food, Agriculture and Biotechnology" and "Nanoscience". On the other hand, when the relative attractiveness is considered, the regions display diverse and specific profiles.

Exhibit 3: Themes - attractiveness compared to European average (€ of contribution)

	ANDALUSIA	BRITTANY	CATALUNYA	EAST ENGLAND	FLANDERS	LOWER SAXONY	WEST FINLAND (OSTROBOTNIA)	PACA	TUSCANY
Health	0,21	0,06	**1,30**	**2,14**	1,78	0,70	0,88	0,74	**1,52**
Food, Agriculture, and Biotechnology	0,45	**1,20**	1,00	**1,89**	**2,98**	0,75	0,24	0,41	0,73
Information and Communication Technologies	0,18	0,32	**1,40**	0,95	**2,41**	0,68	0,43	**0,93**	**1,32**
Nanosciences, Nanotechnologies, Materials and new Production Technologies	0,10	0,16	1,18	1,50	**2,54**	0,65	**2,04**	0,63	1,18
Energy	**1,23**	0,09	0,54	0,52	**2,31**	0,76	1,52	0,62	1,25
Environment (including Climate Change)	0,26	0,69	**1,40**	1,60	1,61	0,42	0,00	0,41	0,84
Transport (including Aeronautics)	0,11	0,10	0,57	1,30	1,51	**1,81**	1,08	0,30	0,85
Socio-economic sciences and Humanities	0,26	0,21	**1,70**	0,89	1,98	0,64	**2,37**	0,26	**1,69**
Security	0,00	0,02	0,80	0,60	1,42	0,31	0,25	**0,93**	0,86
Space	0,04	0,94	0,84	0,98	0,80	0,35	**2,47**	**2,20**	**1,57**

4. Comparison of other results in terms of network, employment and patents

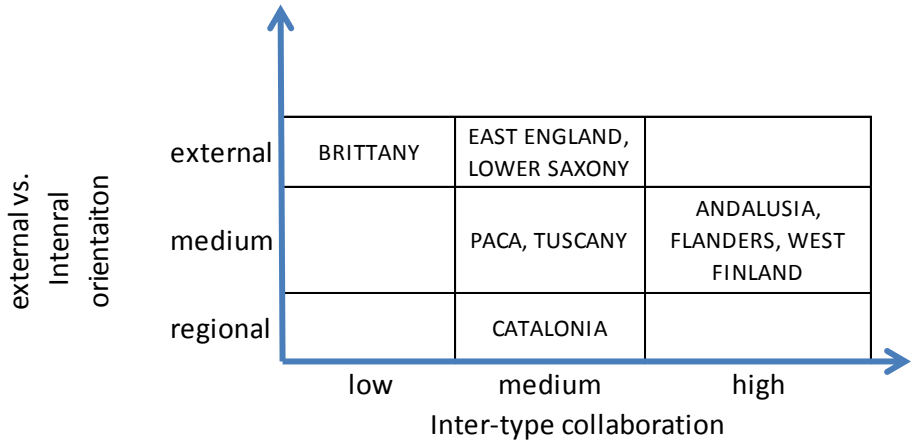
a. Networks

Exhibit 4: Main features of networks created by participation in EU RDI programmes in AMCER Regions

Measure	ANDALUSIA	BRITTANY	CATALUNYA	EAST ENGLAND	FLANDERS	LOWER SAXONY	WEST FINLAND (OSTROBOTNIA)	PACA	TUSCANY
number of nodes (organizations)	111	60	312	190	328	170	69	119	158
number of egdes (cooperations)	164	94	632	270	730	249	124	160	314
Density	0.026	0.051	0.013	0.015	0.014	0.017	0.051	0.022	0.025
Components of 1 node (isolates)	61	26	124	111	92	99	30	69	61
Components of 2 nodes (dyadic isolates)	9	4	8	7	8	7	2	7	7
Components of 3 or more nodes	4	2	1	2	3	3	2	8	4
Characteristic path length	2.809	3.592	4.15	3.741	3.983	4.654	2.653	1.978	3.339
Clustering coefficient	0.415	0.504	0.521	0.376	0.667	0.364	0.509	0.388	0.553
Network levels (diameter)	7	9	11	9	9	11	5	4	7
Network fragmentation	0.964	0.853	0.697	0.9	0.586	0.914	0.798	0.987	0.781
Krackhardt connectedness	0.036	0.147	0.303	0.1	0.414	0.086	0.202	0.013	0.219
Krackhardt efficiency	0.306	0.716	0.969	0.884	0.977	0.841	0.797	-1.232	0.913

One important issue regards the intensity of collaboration with other regions and countries and the level of collaboration between regional actors of different type. Of course, in all cases the share of collaborations with partners in other regions and countries is much more superior to the share of collaborations with regional partners, as it is in the core mission of FP to stimulate international collaboration; nevertheless, intraregional collaboration are also expected to play a role, and by comparing their relative weight across regions it is possible to characterize different types of regions: externally vs. regionally embedded. At the same time, it is important, in terms of research exploitation, that different types of actors cooperate; thus, it is possible to identify “intra-sectorial” regions, where much cooperation occurs between similar types of organizations, and “inter-sectorial” regions, where cooperation often occurs between different types of organizations. In figure x the regions are positioned accordingly.

Figure 1 – Characterization of region by pattern of collaboration



b. Employment specialisation

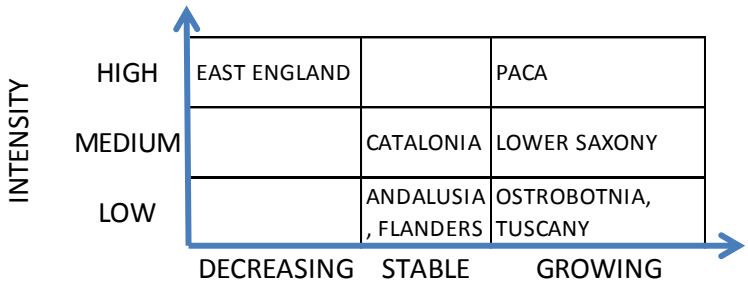
Effects on employment in research clusters. R&D funds from EU programmes received by regions and their component firms and institutions have an effect over time on employment and regional GDP. We analysed the evolution of employment in the core R&D clusters comparing sectors with a strong EU support with others with low EU support.

Exhibit 5: Level of specialised employment in RDI sectors in AMCER Regions

		sectors by technology and knowledge intensity		
REGION		high	medium	low
ANDALUSIA	variation 2004-09			
	Specialization	0,74	0,92	1,39
BRITTANY	variation 2004-09	21.48%	6.86%	4.48%
	Specialization	1.01	1.11	0.72
CATALUNYA	variation 2004-09			
	Specialization	0,99	1	1,01
EAST ENGLAND	variation 2004-09	-3.28%	3.93%	-0.38%
	Specialization	1.31	1.03	0.70
FLANDERS	variation 2004-09	0,87%	0,93%	-1,80%
	Specialization	0,92	1,10	0,79
LOWER SAXONY	variation 2004-09	2,23%	1,49%	8,37%
	Specialization	1.01	1.12	0.68
OSTROBOTNIA	variation 2004-09	27.69%	15.98%	11.23%
	Specialization	0.52	1.11	1.05
PACA	variation 2004-09	11.95%	11.66%	9.34%
	Specialization	1.47	0.90	0.92
TUSCANY	variation 2004-09	6.61%	1.94%	-2.27%
	Specialization	0.58	0.87	1.63
	% employment EUROPE	16,5%	60,0%	23,5%

In terms of employment, all the AMCER regions are specialized in medium knowledge-intensive sectors, but some in particular are oriented to knowledge intensive sectors or they are growing. In the following figure the regions are located according to the degree of specialization and growth in High knowledge intensive sectors.

Figure 2 – Characterization of region by employment dynamic



c. Patents

There are two ways for assessing the technological impact (using patents as a proxy) of FP projects. First: are participants active in the field of technology? This feature can be measured by analysing the patents applied for by projects' participants, by number and sector of application. Second: how does the technological scope of FP programmes fit with a given regional technological profile? This can be assessed by analyzing patents applied by an institution located in a region or that involve an inventor located therein.

Patenting activity also vary significantly, with some regions displaying intensive patenting. In these cases a major role is often played by few large corporations with strong technological orientation. Patenting activity is usually focused on one or two key areas.

Exhibit 6: Patenting – productivity and main sector specialization in AMCER Regions

		Electrical engineering	Instruments	Chemistry	Mechanical engineering	Other fields
ANDALUSIA	total patents	7	15	40	16	5
	specialization*	1,22	3,76	0,63	0,23	0,00
BRITTANY	total patents	373	18	41	21	7
	spec	0,33	0,57	0,14	0,14	0,00
CATALUNYA	total patents	112	159	380	172	55
	spec	1,05	3,39	0,62	0,27	0,00
EAST ENGLAND	total patents	189	96	102	89	22
	spec	1,31	1,86	0,77	0,31	0,00
FLANDERS	total patents	637	196	542	371	109
	spec	1,00	0,94	0,73	0,87	0,00
LOWER SAXONY	total patents	314	164	389	337	57
	spec	0,76	1,78	0,72	0,64	0,00
OSTROBOTNIA	total patents	2	4	1	2	0
	spec	3,01	1,55	0,46	0,00	0,00
PACA	total patents	360	58	93	41	24
	spec	0,70	0,97	0,21	0,37	0,00
TUSCANY	total patents	91	78	71	248	35
	spec	0,72	1,08	0,99	1,42	0,45

* compared to country

5. Comparison of situation in each AMCER region

Andalusia

Andalusia is very low attractive of FP 7 funds, when compared to the national and European average, both in terms of number of projects and the amount of funds attracted. The areas of Seville and Granada attract the large majority of funds. The participants are mostly Research (38%) and Private for profit institutions (32%), as well as Higher Education Institutions (28%). The regional actors are particularly attractive in the theme “Energy”, above European and Spain average. Most research partner organizations are located in Germany (11,7%), Italy (10%) and United Kingdom (9,8%). The most important organizations in the regional FP7 network are the IPTS, the University of Granada and the CSIC.

In terms of employment, the region is mostly specialized in medium (55%) and low (33%) knowledge intensive sectors, while high knowledge sectors only sum up 12% of the employees.

The patenting activity is concentrated in Chemistry and some fields in Electrical Engineering.

In sum, the region appears rather weak both in terms of research potential and the research exploitation, considering the marginal role played by knowledge intensive and R&D intensive fields. The most promising interaction may likely occur between economic sectors “Farming”, “Agricultural products”, in which the region is highly specialized, and research field in the “Food, Agriculture and Biotechnology” field, where the regional actors are rather attractive of FP7 funds.

Brittany

Overall, the Brittany region is less attractive of FP 7 funds, when compared to the national and European average, both in terms of number of projects and the amount of funds attracted. Ile-et-Vilaine and Finistère territories account for the large majority of the funds and projects. The participants are mostly by Research organizations (51%), followed by Higher Education Institutions (29%), and private for profit (17%). The regional actors are particularly attractive in the themes “Food, Agriculture and Biotechnology” and “Environment”, when compared to the national average attractiveness in the same fields, whereas it is less attractive in the rest of the sectors. Most partners are located in Germany (13%), United Kingdom (12%) and France (12%). The most important organizations in the regional FP7 network are the University of Rennes, Sopab Brest SA and University of Western Brittany.

The region is mostly specialized in medium tech sectors, which sum up 66% of the employed, and which have grown by 11.5 thousands units in the considered period (+7%). Although the Region is less specialized in High tech sectors than France, employed have grown considerably, by almost 6 thousands units (22%), mostly in “Financial services” (+3’141), “Education and knowledge creation” (+1’793) and “Aerospace” (+848).

The patenting activity is remarkable in Electrical Engineering, due to the presence of a few intensively patenting organizations: Mitsubishi, France Telecom and Thompson, while it is rather modest in the other fields.

In sum, only in few sectors the region appear to be particularly strong in terms of research potential; in terms of employment, the most relevant high tech sectors are indeed knowledge intensive, but R&D plays a minor role. Nevertheless, one field emerge to be very important and promising both in terms of research activity and employment relevance. In fact, the Region is highly attractive of funds in “Food, Agriculture and Biotechnology”, and is strongly specialized in “Processed food”, which sum up 20% of the regional employees and grew by 1’855 units, and “Farming and animal husbandry” (3,1% and + 4’272), showing an important potential of collaborations.

Catalunya

Catalunya region is highly attractive of FP 7 funds, when compared to the national and European average, both in terms of number of projects and the amount of funds attracted. The area of Barcelona attracts the overwhelming majority of the funds. The participants are mostly Research organizations (48%), Higher Education Institutions (31%), followed by and Private for profit organizations (15%). The regional actors are particularly attractive in the themes “Health”, Nanosciences, Nanotechnologies, Materials and new Production Technologies”, “ICT”, “Environment” and “Socio-economic sciences and humanities”. Most partners are located in Germany (14,4%), United Kingdom (12,3%) and France (10,5%). The most important organizations in the regional FP7 network are the Agencia Estatal CSIC, the Universitat Politecnica de Barcelona and the Universitat Autonoma de Barcelona.

The region is mostly specialized in medium knowledge intensive sectors, which sum up 60% of the employees, while high and low knowledge sectors sum up 16% and 24 % of the employees respectively. The region is strongly specialized in Pharmaceuticals and Constructing materials.

The patenting activity is remarkable in the field of Organic fine Chemistry, Pharmaceuticals, Polymers, Basic material chemistry and nano-technology. .

In sum, the region has a strong research potential, which is not fully exploited on the employment side as the knowledge intensive sectors are not large. Nevertheless, there are clearly some fields important and promising all across the spectrum of activity considered. The region is highly specialized and performing: i) in the “Health” theme in research and “Pharmaceuticals” employment sector; ii) in “Nanosciences, Nanotechnologies, Materials and new Production Technologies” theme in research, “Plastics” in employment, and in the related patenting areas as well, suggesting a potential of interaction between different phases from knowledge production to exploitation.

East England

East England is highly attractive of FP 7 funds, when compared to the national and European average, both in terms of number of projects and the amount of funds attracted. Essex is the most attractive area, with over half of the participation, followed by East Anglia (one third). The participants are mostly Higher Education Institutions (63%), followed by Research organizations (21%) and private for profit (14%). The regional actors are particularly attractive in the themes “Health”, “Food, Agriculture and Biotechnology”, “Nanosciences, Nanotechnologies, Materials and new Production Technologies” and “Environment”. Most partners are located in Germany (15%), United Kingdom (12,4%) and France (10,4%). The most connected and central organizations in the regional FP7 network are the University of Cambridge, the Cranfield University and the University of Essex.

The region is mostly specialized in medium knowledge and technology sectors, which sum up 62% of the employed, and which have grown 18.5 thousands units in the considered period. High knowledge intensive sectors have lost almost 6 thousands employees, mostly in Financial services (-7’783), whereas “Education and knowledge creation” grew considerably, by 4.4 thousands units.

The patenting activity is rather modest, and mostly in Chemistry and Instruments.

In sum, East England has a high research potential and knowledge intensive profile. However, few sectors show a strong specialization all across the different domains. In particular, the region is highly attractive in “Food, Agriculture and Biotechnology” and it is strongly specialized in the Biotech sector, which has grown (+544) in the period, but this sector still represents a marginal share of the employees (0,6%). The region is also highly attractive in “Health”, but when compared to Europe, the level of specialization in related sectors, such as Medical devices and Pharmaceutical, is lower, and the latter sector has lost over 2 thousands employees.

Lower Saxony

Lower Saxony region is less attractive of FP 7 funds, when compared to the national and European average, both in terms of the number of projects and the amount of funds attracted. The majority of projects are located in Braunschweig and Hannover. The participants are mostly Higher Education Institutions (40%), Research (33%) and Private for profit organizations (27%). The regional actors are particularly attractive in the themes “Food, Agriculture and Biotechnology” and “Transport”. Most partners are located in Germany (16,2%), France (11%) and United Kingdom (10,7%). The most important organizations in the regional FP7 network are the Technical University in Braunschweig, the Leibniz University in Hannover and the *Deutsche Zentrum für Luft und Raumfahrt*.

Medium knowledge sectors sum up 67% of the employed, and grew 9 thousands units in the considered period (1,4%). High knowledge sectors represent 17% of the employees, similar to Europe average but lower than

Germany, and they grew by 3'466 (+2,2%). Employed have grown considerably in low tech sectors (5'561, +8%). Behind the relative stability of the aggregate high knowledge sectors, there have been important change in the relative weight of the sub-sectors, as "Financial services" have decreased (-8'123 employees), whereas "Education and knowledge creation" (+5'650), "IT" (+ 4'375) and "Aerospace" (+1'784) have grown considerably.

The patenting activity is remarkable in Chemistry and Electrical Engineering.

In sum, the region does not appear particularly strong in terms of research potential, with the exception of the "Transport" theme, whereas in terms of exploitation there are significant changes as to the employment composition of the knowledge intensive sectors. There is an interesting shift as employed in "Automotive" have decreased by 7'588 units, while at the same time employed in "Transportation and logistics" have grown by 8'751; the research field "Transport" may play a role in both the declining and raising sector. Research and sectors related to Food and Biotechnology are strong and promising both as to research and employment. Also in this case, there has been an important variation in employment composition of the sub sector as the large "processed food" (9,6% of regional employees) have lost 3'454 units, whereas the "Farming and animal husbandry" (1,4%) has grown by 5'691 units.

Ostrobothnia

Ostrobothnia is less attractive of FP 7 funds, when compared to the national and European average, both in terms of number of projects and the amount of funds attracted. Most participations are located in Pirkanmaa area (60%). The participants are mostly Higher Education Institutions (49%), followed by Research organizations (24%) and Private for profit organizations (23%). The regional actors are particularly attractive in the theme "Nanosciences, Nanotechnologies, Materials and new Production Technologies". Most partners are located in Germany (14,5%), Finland (10,7%) and United Kingdom (10,4%). The most important organizations in the regional FP7 network are the Tampereen Yliopisto and the Jyvaskylan Yliopisto.

The region is mostly specialized in medium tech sectors, which sum up 66% of the employed, and which have grown 16 thousands units in the considered period. Although less specialized in High tech sectors than Europe and Finland, employed have grown considerably, by over 3 thousands units (+28%), mostly in Information Technology (+2'620).

The patenting activity is modest.

In sum, only in few selected themes the region appear to be particularly strong in terms of research potential, while it has a strong orientation to Information Technology.

PACA

Overall, the PACA region is less attractive of FP 7 funds, when compared to the national and European average, both in terms of number of projects and the amount of funds attracted. The Alpes-Maritimes and the Bouches-du-Rhone are the most attractive areas. The participants are mostly Research (48%) and Private for profit organizations (31%) as well as Higher Education Institutions (19%). The regional actors are particularly attractive in the themes “ICT” and “Space”. Most partners are located in Germany (15,4%), France (12,7%) and United Kingdom (11,5%). The most important organizations in the regional FP7 network are the CNRS, the University of Marseille II and Inserm.

The region is mostly specialized in medium knowledge intensive sectors, which sum up 54% of the employed, and which have grown by 22 thousands units in the considered period (+11%). The region is more specialized in High knowledge sectors than Europe and France, these sectors are very important (24% of the employees) and they have remarkably grown (+10 thousands, +12%); low knowledge intensive sectors have also grown (+7 thousands). Among High knowledge sectors, the largest sectors also have grown the most: “Financial services” (14,5 % of the regional employees, +7’144 in the period) and “Education and knowledge creation (3,3%, + 4’490).

The patenting activity is remarkable in Electrical Engineering, due to the presence of some intensive patenting organizations.

In sum, the regional research potential is high in some fields and, in terms of knowledge exploitation, the employment profile is strongly oriented to knowledge intensive sectors. Some fields emerge to be very important and promising all across the spectrum of activity considered, suggesting room for interaction. First, “Information and communication technology” is highly attractive of funds, a remarkable share of people are employed in IT (3,2%), and many patents have been registered in “computer technology” (152), “IT methods and management” (32), “digital communication” (72). Second, the field of “Space” (in FP7), and the employment sectors of Aerospace point out an important field of specialization.

Tuscany

Tuscany region is highly attractive of FP 7 funds, when compared to the national and European average, both in terms of number of projects and the amount of funds attracted. The provinces of Florence and Pisa are by large the most attractive. The participants are mostly Higher Education Institutions (55%), followed by private for profit (25%) and research organizations (18%). The region is particularly attractive in the themes “Health”, “ICT”, “Nanosciences, Nanotechnologies, Materials and new Production Technologies”, “Energy”, “Space” and “Socio-economic sciences and humanities”. Most partners are located in Germany (14,8%), United Kingdom (12,2%) and France (10,0%). The most important organizations in the regional FP7 network are the universities of Florence, Pisa and Siena, while a very

important subject in terms of projects led, the European University Institute (EUI), is not embedded in the regional network.

The region is mostly specialized in medium knowledge intensive sectors, which sum up 52% of the employed, and which have grown 6 thousands units in the considered period. The region is weakly specialized in High knowledge intensive sectors (9,5% of regional employees), and strongly specialized in low knowledge intensive sectors (38%), both compared to European and Italian averages. Nevertheless, the formers have grown in the period (+ 3'805 units, +6,6%), where the later have decreased (-4'091, -2.3%), suggesting a slow but relevant shift towards more knowledge intensive economy, and in particular in "Information Technology" (+2'119), "Financial services" (+1'428) and "Pharmaceuticals (+739).

The patenting activity is remarkable in Chemistry and some fields of the Mechanical Engineering, mostly due to the presence of Siemens.

In sum, the region is strong in terms of research potential but more integration is needed of a pivotal actor, such as the EUI. In terms of employment there is a promising trend towards knowledge intensive sectors, and in particular there is a potential of integration between highly attractive sectors in research and growing economic sectors of strong specialization: i) research in "Health" with "Pharmaceuticals" sectors ii) ICT and iii) "Nanoscience" research with sectors in "Chemistry products" and "Construction materials".

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