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AMCER

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

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Executive summary

The present Report constitutes the Draft Final Report of the project: ESPON Targeted Analysis Based on User Demand 2013/2/18: Advanced Monitoring and Coordination of EU R&D Policies at Regional Level (AMCER). ESPON 2013 Programme Project number 102_PR2_18_0283; Contract Number 097/2011.

1   Analytical part incl. key messages and findings

Introduction

AMCER project is an ESPON priority 2 Targeted Analysis Based on User Demand project, (Targeted analysis based on user demand: European perspective on development of different types of territories). Therefore the project was carried out at the express demand of a group of stakeholders regions through the ESPON 2013 Programme.

The AMCER stakeholders Regions involved in the project are: Tuscany Region, Italy (lead stakeholder); Andalusia, Spain; Brittany Region, France; Catalunya, Spain; East of England, United Kingdom; Flemish Government, Belgium; Lower Saxony, Germany; Ostrobothnia, Finland; Provence-Alpes-Côte d'Azur Region, France.

European Union (EU) R&D policies have a substantial impact on regional R&D systems and territorial cohesion, both at a European level and in the regions. Against the backdrop of the aims of Europe´s 2020 strategy, there is a need to improve the impact of EU funding programmes on more competitive R&D systems in regions.

The AMCER- Advanced Monitoring and Coordination of EU R&D Policies at Regional Level, aims to equip the 9 regional actors with an accurate picture of their R&D systems, EU R&D Policy activity and its territorial impacts. This should provide these regional actors with the evidence needed to formulate and manage R&D policy more effectively. More broadly, the project aims at proposing general guidelines with a set of recommendation in order to improve the monitoring at regional level and moving toward an harmonised methodology that other regions can use. The recommendations suggest how data collection can be improved by region and delivered by European Commission so that it contributes more effectively to the management of R&D policy and territorial cohesion initiatives. The **aim** of the AMCER project is to provide a framework for the analysis and monitoring of the impact of EU R&D policies at regional level, for creating strategic knowledge and building better synergies between regional and EU R&D policies.

Description of the methodology followed by the AMCER project

The AMCER project aims has been initially to provide general insights into the RTDI systems of the AMCER regions, by compiling a synthesis of the R&D systems and territorial challenges at the regional level for each of the nine case-study regions involved.

Then information and data has been collected and analysed concerning the participation of the 9 regions in EU R&D programmes.

This allowed to achieve a general statement of the regional participation in FP6, FP7, CIP and ERDF for each of the 9 regions.

The matching activity between regional information and contracts information was carried out in order to obtain a reliable list of regional participations. The verified regional participations were subsequently aggregated to produce regional indicators.

On this basis, Headquarters effect correction was carried out and R&D Budget breakdown calculated from the data gathered on regional participations.

Regional participations and budgets for Framework Programme on R&D, Competitiveness and Innovation Programme (CIP), and Structural Funds were distributed into R&D sectors at intra-regional level (NUTS 3 generally) in order to obtain a first set of comprehensive and aggregated indicators.

In order to identify the number and the intensity of the collaborative links generated by the AMCER regions participation in EU R&D programme, a Social Network Analysis for FP and CIP was carried out. This allowed to get a view on the main European networks in which regional stakeholders are involved. It also allows to develop a mapping of collaboration patterns in the FP; both between project participants and between regions and countries involved.

Social Network Analysis (SNA) is particularly relevant to the FP given its aim to develop collaboration between European organisations. The network analysis reveals key players (regions or legal entities) and core groups around which the research is structured.

Finally, the impact of the participation in EU R&D programmes was assessed in terms of results regarding employments level in R&D sector and patenting activity in the 9 AMCER regions.

Main findings

The analysis of the Regional Innovation Systems of the AMCER regions reveals that 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.

In terms of the participation of AMCER Regions in EU RDI programmes, the analysis carried out in the context of the project, notably on the programmes contacts databases, indicate that AMCER regions have benefitted from their participation in EU programmes. Certain regions, possibly given their existing RDI capacities and potentials have been more successful than other in attracting FP 7 funds, this is the case notably of regions with a strong network of HEI such as East of England, and/or with a strong relationships between research and innovation notably through SMEs (Flanders, Catalunya, Tuscany). Some however are less successful than the national or EU average (Ostrobothnia, Lower Saxony, Andalusia, PACA). However it is difficult to establish a clear link between their participation in EU programmes and their respective overall economic performances.

As noted already in academic research and also in conclusions of the ESPON KIT project, in many regional situations increasing R&D investment does not have a significant automatic and immediate impact on growth and job creation because technological change, as an outcome of research, is only one way to generate wealth.

In the context of monitoring the EU R&D programme, the information concerning effective localisation of project beneficiaries is in some cases biased (Headquarter effect) 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.

AMCER research demonstrated that the Headquarter effect provided overall a degree of distortion comparable to the 7,5 % of the AMCER regions participation had been misplaced. 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. Ingoing participations mainly concern research organisations; while private commercial and public organisation are less prone to generate a headquarter effect.

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 authorities in charge of regional policies should be carrying out in the context of their normal monitoring and strategic planning actions.

The analysis of regional participation in 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.

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%.

In terms of employment, most of the AMCER regions specialized in medium knowledge intensive sectors. Exceptions are Catalunya, East of England and PACA with stronger share in High knowledge areas; on the other end Andalusia and Tuscany have a stronger concentration on low knowledge sectors.

Patenting activity also vary significantly, with some regions where this activity is supported by dedicated intensive patenting organizations or significant technology corporations. Sometimes patenting activities are strongly focussed on one or two key areas (notably electrical engineering).

In terms of participation and predominant R&D themes also the situation is diverse and specific to each region. 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. This allowed to perform the analysis of the themes and sub-

themes for each AMCER Region within the regional profiles annexed to the present report.

The AMCER methodology

The aim of the AMCER project has been to deliver a harmonised methodology on the databases and recommendations on the shape of future databases so as they support evidence-based policymaking.

The methodology focus on a description of the process followed to achieve access to data, analyses performed and results to be achieved, based on practical measures and, proposals on a common structure for databases related to RDI.

The goal has been to develop a practical 'how to' guide for other regions so that their efforts built upon the learning of the AMCER project.

The approach (presented at annex of this Report) is based on the regional actors accessing to relevant of FP/CIP/Horizon detailed data and the verification of the information against information gathered by regions from other sources, notably the matching between contracts information from EU databases and local information, to validate effective regional participations.

This allows to evaluate the possible role of Headquarter effect. It would also allow to achieve a more precise monitoring of the aspects related to the rate of participation of the region in the FP 7, distribution of funding at infra-regional level, distribution of funding by participant type, distribution of funding by participant type at infra-regional level, SMES' participation in FP7/Horizon, and distribution of funding by programme and by theme. In addition, it is possible to integrate additional information from possible additional analyses regarding cooperation and networking and outputs in terms of employment and patents.

This AMCER methodology present some elements which can serve as a guide to other regional decision makers for devising their own approach based on their specific characteristics and requirements in terms of data with a view to improve planning and their approach to Regional Smart Specialisation.

Links with ESPON KIT project

Similar to the KIT project, the AMCER project analyses the territorial dimension of innovation. However, AMCER has a narrower focus as it covers only nine regions and it concentrates the results of their effective participation in EU RDI programmes and integrate also the Governance Dimension. Nevertheless the results of the two ESPON projects show a degree of compatibility and could constitute the basis of further research within future ESPON programmes about territorial dimension of R&D and innovation in Europe.

2   Options for policy development

Contribution to regional smart specialisation strategies

The European Commission has released guidelines for regional smart specialisation strategies which aim at coordinating existing tools within the EU policies and Regulations. The individual RIS3 strategies would take the form of an annex to the Operational Programmes for the next Financial Framework of Cohesion programmes.

The AMCER project results could constitute a useful contribution for the participating regions in the context of preparation of their respective Smart Specialisation Strategies and more generally in the context of the planning for the next cycle of the EU Financial Framework 2014-2020.

Indicators provided by AMCER such as participations indicators, numbers of patents, clusters analysis contribute each to the design of indicators for the Regional innovation smart specialisation strategy that have to be delivered jointly with the next ERDF Operational Programme for the 2014-2020 programming period.

In particular, AMCER results on FP 7 participation, collaboration patterns, possible headquarter effects, main R&D sectors to be targeted, etc. should contribute notably to assessments concerning: identification of priorities; definition of an action plan with a coherent policy mix; and monitoring and evaluation.

AMCER approach can also contribute to the identification of 'niches' or specific domains for (present and future) competitive advantages, from an international stance, inform on the positioning of the regional economy in international value chains and on identification of specific key assets.

The AMCER analysis is based specifically on the drawdown of EU/FP7 (cooperation programme) funding and should be assessed in this context. It may not give a complete picture of regional/localised strengths and specialisations on the ground.

Therefore, on the basis of the Commission guidelines for regional smart specialisation strategies, the AMCER project results could constitute a useful contribution for the participating regions in the context of preparation of their respective Smart Specialisation Strategies and more generally in the context of the planning for the next cycle of the EU Financial Framework 2014-2020. The individual RIS3 strategies would take the form of an annex to the Operational Programmes for the next Financial Framework of Cohesion programmes.

Issues related to the data on EU Programmes on RDI

It should also be noted that access to EU databases had been problematic and had created substantial delays in the project implementation, which had not been foreseen in the planning phase of the project. Among the challenges encountered during the project implementation, it should be noted that that the quality of the data collected by the EU about the performance of the EU RDI programmes is generally insufficient to provide any useful, readily accessible conclusions.

The AMCER activities and research have demonstrated that EU databases should be improved in the context of the next Framework Cycle till 2020, by integrating geographical information and localisation, notably in order to effectively localise the research departments that effectively carry out the work related to the EU programmes. Possibly this should be made into an effective reporting/monitoring requirement in the programme manual. Concerning the CIP, the monitoring structure should converge towards the FP structure. The ultimate aim would be to make the regions more self-reliant in terms of data analysis concerning the EU programmes.

At regional level, links should be established (or enhanced where existing already) between the administrative departments in charge of EU Programmes and those implementing ERDF by establishing effective communication and coordination mechanisms. Possibly the administrative capacity should be concentrated in the context of regional agencies together with standardised and mandatory set of procedures.

In the context of the planning for the next Financial Framework, the European Commission could also provide guidelines concerning data harmonisation. In this context, the regional scoreboards prepared in the context of the AMCER project could serve as a basis or model as a possible way to harmonise the data coming from different sources/programmes.

It should be noted that there is no regional agenda within the Framework Programmes which were not conceived to have a territorial dimension and were not evaluated on a geographical basis. Rather the FP was and would continue within next cycle to support excellence.

Each financial instrument has its specificities and focus, and it is not the purpose of the present report to assess them. However, it has appeared in the course of the project activities and in particular in contacts with regional stakeholders that better coordination and exchange of information should be sought between the bodies in charge of their implementation at Commission level (DG Regio and RTD) and the authorities in charge of regional policies in charge of RD policies and ERDF implementation.

Confidentiality aspects should be taken into account: information related to individual financial contribution should not be divulgated. It is considered by some regions that the information about failed applications should also be kept confidential.

Recommendations for policy development

1. On principles, there should be a structured and coordinated debate, possibly in the context of the smart specialization strategy process concerning an overall and coherent approach combining: territoriality elements of RDI programmes, access to data by authorities in charge of regional policies, harmonized monitoring approach and indicators, coordination with other related programmes (EU/national). The ultimate aim would be to make the regions more self-reliant in terms of data analysis concerning the EU programmes.

   This would contribute to establishing at EU level permanent and effective governance mechanisms of coordination of financial instruments should be devised to improve the management, performance and efficiency of the synergies between Horizon 2020 programme and Common Strategic Framework (CSF) Funds notably ERDF but also ESF as concern Human Resources support for R&D.

2. At EC level: EU databases should be improved in the context of the next Framework Cycle till 2020, by integrating geographical information and localisation, notably in order to effectively localise the research departments that effectively carry out the work related to the EU programmes. Possibly this should be made into an effective reporting/monitoring requirement in the programme manual.

3. At regional level: a better coordination is needed between services in charge of the follow-up of the ERDF programme and the services in charge of the monitoring of the FP/CIP. Notably, links should be established (or enhanced where existing already) between the administrative departments in charge of the ERDF participation analysis and FP/CIP participation monitoring is needed by establishing effective communication and coordination mechanisms in order to develop a common frame for monitoring and for developing indicators. Possibly the administrative capacity, could be concentrated in the context of regional agencies together with standardised and an agreed set of procedures.

4. Among regions/at national or European level: an agreement is needed on a common set of definitions and taxonomy. A set of common definitions among the programme should be agreed upon. For instance, a common approach is needed for counting the regional participations, in particular for those participations spread into several laboratories. A common set of scientific themes is also needed.

   In particular, in the context of the planning for the next Financial Framework, the European Commission could also provide guidelines concerning data harmonisation. In this context, the regional scoreboards

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prepared in the context of the AMCER project could serve as a basis or model as a possible way to harmonise the data coming from different sources/programmes.

5. Among regions/at national or European level: an agreement is needed on a common set of indicators for monitoring R&D participation.

A common set of indicators for the different programmes should be designed. This has to be done for helping the regions in the production of participants' typologies and in the identification of scientific or strategic domains. These indicators should be useful to feed regional policies.

6. At EU/regional level, in order to better understand SMEs' role in regional RDI development, it would be useful for the data concerning their participation in EU programmes to be collected in a systematic way on the basis of common definition (possibly harmonized with Cohesion Funds requirements).

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Need for further analysis/research

Regional typologies for R&D

Further investigate the possibility to achieve Regional typologies on the basis of the results of the KIT project and taking account of the other similar classifications of regional performance in terms of knowledge, innovation, research and development, such as Erawatch, the RIM and RIS.

Regional Innovation Systems (RIS)

Consideration may be given to further explore the possibility of using the Regional Innovation System model on the basis of Cooke's approach[1]. This would allow to integrate governance elements that might also be extended to aspects of programme governance and coordination. A systematic approach once devised on these bases, could serve as a tool to monitor regions' performances in RDI policies and programmes.

The AMCER methodology of integrating the RIS approach, results and effects of the regions' effective participation in EU RDI programmes, with their overall performances in terms of RDI output could also serve the purpose of supporting the smart specialisation process.

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[1] Cooke, P. (1992). Regional Innovation Systems: Competitive Regulation in the New Europe. *Geoforum* n. 23: 365-382.

ESPON 2013 Programme

Advanced Monitoring and Coordination of EU R&D Policies at Regional Level (AMCER).
Draft Final Report
Main Report
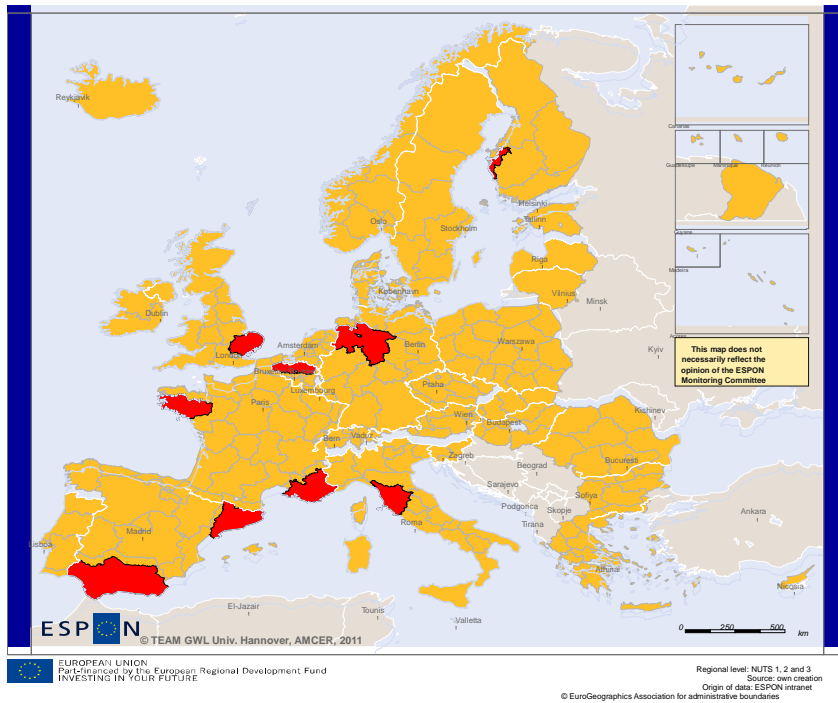
Overall considerations

1. The concept of the project

The Advanced Monitoring and Coordination of EU R&D Policies at Regional Level (AMCER) project aims to provide a framework for the analysis and monitoring of impacts of EU R&D policy at the regional level and current coordination in order to create strategic knowledge for building better synergies between individual regional R&D policies and EU ones. The study is carried out in nine European regions involved[2] and through a set of specific tasks divided into five components.

Main objectives of the research

Provide a framework for the analysis and monitoring of impacts of EU R&D policy at the regional level and its current coordination in order to create strategic knowledge for building better synergies between individual regional R&D policies and EU ones. In furtherance to this main objective, the project will deliver the following results:

- A synthesis of the main R&D challenges and the territorial and R&D systems of the regions involved in the project;

- The development and/or consolidation of data with regard to the investments funded through EU R&D policies in the regions involved in the project;

- The development of a harmonised methodology for the development and consolidation of regionalised data concerning the investments funded in the framework of EU R&D policies in the regions involved in the project; a methodology for advanced monitoring that is able to control for headquarters effects and with recommendations for the next generation of EU R&D and innovation programme, Horizon 2020;

- The analysis of the impact of the investment funded in the framework of EU R&D policies in the regions involved in the project both in terms of: a) R&D performance, territorial cohesion, R&D specialisation and b) territorial trends like geographical concentration of R&D activities in regions, links and the eventual parallels between the territorial dynamics generated by EU funding for R&D in terms of geographical concentration of activities and the ones observed more globally;

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2 AMCER Regions: Tuscany, Andalusia, Catalunya, Bretagne, Provence Alpes – Cote d'Azur, Ostrobothnia, Lower Saxony, Flanders, East of England.

- An inter-regional comparison of the results obtained for each of the regions involved, at horizontal level (all R&D sectors taken together), and at the level of specific R&D sectors to be defined.

AMCER project is a priority 2 Targeted Analysis Based on User Demand project, Targeted analysis based on user demand: European perspective on development of different types of territories. This priority responds to a clear demand of practitioners for user and demand driven actions within the ESPON 2013 Programme. By convening an analytical process where ESPON findings are integrated with more detailed information and practical know-how, new understanding of future development opportunities and challenges may arise, which could be transformed into projects and actions.

Targeted analyses under Priority 2 enable stakeholders to obtain customised and up-to-date information on their particular territorial context and opportunities for development which can be used for policy development. Given the targeted focus of these projects on specific territorial entities, targeted analyses will contribute to the use of ESPON results in practise and to the involvement of policy makers, practitioners and scientists in a joint synergetic process.

The project objective is to study and illustrate the influence of EU programmes related to Research, Development and Innovation on the regional systems involved; to discuss ways of improve monitoring and coordination of RDI activities at regional level; and to encourage the transfer of good practices at the European level.

The aim of the project has been to provide a tool for strategic governance and that the results of this component and the eventual results of the project at large cannot be considered as a fully fledged evaluation or audit of the participating regions. This would help the regions concerned (and possibly serve as a model for other regions too) prepare independent assessments of the regional participation in the EU Programmes.

Therefore the importance of this project lays in setting out a path for making R&D data more territorial – through a methodology that regions can use and through suggesting practical improvements for EC level R&D data collection.

The project provides an assessment on various aspects (inputs, outputs, SNA, cooperation, patent, etc.) that will inform participating regions on effects of their participations in EU programmes on RTD. However, this analysis does not constitute and should not be considered as an impact assessment as it is methodologically not feasible without longitudinal data.

Cut off date

This document provide a localisation analysis of research activities executed in the respective AMCER region in the FP7 and other EU programmes relevant for RDI activities in the period between 2007-2011. In particular, the

information related to FP7 is based on the data included in the contract database as of 15 October 2011.

The employment profile for each AMCER region covers the period 2004-2009, by paying particular attention to knowledge intensive and research dynamic sectors. Concerning patents-analysis produced in the region the reference period is 2002-2007.

2. Results of Project Analysis

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.

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 (including 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.

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[3] (see methodology part, component 1).

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

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[3] Cooke, P. (1992). Regional Innovation Systems: Competitive Regulation in the New Europe. *Geoforum* n. 23: 365-382.

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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[4], 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

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[4] Cooke, P. (1992). Regional Innovation Systems: Competitive Regulation in the New Europe. *Geoforum* n. 23: 365-382.

dependent on RTDI activities of Multinational Enterprises (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.

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.

Participation of AMCER Regions in EU RDI programmes

Regions have benefitted from their participation in EU programmes. However it is difficult to establish a clear link between their participation in EU programmes and their respective overall economic performances

As noted already in academic research and also in conclusions of the KIT project, in many regional situations increasing R&D investment does not have a significant automatic and immediate impact on growth and job creation because technological change, as an outcome of research, is only one way to generate wealth.

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 authorities in charge of regional policies should be carrying out in the context of their normal monitoring and strategic planning actions.

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: FP7 participations according to the Cooperation contracts database (until 31/10/2011)

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 % 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	542	656	17,4%
PROVENCE ALPES COTE DAZUR	FR	Strong	FR82	2	321	413	22,2%
TUSCANY	IT	Strong	ITE1	2	591	645	8,3%

(source CORDIS elaboration AMCER TPG)

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.

In general, it can be said that regions have certainly benefitted from the contributions provided by EU programmes. However, certain regions, possibly given their existing RDI capacities and potentials, have been more successful than other in attracting FP 7 funds, this is the case notably of regions with a strong network of HEI such as East of England, and/or with a strong relationships between research and innovation notably through SMEs (Flanders, Catalunya, Tuscany). Some, however, are less successful than the national or EU average (Ostrobothnia, Lower Saxony, Andalusia, PACA).

The analysis of regional participation in 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 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.

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%.

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Thematic 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. In terms of participation and predominant R&D themes also the situation is diverse and specific to each region. This is to some extent influenced by national characteristics.

FP7 Specialisations

Levels of specialisation have been determined based on a 'regional attractiveness' indicator estimated by calculating a ratio between the "funds attracted per inhabitant" by the Region and the "funds attracted per inhabitant" by the country and Europe: a ratio above 1.00 indicates that the region is relatively more attractive than the Country or EU as a whole. A more detailed explanation on how this indicator was developed may be found in the methodological report of the AMCER project.

The strong, no specialisation and under-specialisation categories have been determined using the European attractiveness ratio for each region.

- Under-specialisation = 0 – 0.8;

- No-specialisation = 0.81 – 1.2;

- Strong specialisation = > 1.2.

The following table presents an overview of the main specialisation themes for each of the regions analysed, for 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 • Transport • Socio-economic sciences and humanities • Space	• Energy • Security • General Activities
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

(source CORDIS elaboration AMCER TPG)

Concerning networking analysis the sample of regions is too limited to deduce some general trends as the situation remains specific to each region.

Sometimes the participation is highly concentrated geographically in one area (ie Ostrobothnia) or in some cases there is one part of the region that is more attractive than the others (cf Andalusia, Flanders, East of England).

Networks

The analysis of intra-regional collaboration patterns allow to understand the types of networks created at the regional level as a result of participation in FP7. Regional reports include a graphic representation of these networks. The following table presents the main indicators used to define regional cooperation networks[5].

The first two rows of the table present the number of *nodes* (actors) and *edges* (links or cooperations among these actors) and provide an idea of the sizes of the networks and the intensity of intra-regional collaboration. The subsequent rows mainly provide indicators on the density of networks, clustering and the gregarious nature of FP7 participants at the regional level.

As can be seen, the nature and size of networks varies considerably from while region to another. In general terms however, networks tend to display relatively high levels of node isolation and fragmentation, as well as weak clustering. These characteristics are in part expected because only collaboration in FP7 projects has been taken into consideration. Still, in the majority of cases a few central actors are highly connected and central.

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[5] A detailed explanation of each one of these indicators is provided in the methodological annex of the AMCER report.

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Table of networking indicators in AMCER regions

Measure	TUSCANY	ANDALUSIA	BRITTANY	CATALUNYA	EAST ENGLAND	LOWER SAXONY	PACA	WEST FINLAND (OSTROBOTNIA)
number of nodes (organizations)	158	111	60	312	190	170	119	69
number of egdes (cooperations)	314	164	94	632	270	249	160	124
Density	0.025	0.026	0.051	0.013	0.015	0.017	0.022	0.051
Components of 1 node (isolates)	61	61	26	124	111	99	69	30
Components of 2 nodes (dyadic isolates)	7	9	4	8	7	7	7	2
Components of 3 or more nodes	4	4	2	1	2	3	8	2
Characteristic path length	3.339	2.809	3.592	4.15	3.741	4.654	1.978	2.653
Clustering coefficient	0.553	0.415	0.504	0.521	0.376	0.364	0.388	0.509
Network levels (diameter)	7	7	9	11	9	11	4	5
Network fragmentation	0.781	0.964	0.853	0.697	0.9	0.914	0.987	0.798

(Source EU Commission elaboration AMCER TPG)

Employment specialization

In terms of employment, most of the AMCER regions specialized in medium knowledge intensive sectors. Exceptions are Catalunya, East of England and PACA with stronger share in High knowledge areas; on the other end Andalusia and Tuscany have a stronger concentration on low knowledge sectors.

Employment specialization

REGION		sectors by technology and knowledge intensity		
		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%

(source Eurostat elaboration AMCER TPG)

Patenting

Patenting activity also vary significantly, with some regions where this activity is supported by dedicated intensive patenting organizations or significant technology corporations. Sometimes patenting activities are strongly focussed on one or two key areas (notably electrical engineering). Patenting activity has been assessed as rather modest in East of England and Ostrobothnia.

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

(source Eurostat and EPO, elaboration AMCER TPG)

Analysis of FP7 Themes and sub-themes

FP7 allocates a total of EUR 32 413 million to the Cooperation specific programme. This funding is mainly aimed at supporting cooperation between universities, industry, research centres and public authorities through collaborative research projects. As of October 2011, 3 725 projects were funded through the FP7 cooperation programme representing a total of 14.5€bn.

The FP7 cooperation programme covers 11 themes (Cf. Box 1) which themselves cover a number of research areas. For the purposes of this study, 188 research areas have been selected in order to perform a regional specialization analysis of each theme.

Box 1

The 11 themes of the FP7 cooperation programme (and the number of research areas for each of them)

• Health (13 research areas)

• Food, Agriculture, and Biotechnology (17 research areas)

• Information and Communication Technologies (12 research areas)

• Nanosciences, Nanotechnologies, Materials and new Production Technologies (16 research areas)

• Energy (8 research areas)

• Environment (including Climate Change) (9 research areas)

• Transport

      o Aeronautics (17 research areas)
      o Surface transport (15 research areas)

Socio-economic sciences and Humanities (18 research areas)

• Space (5 research areas)

• Security (7 research areas)

The analysis of the themes and sub-themes for each AMCER Region is provided at annex 1 of the regional profiles annexed to the present report.

Social Network Analysis in AMCER

The aim of a Social Network Analysis (SNA) is to develop a mapping of collaboration patterns in the FP; both between project participants and between regions and countries involved. This is instrumental in assessing the impact of the programme in building the ERA. It contributes to answering some of the efficiency and effectiveness evaluation questions, especially for synergies and cooperation criteria. SNA is a tool which is particularly relevant to the FP given its aim to develop collaboration between European organisations. The network analysis reveals key players (regions or legal entities) and core groups around which the research is structured. These analyses and the resulting maps can be carried out at two levels: the level of participants and the level of regions.

SNA gives an analysis at the programme level (programme dynamics from one call to the other, cooperation patterns, inclusion of less developed regions through mentors, etc.) and an analysis of the participation of FP participants in other key European initiatives (Europe Innova networks, PRO INNO Europe® Cluster Networks, INTERREG IVC). It reveals the main players (institutions and regions) in these different trans-regional programmes and eventual complementarities, synergies, gaps and overlaps between them.

More generally, the SNA allows the assessment of:

- The extent to which the EU programmes contribute to building the ERA through the implementation of trans-regional research projects;

- The degree of integration of regions and the evolution of participation of regions with different research profiles around a core group of regions;

More precisely the analysis will allow the mapping of:

- The links between regional research driven clusters and their partners;
- The evolution in the ERA of the synergies created;
- The regional main players and collaboration patterns.

The main objective of the AMCER project is not to provide a detailed Social Network Analysis for each of the regions currently studied. Instead, the project seeks to illustrate the utility this particular tool has in the analysis of the impact of European funding on the development of links between research actors, and creation of collaborative networks at the regional, national and the European level.

The SNA tables included in the regional profiles presented at annex to the present report represent an example of how Social Network Analysis can contribute to this type of analysis.

The SNA figures that are presented for each region are meant to provide a starting point that may lead to further enquiries into the collaborative patterns existing within and among regions.

The tables included in the regional profiles show the links existing among actors that have been regrouped according to their country of origin and the type of organization (see annex).

They have been built on the basis of aggregated data from several different specific programmes, and as such, do not reflect specific theme-oriented trends. In no manner shall these be considered as offering an exhaustive view of the collaboration networks of each region under the Seventh Framework Programme of the European Commission.

Example of SNA analysis for Catalunya

The main collaborations between participant of ES51 and European participants in the FP7 cooperation programme (link exists if entities collaborate more than 10 times)
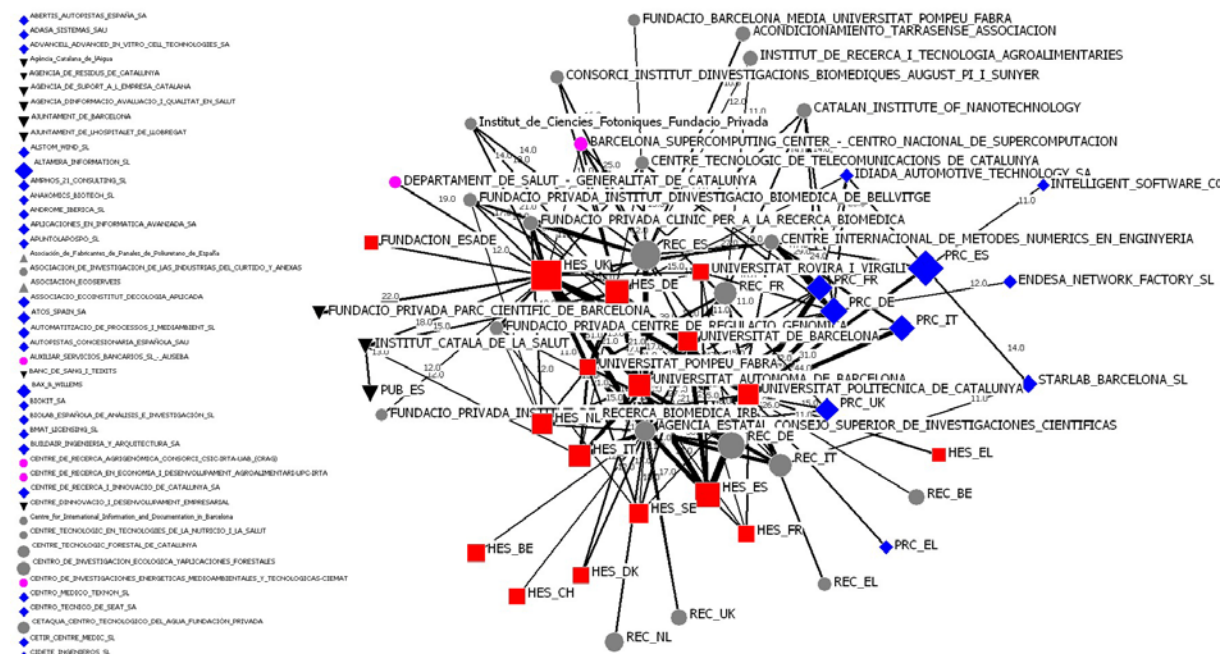
(source EU Commission elaboration AMCER TPG)

Results of the ESPON KIT project and their influence for AMCER

The ESPON KIT (2010-2012) studies the territorial dimension of the innovation and knowledge economy. It reviews the current state, patterns and potentials of regions with respect to the knowledge and innovation economy and identifies new development opportunities through innovation for Europe and its territories.

ESPON AMCER DFR has been invited to seek to explore and reflect on the KIT results at the regional level and ensure their consideration in recommendations.

Main results envisaged by ESPON KIT:

- Evidence about territorial potentials that can be exploited in different territories to further support the development of the innovation and knowledge economy.

- Identification of spatial patterns of innovation and knowledge creation as well as patterns of innovation and knowledge spill-overs.

- Conceptual definition of the knowledge economy to identify the territorial dimension and spatial trends of innovation and knowledge as well as territorially relevant elements of the innovation and knowledge economy.

- Measurement of the performance of the innovation and knowledge economy and detection of territorial potentials to increase this performance.

- Building of a spatial development strategy for the innovation and knowledge economy by identifying winning strategies for innovation and knowledge development.

- Typology highlighting models of endogenous regional innovation and knowledge creation and models of regional innovation and knowledge acquisition from outside the region.

Within the KIT ESPON project an overall concept is used including product innovation, process innovation and organisational innovation. This project takes into account the current state, patterns and potentials of regions with respect to the knowledge and innovation economy and identifies new development opportunities through innovation for Europe and its territories. In this context the KIT project identified "territorial patterns of innovation" by applying empirical analyses. In summary, they found five groups with different characteristics: 'science-based areas', 'applied science areas', 'smart technological application areas', 'smart and creative diversification areas', and 'creative imitation areas'.

Similar to the KIT project, the AMCER project analyses the territorial

dimension of innovation. In the context of the first component of the AMCER project, the RIS approach by Cooke has been applied.[6] This approach distinguishes between two major dimensions: the 'Governance Dimension' and the 'Innovation Dimension'. The Governance Dimension shows how the controlling and managerial competences of a RIS are formed in interaction between economic and political actors. The Innovation Dimension reveals how the R&D sectors is structured and set up with regard to RTDI relevant aspects (e.g. collaboration, R&D participation, sharing of knowledge).

Although some characteristics or findings which are embodied in the observed patterns of the KIT project bear similarities with the aspect analysed within the innovation dimension in the AMCER project, the approaches´ comparability is limited due to various conceptual and methodological reasons:

- The focus of the two projects varies: KIT uses the wider concept of Knowledge and Innovation and covers NUTS 2 regions. AMCER has a more limited scope as it focus on only nine regions more in depth and focus on their participation in EU RDI programmes (FP7, CIP, etc.)

- Within the KIT project the patterns have been identified by applying empirical analyses. To the contrary, in the AMCER project an existing approach (Cooke's RIS) has been applied.

- In contrast to the KIT project, we also considered the governance and policy dimension. Moreover, we incorporated an analysis of trends and challenges.

- Within the KIT project patterns have been identified on the basis of NUTS2 regions. In Cooke´s approach the dimensions and their basic types have been developed on the basis of empirical studies from regions from different scales.

- Within the KIT project the classification of regions is based on rather quantitative data. By using the RIS approach we made use of both quantitative and qualitative data and/or information.

In the context of the ESPON KIT project, five main patterns of Territorial patterns of innovation in Europe have been identified[7]:

A European science-based area (pattern 1a), characterised by strong knowledge and innovation producing regions, specialized in general purpose technology, with a high generality and originality of science-based local knowledge, and a high R&D endowment. KIT identifies these regions as been mostly located in Germany, with the addition of Wien, Brussels, and

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[6] Cooke, P. (1992). Regional Innovation Systems: Competitive Regulation in the New Europe. *Geoforum* n. 23: 365-382.

[7] Similar attempts of classifications or taxonomy have been carried out within the ERAWATCH, RIM and RIS initiatives.

Syddanmark in Denmark. In the context of AMCER, the East of England and Flanders regions may be assimilated to this pattern.

An applied science area (pattern 1b), made of strong knowledge producing regions characterized by applied science, with a high degree of knowledge coming from regions with a similar knowledge base. R&D activity is high also in this cluster of regions. In the context of AMCER, the West Finland (Ostrobothia) and Niedersachsen could be assimilated to this model.

A smart technological application area (pattern 2a), in which a high product innovation rate is registered, with a limited degree of local applied science, and a high creativity which allows to translate external basic science and applied science knowledge into innovation. In the context of AMCER, Cataluña and Tuscany regions can be assimilated to this model.

A smart and creative diversification area (Pattern 2b), characterized by a low degree of local applied knowledge, some internal innovation capacity, high degree of local competences, which suggest that the not negligible innovation activities carried out in the area mainly rely upon tacit knowledge embedded into human capital. In the context of AMCER, Bretagne, PACA and Andalusia regions can be assimilated to this model.

An imitative innovation area (pattern 3), in which one measures a low knowledge and innovation intensity, entrepreneurship, creativity, a high attractiveness and a high innovation potentials, that can be considered as local pre-conditions enabling the acquisition of external innovation. KIT identifies these regions as being located mostly in the EU12 new Member States, but also in Southern Italy. None of the AMCER regions correspond to these regions and model.

The AMCER regions represent a selection of case studies. They do not all correspond to NUTS2 definition. Some are characterised by the presence of important RDTI Knowledge production centre in the form of important urban centres or high education and research centres. The nine regions selected are not meant to represent an ideal case of a model typology of the EU RDTI regions in terms of Research or Innovation performances.

At the same time there are different model of typologies developed in the context of evaluation or Structural Funds, ERA, OECD, etc. Most recently, the ESPON KIT proposed a classification of Territorial patterns of innovation in Europe. The various approaches may not necessarily be overlapping or fully compatible. The evaluation of various forms of typology or patterns of regional innovation was not the aim of the AMCER project. On the basis of the useful results achieved by ESPON KIT and taking into account the results of other relevant research also mentioned above, additional research may be undertaken to further investigate possible links between regions performances in terms of RD and Innovation and the governance model and performance of regions in the context of EU RD programmes (including ERDF), by integrating the AMCER approach/methodology.

2 Options for policy development

Contribution to Smart Specialisation agenda

Smart Specialisation

The European Commission has set the ambition of all EU policies and programmes supporting the objective of smart and sustainable growth, as set out in the EU2020 strategy. How regional policies and funding programmes such as the European Regional and Development Fund (ERDF) can support innovation is set out in *Regional Policy contributing to smart growth in Europe 2020*. Authorities in charge of regional policies have an important role to play in supporting key elements of the EU knowledge infrastructure, such as universities, SMEs and the development of clusters. As at present only around 1 in 10 EU regions achieves the target of spending 3% of GDP on R&D, this support is essential.

However, the level of support given to research and innovation varies across regions. Therefore, there is a need to re-orientate this funding to support the development of innovation capability in all regions, by focusing funding on those areas "*which give regions the best chance of developing competitive advantage, and maximising synergy between the different sources of Community funding for innovation*". The mechanism for achieving this shift should be smart specialisation strategies. These: focus on a limited number of priorities linked to innovation; coordinate of all relevant policies and other activities; involve business, research centres and universities; and are coordinated with other EU funding programmes (e.g. Framework Programmes), and in future, the European Innovation Partnerships focused on societal challenges. Priorities for smart specialisation strategies could include support for KET-linked projects such as R&D, pilot lines and projects linked to competitive manufacturing, as well as clusters.

Smart specialisation is a welcome development in EU regional policy. All regions, not just those that are eligible for Structural Funds, should consider developing smart specialisation strategies or reflecting these principles in their economic development strategies, to enable EU, national and regional funding programmes to be focused on sectors and activities in which regions can develop competitive advantage. This would have the double benefit of concentrating resources on sectors with growth potential, and also increasing the resources being invested in major European projects with wide societal benefits, such as smart grids and broadband infrastructure (to meet the agreed EU objective of complete broadband coverage by 2020), which will increase demand for KETs.

The European Commission has released guidelines for regional smart specialisation strategies which aim at coordinating existing tools within the EU policies and Regulations. The individual RIS3 strategies would take the form

of an annex to the Operational Programmes for the next Financial Framework of Cohesion programmes.

The AMCER project results could constitute a useful contribution for the participating regions in the context of preparation of their respective Smart Specialisation Strategies and more generally in the context of the planning for the next cycle of the EU Financial Framework 2014-2020.

Origins of the concept

The smart specialisation argument emerged originally out of the literature[8] examining the transatlantic productivity gap. The concept was first sketched out by Dominique Foray and Bart van Ark, and subsequently developed along with their co-authors Paul David, Bronwyn Hall and by other members of the "Knowledge for Growth" expert group (2009)[9]. The focus here was initially on the role played by transatlantic differences in R&D intensity in explaining growth differentials, but more recently the focus of this literature has shifted somewhat also to the issue of the transatlantic differences in the dissemination of new technologies across the wider economy.

Regarding the design of smart specialisation strategies, David, Foray and Hall[10] consider without measurement activities leading to the production of indicators and the regular collection of systematic data, smart specialisation is hardly visible and policies have no way to track progress, assess structural transformations and compare performance. S&T indicators and data are, therefore, needed to make smart specialisation more visible so that policy makers can grip it in order to design and bring innovative policy responses to science and technology issues.

Smart specialisation should be measurable with the production of aggregate statistics.

In terms of the empirical aspects of the smart specialisation strategy, the approach is still so new that very little research has actually been undertaken regarding the relationships between the policy objectives and policy instruments. In a policy context, the major challenges is therefore the linking inputs, to outputs and then most importantly, to outcomes. As yet there are no clear outcome indicators for the smart specialisation approach, as is made clear by the authors of the strategy themselves (Mc Cann and Ortega-Argiles, 2011)[11].

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[8] There is a reference to "smart specialisation" in the Communication on the EU2020 Strategy (page 7); there are also many linkages between "smart specialisation" and several themes of the work programme 2011-2012 of the Committee for S&T Policy at OECD

[9] Foray, D.; P. David and B. Hall (2009) "Smart Specialisation – The Concept", Knowledge Economists Policy Brief No 9, June 2009

[10] David.P., Foray, D.,and Hall, B., (2011), "Measuring Smart Specialisation: The concept and the need for indicators"

[11] McCann, P. and Ortega-Argilés R. (2011), "Smart Specialisation, Regional Growth and Applications to EU Cohesion Policy"

The design of Smart specialisation strategies and AMCER project

The monitoring and the use of several types of indicators have a crucial importance at different moment of the life cycle of a programme or a strategy. These three crucial steps take a part in the design process, each type of output/outcome indicator take different importance according to the stage of realisation of the programme/strategy.

These three steps of the policy cycle can be listed as follows:

1. Indicators to monitor the implementation of the programme strategy
2. Indicators to assess the impact of the programme/strategy (leverage effect measurement)
3. Indicators to design the future programme/strategy to be launched.

Indicators provided by AMCER such as participations indicators, numbers of patents[12], clusters analysis contribute each to the three stages listed previously.

The design of a Regional innovation smart specialisation strategy has to be delivered jointly with the next ERDF Operational Programme for the 2014-2020 programming period. The European Commission, through DG Regio and DG JRC, has launched the concept of smart specialisation strategies and support the regions with guidelines[13] and with various tools such as an internet platform[14] and conferences.[15]

AMCER shows that most of European regions suffer from a lack of reliable S&T indicators. Moreover these indicators are not comparable among regions due to the absence of a common framework. In addition to the use of traditional indicators such as patents and publications, AMCER propose to exploit data on the participation in EU programmes.

The participation information is a proxy indicator. Being upstream of the S&T delivering process, it does not testify of any S&T results but assess stakeholders behaviour in terms of:

- Choice of research fields which corresponds or does not correspond to economic sectors,
- Choice of European strategic alliances.

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[12] Nikulaien (2008) shows how patent data can be used to a certain extent to assess the progress of the industry toward smart specialisation by looking at the increase in patent applications by P&P firms related to nanotechnology.

[13] http://s3platform.jrc.ec.europa.eu/s3pguide
[14] http://s3platform.jrc.ec.europa.eu/fr
[15] JRC-IPTS is planning to organise a conference about indicators and smart specialisation in Groningen (Netherlands) in January 2013

AMCER project shows that EU programme participation indicators can be used smartly in order to draw the specialisation profile of each region and their main European collaboration axis.

Methodological approach of the design of RIS3 and AMCER results

This section aims at presenting the main content of the guidelines distinguishing where indicators and especially AMCER contribution could feed the design process.

A step by step approach has been developed in the design of RIS3. These steps are developed in a guide targeting at Structural Funds Managing Authorities, policy-makers and regional development professionals. It sets out the concept of smart specialisation and provides orientations on how to develop research and innovation strategies for smart specialisation (RIS3). Guidance is structured around six steps:

1) Analysing the innovation potential
2) Setting out the RIS3 process and governance
3) Developing a shared vision
4) Identifying the priorities
5) Defining an action plan with a coherent policy mix
6) Monitoring and evaluating

AMCER results feed the design process for the steps 4, 5, 6 by using EU programmes participation of regions as intermediary outcomes revealing to the regional key players their collaboration patterns and sectors/research fields to target.

The identification of 'niches' appears also as a crucial issue. Within the perspective of a RIS3, it can also be argued that too little emphasis is placed on the *identification of 'niches' or specific domains for (present and future) competitive advantages*, from an international stance. Hence, the work for this analytical step of a RIS3 strategy should combine the above types of analyses with other analyses aiming at shedding light on potential for knowledge-based transformation of the economy, based on information on the positioning of the regional economy in international value chains and on identification of specific key assets.

The Analysis of (matching) Scientific and Technological specialisation: analyses of specialisation of R&D investment, publications and citations, and patent applications and citations by 'field' or the participation in collaborative projects of EU programmes (as AMCER project proposed it). A region has a comparative advantage in a certain field if it shows an above-average concentration of these indicators compared to the value taken in the country or a group of countries.

Therefore, on the basis of the European Commission guidelines for regional smart specialisation strategies, the AMCER project results could constitute a useful contribution for the participating regions in the context of preparation of their respective Smart Specialisation Strategies and more generally in the context of the planning for the next cycle of the EU Financial Framework 2014-2020. The individual RIS3 strategies would take the form of an annex to the Operational Programmes for the next Financial Framework of Cohesion programmes. In particular AMCER results on FP 7 participation, collaboration patterns, possible headquarter effects, main R&D sectors to be targeted, etc. should contribute notably to assessments concerning: identification of priorities; definition of an action plan with a coherent policy mix; and monitoring and evaluation.

Issues of regional data in EU programmes

The aim of the AMCER project has been i.a. to establish a link between different programmes such as FP7 and ERDF by focussing on the cases of the 9 participating regions. It also confirmed that there is a need to involve more the regional stakeholders in the monitoring of the implementation of FPs in order in particular to allow compatibility with regional monitoring.

It should also be noted that access to EU databases had been problematic and had created substantial delays in the project implementation, which had not been foreseen in the planning phase of the project.

Among the challenges encountered during the project implementation, it should be noted that that the quality of the data collected by the EU about the performance of the EU RDI programmes is generally insufficient to provide any useful, readily accessible conclusions. For instance, within 6th and 7th Framework Programmes on RD no impact indicators exist. In other programmes data of localisation is not collected in a systematic or harmonized way with other programmes.

Data related to EU Social Fund is not in the scope of the project activities and its inclusion would not be possible at this stage for reasons of accessibility, relevance and comparability of the data.

It should be noted that concerning East England, R&D data predated the end of the RDA structure in the East of England and this was to be borne in mind for exploration where appropriate.

The AMCER activities and research has demonstrated that EU databases should be improved in the context of the next Framework Cycle till 2020, by integrating geographical information and localisation, notably in order to effectively localise the research departments that effectively carry out the work related to the EU programmes. Possibly this should be made into an effective reporting/monitoring requirement in the programme manual.

The ultimate aim would be to make the regions more self-reliant in terms of data analysis concerning the EU programmes.

Concerning the CIP, the monitoring structure should converge towards the FP structure.

At regional level, links should be established (or enhanced where existing already) between the administrative departments in charge of EU Programmes and those implementing ERDF by establishing effective communication and coordination mechanisms. Possibly the administrative capacity, should be concentrated in the context of regional agencies together with standardised and mandatory set of procedures.

In the context of the planning for the next Financial Framework, the European Commission could also provide guidelines concerning data harmonisation. In this context, the regional scoreboards prepared in the context of the AMCER project could serve as a basis or model as a possible way to harmonise the data coming from different sources/programmes.

It should be noted that there is no regional agenda within the Framework Programmes which were not conceived to have a territorial dimension and were not evaluated on a geographical basis. Rather the FP was and would continue within next cycle to support excellence.

Each financial instrument has its specificities and focus, and it is not the purpose of the present report to assess them. However, it has appeared in the course of the project activities and in particular in contacts with regional stakeholders that better coordination and exchange of information should be sought between the bodies in charge of their implementation at Commission level (DG Regio and RTD) and the authorities in charge of regional policies in charge of RD policies and ERDF implementation.

Confidentiality aspects should be taken into account: information related to individual financial contribution should not be divulgated. It is considered by some regions that the information about failed applications should also be kept confidential.

Data Protection

The main rules for recording and processing of personal data (notably in the context of EU programmes, procurement and contracts, is Regulation (EC) No 45/2001 on the protection of individuals with regard to the processing of personal data by the European Union institutions and bodies and on the free movement of such data.

However, for the purposes of safeguarding the financial interest of the Union, personal data may be transferred to internal audit services, to the Court of Auditors, to the Financial Irregularities Panel and/or to the European Anti-Fraud Office (OLAF).

In particular, the rules concerning the access to CORDA data base are outlined in a dedicated Commission document, "Confidentiality rules for Framework Programme data stored in CORDA and E-CORDA". [16]

Therefore, without prejudging the prerogatives of each institution, while preserving confidentiality of data, some measure of access should be provided to authorities in charge of regional policies to the EU data on relevant RTD programmes such as Framework Programme, CIP, etc.

This could take the form of a contract or MoU which will establish an appropriate procedure for the request including format, time for reply, condition of use, and subscription of confidentiality measures.

Summary on access to main sources of data

The overall situation concerning access to data of the relevant EU programmes is as follow:

- Data from CIP-EIP (Entrepreneurship and Innovation Programme) had not been retained as there was no structured database for this programme.

- For CIP-IEE, only partial contract database had been provided and with no geographical information, which impairs the capacity to build effective regional indicators. Access to all relevant elements of the CIP-IEE programme database should be improved and LP and ESPON CU will introduce another request through DG Regio.

- Data from CIP-ICT can be used with no additional request to make.

- Concerning FP data, priority was given to research and analysis of FP7, which is likely to provide the most interesting and relevant information for the SH. Information concerning FP6 should be taken into consideration as appropriate for historical/background purposes FP7 data was compiled for each participating region and circulated to Stakeholders for validation and verification, notably to identify certain recipients in their respective regions; verify cases of "suspicious participation" i.e. for beneficiaries where laboratory is located in another region than the HQ. Verify some participants registered as SMEs, etc. A specific communication will be forwarded to each region in due course, with detailed instructions.

- Concerning ERDF, Stakeholders will also be consulted in order to provide feedback on the data collected by TP (regional scoreboards) and complete the information as necessary.

- Data related to EU Social Fund, notably as possibly related to development of Human Resources for RDI was not in the scope of the project activities and its inclusion could not be possible for reasons of accessibility, relevance and comparability of the data. However, Analysis of

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[16] Ares(2011)185152 - 18/02/2011

relevant ESF data may be considered by some stakeholder as important and may be included in future analyses.

Exhibit: Overview of the use of data sources and relation with stakeholder regions

Programmes	Main characteristics of the EC Contracts database	Requested actions of the regions for the matching	Quality of the regional analysis
FP6 **FP6 contracts**	**Quality : relatively rich but not reliable** **Description:** FP6 database contains the participation information with only the headquarter localisation. Some information regarding participants need to be checked (eg SME) because not validated by the EC **Improvement/ recommendation**: EC improved considerably the quality of the information	**Requested involvement: Necessary** **Description:** The matching between regional analysis and FP database is requested in order to produce a complete assessment of the participation of the region in the FP6.	**Reliable**
FP7 FP7 contracts database (ms Access)	**Quality : rich and relatively reliable** **Description :** FP7 database contains 2 types of information regarding the localisation of a participation : -Information about headquarter localisation - Information about Research department localisation These 2 information allow a first headquarter analysis (ingoing/outgoing participations) without the intervention of the region. The characteristic of participation is validated by the EC services (Eg SME identification) **Improvement/ recommendation:** Some information regarding Research department localisation may be missing. EC should pay attention to this field.	**Requested involvement: useful but not necessary** **Description:** Region have only access to online E Corda database without research department information. Regions cannot correct the headquarter by themselves Region intervention is useful to share the information obtained with the database exploration. The role of region to validate and correct the possible mistakes in the contract database	Reliable
CIP-ICT-PSP	**Quality : relatively rich but not reliable** **Description:** CIP database contains the same information as FP6 database. Only the headquarter localisation (NUTS3) is provided. Some information regarding participants need to be checked (eg SME) because not validated by the EC **Improvement/recommendation**: EC should adopt the FP7 database structure for the CIP-ICT-PSP database. **Improvement/Recommendation**: see FP7	**Requested involvement: necessary/useful** **Description:** The matching between regional analysis and FP database is requested in order to produce a complete assessment of the participation of the region in the sub-programme. The number of participations is relatively low and information can easily be checked by the region.	**Reliable**
CIP-IEE	**Quality: Poor** **Description:** The CIP IEE database does not contain normalized information such as NUTS codes and country code Database does not contain information regarding participants (eg, SME, type of legal entity...)	**Requested involvement: necessary** **Description:** region is necessary to localise the participant in the database.	Unknown
ERDF	**Quality: rich but not available** ERDF database is managed at national level. The information provided is rich and reliable regarding the funding and the participant information. The information regarding output and impact is not reliable and is too much dependent of the region itself to be useful	**Requested involvement: Not necessary** **Description:** AMCER uses information provided by the Annual implementation report with are validated by the EC	Unknown

(source EU Commission elaboration AMCER TPG)

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Remarks on ERDF data

ERDF data access presented an added difficulty as it is often collected and presented in the national language. Some beneficiaries are difficult to identify (ex. SMEs). There is a problem of how to establish links between the programme data.

Some data exist in regions but may be difficult to access. Data had been in many case difficult to access for various reasons (use of national language, change in administrative setup, heterogeneous formatting of the databases, etc.) and the databases themselves were not considered reliable in certain cases.

Particular attention should be given to the issue of reliability of the classification of activities in the EU programmes and notably in ERDF.

Also localising beneficiaries had proved problematic in the course of the project activities, as the various programmes do not have a harmonised approach toward indentifying where the effective beneficiaries are located.

There was agreement that the themes related to role of SMEs and localisation of beneficiaries had been identified as those posing more concern.

Data collection and its use should also be better codified (both in terms of common definition of fields of template to be filled and type of data) in the context of ERDF.

Finally, impact indicators are in many cases weak, non-existent or not filled properly. ERDF contains some indication of impact but in general of limited quality.

This prevents achieving a minimum of evaluation of the performance of the projects and programmes concerned. Therefore indicators should be reinforced, introduced where lacking and made more explicit. Clear instructions should be given on how to fill these indicators.

Recommendation: in the context of ERDF, data collection and its use should also be better codified (both in terms of common definition of fields of template to be filled and type of data).

Remarks on FP6

In the course of the project analysis it has been confirmed that information about FP6 could not be used for a number of reasons: it was already been reviewed in part through relevant programme evaluations and other studies, it was not so interesting for the project analysis as it was outdated and non directly comparable.

Remarks on CIP/ICT

The information concerning this programme is managed by the Commission (European Commission - Directorate-General Communications Networks, Content and Technology – ex. Information Society and Media). Following assessment during the course of the project analysis, it appears that this programme has little or no influence on the AMCER regions RTDI activities for the following reasons:

- Some have proposed that distinguishing between SMEs and Research Institutions would allow to better understanding public and private engagement patterns.

- A proposal was made to include applicant databases in the scope of the regional participation to EU programmes in order to better evaluate success rate of applications of regions in FP/CIP. This proposal was not retained in the course of the project as this was outside of the scope of the project specification but also because it was considered that it would not provide useful information about the real RDI performances of the regions'. Also in this case however, future studies or analysis carried out on the basis of the AMCER methodology may include data about applications rates if considered relevant by stakeholders.

- The analysis of the data about the participation of the AMCER regions in the EU programmes on RDI does not provide significant evidence whether or cases where consortia of High Education Institutions are affected by EU assistance.

Issues related to EU programmes databases

Overall improvement of Programmes databases: aim of the AMCER project is also to recommend improvements to these databases so they are useful at regional level.

Localisation of beneficiaries has been one of the objectives of the project from the start and has proved a source of difficulties in carrying out the project analyses. As already noted in several instances, the headquarter effect has had a distorting influence in general. But this is not the only problem affecting localisation. In many cases, information is provided in diverse formats (NUTS code, postal code, address, PIC code). In some cases the information is not collected at all.

Recommendation: information about localisation of final beneficiaries should be collected systematically in a common format (possibly PIC code), and be the same also for different programmes. This would facilitate greatly monitoring activities.

Common definitions

Innovation: An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relation. The minimum requirement for an innovation is that the product, process, marketing method or organisational method must be new (or significantly improved) to the firm.[17]

Innovation activities: All scientific, technological, organisational, financial and commercial steps which actually, or are intended to, lead to the implementation of innovations. Some innovation activities are themselves innovative, others are not novel activities but are necessary for the implementation of innovations. Innovation activities also include R&D that is not directly related to the development of a specific innovation.[18]

Headquarter effect

Box Brief definition of the headquarters effect and the inflow/outflow model

The headquarter effect occurs when the legal entity who signed a contract with the European Commission and the research implementation funded by the project is not localized at the same place:

From the analysis of contract database, three cases can be distinguishedAccording the type of the participant and project, the place where the contract has been signed and the research activities are performed may be different. 4 cases are possible:

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   There is an Ingoing headquarter effect when the research is performed in the targeted region AND the headquarter localised OUT of the targeted region. These participations have to be added to the regional assessment.

3   There is an outgoing headquarters effect when the research is performed IN the targeted region (your region) AND the headquarter localised OUT of the targeted region THEN it is an INGOING participation. The participations have to be subtracted of the regional assessment.

Evaluation of impact: The AMCER project provides a degree of assessment concerning the possible impact of EU programmes in the 9 target regions. It does not provide an extensive evaluation of regional RDI policies, as the project was not intended as a technical ex post impact evaluation. In principle each programme should foresee the evaluation of impact of the assistance deployed, therefore the responsibility for this task would depend on the EU competent services or in the case of ERDF on the implementing agencies at regional level.

For other relevant definitions, please refer to the annex to the present Report.

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[17] Source DG ENTR Glossary
[18] Source DG ENTR Glossary

AMCER Methodology

The aim of the AMCER project has been to deliver a harmonised methodology on the databases and recommendations on the shape of future databases so as they support evidence-based policymaking.

The methodology focus on a description of the process followed to achieve access to data, analyses performed and results to be achieved, based on practical measures and, proposals on a common structure for databases related to RDI.

The goal has been to develop a practical 'how to' guide for other regions so that their efforts built upon the learning of the AMCER project.

The approach (presented at annex of this Report) is based on the regional actors accessing to relevant of FP/CIP/Horizon detailed data and the verification of the information against information gathered by regions from other sources, notably the matching between contracts information from EU databases and local information, to validate effective regional participations.

This allows to evaluate the possible role of Headquarter effect. It would also allow to achieve a more precise monitoring of the aspects related to the rate of participation of the region in the FP 7, distribution of funding at infra-regional level, distribution of funding by participant type, distribution of funding by participant type at infra-regional level, SMES' participation in FP7/Horizon, and distribution of funding by programme and by theme.

In addition, it is possible to integrate additional information from possible additional analyses regarding cooperation and networking and outputs in terms of employment and patents.

This AMCER methodology present some elements which can serve as a guide to other regional decision makers for devising their own approach based on their specific characteristics and requirements in terms of data with a view to improve planning and their approach to Regional Smart Specialisation.

The main aspects to be taken into account in this context are their governance and therefore their planning and coordination capacities should also be considered their capacity for data managements in relation or in parallel between the various actors in charge of programme management and their respective degree of (financial) responsibility, ie whether at local, regional, interregional, national or EU level.

Coordination of EU programmes

Framework programs and Structural Funds are complementary and together result in high frequency knowledge networks with strong ties, establish and facilitate intraregional linkages, connecting the region to the high-level knowledge networks, stimulate networking amongst companies and other regional institutions.

The Structural Funds have been used on many occasions to establish research and innovation centers as well as to promote co-operation between higher education and applied research bodies and the private sector, whilst the Framework Programs have also been instrumental in promoting such co-operative arrangements.

Such actions are taking place in both economically strong and weak areas, although there is evidence that the relative impact is greater in economically weak areas. However, Framework Programs are particularly prone to reinforcing existing clusters of activity, the benefits are often highly concentrated within regions, and knowledge may be principally retained by the project participants themselves.[19]

It is generally noted that Horizon funds would not be allocated on a geographical basis, however, it was recognised that territorial dimension of RDI and the coordination with CSF/ERDF should be pursued as much as possible.

The following table provides an outline of the points of convergence between the Europe 2020 and Cohesion policy.

	Europe 2020 Strategy			Cohesion policy
EU priority	**Objective**	**Headline target**	**Flagship initiative**	**Thematic priorities**
Smart growth	• Improving the conditions for innovation, research and development	• R&D 3% of GDP (A new indicator for innovation)	Innovation Union A Digital Agenda for Europe An Agenda for New Skills and Jobs	• **Strengthening research and technological development (IG4)** • **Promoting innovation and smart specialization (IG4)** • **Enhancing accessibility to and use and quality of information and communication technologies(IG4**

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[19] Espon, 2.1.2 project, Final Report 2006

				)
				• **Removing obstacles to the growth of SME's** (IG6)
	• Improving education levels	• At least 40% 30-34 old having completed tertiary education • Reduce school dropout rates to less than 10%	Youth on the Move An Agenda for New Skills and Jobs	• **Improving the quality and performance of education and training system at all levels and increasing participation in tertiary or equivalent education** (EGL9)
Sustainable growth	• Meeting climate change and energy objectives	• 20% reduction of G-emission	Resource efficient Europe	• **Supporting in all sectors the shift towards a low-carbon, resource efficient and climate resilient economy** (IG5) • **Promoting renewable energy sources** (IG5)

(source European Commission)

Recommendation: On principles, there should be a structured and coordinated debate, possibly in the context of the smart specialization strategy process concerning an overall and coherent approach combining: territoriality elements of RDI programmes, access to data by authorities in charge of regional policies, harmonized monitoring approach and indicators, coordination with other related programmes (EU/national). The ultimate aim would be to make the regions more self-reliant in terms of data analysis concerning the EU programmes.

Role SMEs

SMEs play an important role in R&D and particular in translating it in innovations, creating value, wealth and employment in Europe.

The EU has particularly focused assistance on SMES. Between 2007 and 2013, cohesion policy programmes support explicitly the creation and growth of SMEs, including activities related to access to finance, research and innovation, technology transfer, access to information and communication

technologies or environmentally friendly production. About €27bn (7.9% of the total Cohesion policy allocation) are allocated specifically to SMEs.[20]

The research and analysis carried out in the context of the AMCER project concerning the 9 Stakeholders regions have highlighted that:

- SMEs in the target regions have benefitted substantially of EU RDI programmes.

- The vast majority of regional SME participations is constituted by private commercial SME (in most cases 100%).

- SMEs participations are roughly proportional to the regional share of overall national participations.

- SMEs constitute a share of total participation that vary greatly from region to region: from 4% in Brittany to over 40% in Flanders (depending whether in number of participations or in value of funding).

- Finally, SMEs are often concentrated or clustered in one of the region provinces.

In terms of data availability, information concerning SMEs is not collected in a systematic way in the context of EU RDI programmes, notably whether it is a SME or not, its location, whether it is a subsidiary of another company, etc.

Recommendation: In order to better understand SMEs' role in regional RDI development, it would be useful for the data concerning their participation in EU programmes to be collected in a systematic way on the basis of common definition (possibly harmonized with Cohesion Funds requirements).

Governance

Policy-formulation level: concerning general legal frameworks, governance processes and 'cultural' issues within or above a given innovation system. In medium to large Member States, there is a clear need to take action to improve coordination amongst regional programmes and policies, both horizontally between regions and vertically with central government departments. An approach via interministerial 'committees' does not necessarily seem optimal (e.g. Spanish experience).

Rather investment in strategic intelligence tools such as policy benchmarking, foresight, inter-regional co-operation programmes can create a voluntary exchange of now-how.[21]

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[20] European Commission, DG Entreprise.

[21] See i.a. Regional Innovation Monitor, Innovation Patterns and Innovation Policy in European Regions - Trends, Challenges and Perspectives 2010 Annual Report, 2011.

Role of national/regional RTDI agencies:

As Noted in RIM EU report 2010, in most cases regions need to improve their coordination.[22]

In the course of the project activities it was noted in several instances the key role played by dedicated public bodies for the coordination of RTD policies and programmes, whether at national level (Spain RDTI)[23], regional (Flanders EWI). In addition, the negative effect in terms of monitoring and coordination capacities of the reform of the regional policy in the UK have been noted. There is no feedback or capacity to access, evaluate the accuracy and possible distortions within the EU programs datasets.

Cities

Urban areas are home to main drivers of innovation and economic growth. Within Europe, London, Paris, and the Rhine-Ruhr area stand out as large and highly integrated metropolitan areas. They are followed by Madrid and some other capital cities.[24]

Nano-, bio-, information-technology and cognitive (NBIC) sciences are expected to drive future innovation waves. These sectors are expected to drive the next innovation wave which is expected to emerge by 2020. Accordingly, the location of NBIC centres may influence the future path of the European urban system. The locations and networks of this important sector, mainly in Europe's capitals and university cities, will become increasingly influential in the European urban system.[25]

The 9 AMCER regions, with the exception of Catalunya, do not correspond necessarily to important economic city hubs. Mostly gravitate at the periphery of significant economic and political capitals such as Madrid, Paris, Milan/Rome, London and Berlin. While belonging to the largest EU member states (Germany, France, Italy, Spain, UK), the 9 regions can be considered sufficiently connected taking into account that the most connected regions tend to be those hosting national capitals.

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[22] Regional Innovation Monitor, Innovation Patterns and Innovation Policy in European Regions - Trends, Challenges and Perspectives 2010 Annual Report, 2011

23 In particular it was noted the central role played by Spain national RDI agency (CDTI) in promoting FP7, making available information from CORDA to regions, collecting information at regional and provincial level, including information also about failed proposals, etc.

[24] ESPON Synthesis report 2012

[25] *Ibid.*

Transferability of results

The methodology that has been developed for the AMCER project is based on a pragmatic approach. It does not constitute a systematic user guide that would be followed step by step by a new user.

In particular, the approach is to produce overall scoreboards of performance to aid regions to build their investment monitoring and support strategies. These scoreboards or regional profiles should serve as a model for the regions to develop their own approach based on their administrative set-up, monitoring approaches, policy mechanisms etc.

However, the proposed AMCER approach is based on the methodology outlined in at Annex to the present report as well as in the nine AMCER regional profiles which can constitute a possible model and a source of inspiration for the authorities in charge of regional policies who wish to further develop their monitoring approach for RDI programmes and activities.

It should be noted that the approach developed for the AMCER project is replicable but implies a deep knowledge in the structure of the European databases as well as in the management tool of databases. The AMCER approach is aimed at describing the general process and the different steps.

However, regional actors who would like to follow the AMCER approach should take into account that:

- Sources are different for each programme and, as a matter of fact, database structure changes from one programme to another.

- Data available at national or regional level are displayed in a format that is specific to each country or region (most often the format depends on the way the statistical services deal with their own statistics and on their own objectives).

- Regional administrative structures are often specific, at least in each country, and the approach need to be adapted to the administrative set-ups and information and decision making mechanisms of the regions.

Therefore, ultimately, authorities in charge of regional policies in charge of planning, managing and monitoring RDI programmes should review the results of the AMCER project and carry out a reflection about the possible relevance and adaptability of the approach devised in this project to their specific situation taking also into account the status of their monitoring efforts.

Policy recommendations

1. On principles there should be a structured and coordinated debate, possibly in the context of the smart specialization strategy process concerning an overall and coherent approach combining: territoriality elements of RDI programmes, access to data by authorities in charge of regional policies, harmonized monitoring approach and indicators, coordination with other related programmes (EU/national). The ultimate aim would be to make the regions more self reliant in terms of data analysis concerning the EU programmes.

   This would contribute to establishing at EU level permanent and effective governance mechanisms of coordination of financial instruments should be devised to improve the management, performance and efficiency of the synergies between Horizon 2020 programme and Common Strategic Framework (CSF) Funds notably ERDF but also ESF as concern Human Resources support for R&D.

2. At EC level: EU databases should be improved in the context of the next Framework Cycle till 2020, by integrating geographical information and localisation, notably in order to effectively localise the research departments that effectively carry out the work related to the EU programmes. Possibly this should be made into an effective reporting/monitoring requirement in the programme manual.

   However, improvements of the information provided by contracts' databases FP7 database has been noted. Within those surveyed during the course of the AMCER project, the FP contract database appears as the most complete and reliable databases. DG RTD has significantly improved the quality and the reliability of the data. The FP7 database provides useful information on the localisation of research departments.

   According to the experience accumulated by AMCER, the only recommendation for the FP7 database would be to always request (make mandatory) the information about the localisation of the research department. CIP sub-programmes' databases should adopt the same structure as that of the FP7.

3. At regional level: a better coordination is needed between services in charge of the follow-up of the ERDF programme and the services in charge of the monitoring of the FP/CIP. Notably, links should be established (or enhanced where existing already) between the administrative departments in charge of the ERDF participation analysis and FP/CIP participation monitoring is needed by establishing effective communication and coordination mechanisms in order to develop a common frame for monitoring and for developing indicators. Possibly the administrative capacity, could be concentrated in the context of regional agencies together with standardised and an agreed set of procedures.

4. Among regions/at national or European level: an agreement is needed on a common set of definitions and taxonomy. A set of common definitions among the programme should be agreed upon. For instance, a common approach is needed for counting the regional participations, in particular for those participations spread into several laboratories. A common set of scientific themes is also needed.

   In particular, in the context of the planning for the next Financial Framework, the European Commission could also provide guidelines concerning data harmonisation. In this context, the regional scoreboards prepared in the context of the AMCER project could serve as a basis or model as a possible way to harmonise the data coming from different sources/programmes.

5. Among regions/at national or European level: an agreement is needed on a common set of indicators for monitoring R&D participation

   A common set of indicators for the different programmes should be designed. This has to be done for helping the regions in the production of participants' typologies and in the identification of scientific or strategic domains. These indicators should be useful to feed regional policies.

6. At EU/regional level, in order to better understand SMEs' role in regional RDI development, it would be useful for the data concerning their participation in EU programmes to be collected in a systematic way on the basis of common definition (possibly harmonized with Cohesion Funds requirements).

Aim of further research

<u>Regional typologies for R&D</u>

Further investigate the possibility to achieve Regional typologies on the basis of the results of the KIT project and taking account of the other similar classifications of regional performance in terms of knowledge, innovation, research and development, such as Erawatch, the RIM and RIS.[26]

<u>Regional Innovation Systems (RIS)</u>

Consideration may be given to further explore the possibility of using the Regional Innovation System model on the basis of Cooke's approach.[27] This would allow to integrate governance elements that might also be extended to aspects of programme governance and coordination. A systematic approach once devised on these bases, could serve as a tool to monitor regions' performances in RDI policies and programmes.

The AMCER methodology of integrating the RIS approach, results and effects of the regions' effective participation in EU RDI programmes, with their overall performances in terms of RDI output could also serve the purpose of supporting the smart specialisation process.

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[26] Tödtling, F., Trippl, M (2005) One size fits all? Towards a differentiated regional innovation policy approach. Resarch Policy 34, 1203-1219.

[27] Cooke, P. (1992). Regional Innovation Systems: Competitive Regulation in the New Europe. *Geoforum* n. 23: 365-382.

Appendix Table: RIS Types by Governance Dimension

RIS Type	Primary Source of Initiative	Primary Source of Funding	Predominant Competences	Degree of Coordination	Degree of Specialization
Grassroots	Locally organized (e.g. town or district level)	Diffused locally	Applied and near-market	Supra-local degree of coordination is likely to be low	Likely to be low and problem-solving likely to be generic than significant
Network	Multi-level	Guided by agreements among banks, government agencies and firms	Pure, applied, exploration, exploitation	Assumed to be quite high, due to existence on many actors	Rather flexible than dedicated
Dirigiste	Mainly from outside and above the region itself	Centrally determined, with decentralized units located in the region	Basic or fundamental, often to the needs of larger, stated-owned firms	Likely to be very high, because state-run	Likely to be high

(Source: own creation; based on COOKE 1998a and 2004)

Appendix Table: RIS Types by Business Innovation Dimension

RIS Type	Enterprise Domination	Research Reach	Associationalism
Localist	Tend to have few or no large indigenous firms and relatively few large branches of externally-controlled firms	- Business innovation culture is not very great, although there may be local research organizations capable of combining with industry clusters within the region - Will probably have few major public innovation or R&D resources, but may have smaller private ones	Reasonably high degree of association among entrepreneurs and between them and local or regional policymakers
Interactive	Balance between large and small firms	- Varies between numerous instances of access to regional research resources - Mix of public and private research institutes and laboratories is balanced, reflecting the presence of larger firms with regional headquarters and a regional government keen to promote the innovation base of the economy	Above-average
Globalized	Dominated by global corporatios, often supported by clustered supply chains of rather dependent SMEs	Largely internal and private rather than public, although a more public innovation structure aimed at helping SMEs may have developed	Normally greatly influenced by the needs of large-sized enterprises, and conducted to a significant extent to their terms

(Source: own creation; based on COOKE 1998a and 2004)

<u>Appendix Table:</u> Economic Performance of the nine AMCER-Regions

Region	GDP in Billions of EUR (2008)	GDP per capita (2008)	GDP per capita in % of the EU-27 average (2008)
Flanders (Belgium)	199.3	32,200	128.3
Ostrobothnia (Finland)	5.9	32,000	127.7
Tuscany (Italy)	106.1	28,700	114.3
Provence-Alpes-Côte d'Azur (France)	140.3	28,600	113.9
East of England (United Kingdom)	159.5	28,000	111.6
Catalonia (Spain)	202.8	27,900	111.2
Lower Saxony (Germany)	211.8	26,600	106.0
Bretagne (France)	83.7	26,500	105.6
Andalusia (Spain)	149.0	18,400	73.3

(Source: own creation; based on data from EUROSTAT 2011 and STATFIN 2011)

<u>Appendix Table:</u> Economic Structure of the nine AMCER-Regions

Region	Share of agriculture sector in employment in % (2008)	Share of industry sector in employment in % (2008)	Share of service sector in employment in % (2008)
Catalonia (Spain)	2.0	33.1	65.0
Ostrobothnia (Finland)	6.3	32.0	60.7
Tuscany (Italy)	3.0	31.2	65.8
Lower Saxony (Germany)	3.0	28.3	68.7
Flanders (Belgium)	1.9	26.7	71.3
Bretagne (France)	6.1	23.6	70.3
Andalusia (Spain)	7.5	23.2	69.3
East of England (United Kingdom)	1.8	21.5	76.5
Provence-Alpes-Côte d'Azur (France)	3.3	17.2	79.3

(Source: own creation and calculations; based on data from EUROSTAT 2011 and RCO 2011a)

<u>Appendix Table:</u> Unemployment in the nine AMCER-Regions

Region	Unemployment rate in % (2010)	Long-term unemployment share in % (2009)	Youth unemployment rate (15-24 year-olds) in % (2009)
Flanders (Belgium)	5.1	30.4	15.7
Ostrobothnia (Finland)	5.9*	28.0	15.9
Tuscany (Italy)	6.1	34.3	17.8
Lower Saxony (Germany)	6.5	46.7	10.3
East of England (United Kingdom)	6.6	22.3	16.5
Bretagne (France)	7.2	25.4	15.5
Provence-Alpes-Côte d'Azur (France)	10.2	36.1	24.8
Catalonia (Spain)	17.8	23.8	37.1
Andalusia (Spain)	28.0	24.9	45.0

* data available for 2009

(Source: own creation; based on data from EUROSTAT 2011 and STATFIN 2011)

Appendix Table: R&D-related Aspects in the nine AMCER-Regions

Region	R&D expenditures per capita in EUR (2007)	R&D expenditures per GDP in % (2007)	R&D personnel (FTE) per 1,000 employees (2007)	Share of R&D personnel (FTE) in the business sector in % (2007)	Share of business expenditures on R&D in GERD in % (2007)
East of England (United Kingdom)	1417.8	4.4	18.1	65.7	82.3
Ostrobothnia (Finland)	934.0*	2.55*	16.7**	>80.0**	90.0*
Lower Saxony (Germany)	644.6	2.5	11.5	61.9	69.0
Flanders (Belgium)	631.2	2.0	13.3	60.8	68.9
Provence-Alpes-Côte d'Azur (France)	536.8	1.9	14.1	50.1	58.0
Bretagne (France)	427.9	1.7	12.0	58.5	63.6
Catalonia (Spain)	410.5	1.5	12.3	52.9	62.8
Tuscany (Italy)	288.2	1.0	9.2	33.3	40.5
Andalusia (Spain)	186.7	1.0	6.9	26.0	37.1

* data only available for 2008, ** data only available for 2009

(Source: own creation and calculations; based on data from CISAD 2011; EUROSTAT 2011 and STATFI 2011)

Appendix Table: Human Capital Endowment in the nine AMCER-Regions

Region	Share of HRSTC in economically active population in % (2009)	Share of employment in high-tech industries and knowledge-intensive services in % (2009)	Secondary level students (ISCED 2-4) per 1,000 inhabitants (2010)	Tertiary level students (ISCED 5-6) per 1,000 inhabitants (2010)	Early leavers from education and training in % (2010)	Participation of adults aged 25-64 in education and training in % (2010)
Bretagne (France)	18.2	3.0	91.9	31.6	9.8**	5.6
East of England (United Kingdom)	16.3	5.7	92.9	30.0	16.2	19.6
Lower Saxony (Germany)	14.4	2.6	110.1	22.8	13.9	6.7
Andalusia (Spain)	14.5	2.4	75.6	35.4	34.9**	10.2
Catalonia (Spain)	16.6	3.7	60.8	34.4	29.8**	9.9
Flanders (Belgium)	21.7	4.4	116.0	33.6	9.6	8.2
Ostrobothnia (Finland)	20.8*	3.6*	67.6***	69.5***	10.3**	21.7*
Tuscany (Italy)	12.0	2.3	65.5	39.0	14.8**	7.2
Provence-Alpes-Côte d'Azur (France)	16.0	3.0	90.3	30.6	17.2**	4.4

* data available for Länsi-Suomi (superior NUTS-2 region), ** data available for the respective superior NUTS-1 region, *** data available for 2009

(Source: own creation and calculations; based on data from EUROSTAT 2011 and STATFI 2011)

Appendix Table: Patent Applications at the EPO in the nine AMCER-Regions

Region	Aggregated patent applications at the EPO, absolute figures (2004-2007)	Patent applications at the EPO per million inhabitants (2004-2007)	Productivity of R&D (EPO patent applications per million R&D expenditures) 2005	Aggregated high-tech patent applications at the EPO, absolute	High-tech patent applications at the EPO per million inhabitants (2004-2007)
Ostrobothnia (Finland)	1195*	897*	0.26*	506*	380*
Lower Saxony (Germany)	4957	620	0.32	708	89
Flanders (Belgium)	3492	576	0.27	903	149
East of England (United Kingdom)	2947	531	0.14	878	158
Bretagne (France)	1382	448	0.35**	784	255
Provence-Alpes-Côte d'Azur (France)	1739	362	0.22**	710	148
Tuscany (Italy)	999	277	0.26	69	19
Catalonia (Spain)	1816	265	0.21	174	25
Andalusia (Spain)	202	26	0.06	31	4

* data only available for Länsi-Suomi (superior NUTS-2 region), ** data available for 2004, Remark: patent figures are rounded

(Source: own creation and calculations; based on data from EUROSTAT 2011)

Glossary of terms

BERD: Business Expenditure on Research and Development.

CSF: Community Support Framework. In some cases, mainly in Objective 1 regions, the adoption of structural programmes is preceded by the adoption of a CSF, which lays down the general strategy for ERDF assistance in a certain number of regions within a Member State.

CSF: Common Strategic Framework 2014-2020.

CIP: Between 2007 and 2013, some 350,000 small and medium-sized enterprises (SMEs) will receive 3.6 bln EUR in EU support to invest in all forms of innovation and growth. The new programme will support actions to help enterprises and industry to innovate. It will also boost energy efficiency and renewable energy sources, environmental technologies and a better use of information and communication technology (ICT).

ERDF: European Regional Development Funds: whose principal objective is to promote economic and social cohesion within the European Union through the reduction of imbalances between regions or social groups.

ESF: European Social Fund: the main financial instrument allowing the Union to realise the strategic objectives of EU employment policy.

FP6: The 6th Framework Programme 2002-2006 supports research co-operation and integration of research efforts, promote mobility and co-ordination and invest into mobilising research in support of other EU policies.

FP7: Between 2007 and 2013, the 7th Framework Programme plans for a budget of 54.6 bln EUR organised into four programmes on Cooperation, Ideas, People and Capacities. The latter in particular provides enhanced opportunities for regions to participate.

GERD: Gross expenditure on Research and Development

Innovation: is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations. The minimum requirement for an innovation is that the product, process, marketing method, or organisational method must be new (or significantly improved) to the firm.

Innovation (according to OECD Oslo Manual): "*the implementation of a new (for the enterprise, for the industry, for the world) solution aiming at enhancing its competitive position, its performance, or its know-how*". Innovation is also defined as *"… the embodiment, combination, or synthesis of knowledge in original, relevant, valued new products, processes, or services*".

ICT: information and communication technologies can be defined as a combination of manufacturing and services industries that capture, transmit and display data and information electronically.

IPR: Intellectual Property Rights.

Knowledge-based Economy: The knowledge– based economy describes trends in advanced economies towards greater dependence on knowledge, information and high skills levels, and the increasing need for ready access to all of these by the business and public sectors.

MAP: Multi-annual Programme for Enterprise and Entrepreneurship was a framework plan of activities (2001-2006), which aimed at: enhancing the growth and competitiveness of enterprises; promoting entrepreneurship, simplifying and improving the administrative, regulatory and financial environment for business, especially for SMEs.

NSRF: National Strategic Reference Framework. For 2007-13, this document outlines the national choices made in terms of the community priorities defined in the Strategic Community Guidelines (SCG). The national and local players will draw on this strategic framework to develop operational programmes (OP).

Operational programme. In the context of the Structural Funds, this refers to a document approved by the Commission to implement a Community Support Framework, comprising a consistent set of priorities and multiannual measures, which may be implemented by one or more Structural Fund or other financial instruments.

PPP: Public-Private Partnership.

RIS3: research and innovation strategies for smart specialisation.

RTDI: research, technological development and innovation

RDI: Reserach, Developement and Innovation

R&D (according to OECD Frascati Manual):"*Research and experimental development (R&D) comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications"*.

SFs: The Structural Funds and the Cohesion Fund are intended to narrow the gaps in development among the regions and Member States of the European Union. They represent 35% of the Community budget, and are therefore the second largest budget item (after the Common Agricultural Policy).

SPD: Single Programming Document. In order to speed up and simplify the programming procedure, Member States have had the option since 1993 of presenting a SPD, incorporating both the Plan and the financing request. In this case, the Commission adopts a single decision in respect of elements normally set out separately in a CSF and OP.

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