



**Increasing regional competitiveness in Europe**  
*Strategy for development of regional RI capacity*

**2012 Progress Report of the ESFRI Regional Issues Working Group**

## **Table of Content**

Executive summary .....	3
1. Introduction .....	5
2. Context of the current ESFRI strategy .....	10
2.1 ESFRI Roadmap.....	10
2.2 Regional dimension .....	11
3. Development of regional RI capacity .....	12
3.1 Nodes of distributed RIs.....	14
3.2 Regional Partner Facilities .....	14
Conclusions.....	17

## Executive summary

The successful realisation of the European Research Area (ERA) requires, amongst other factors, the development of effective cooperation in planning and performing research contributing to the European competitiveness. In order to contribute to strong ERA it is therefore essential to engage all stakeholders in increasing regional competitiveness throughout all European countries.

Regional research infrastructures (RI) performing synergetic research to the pan-EU and international ones, are key instruments to outreach the scientific communities and facilitate full utilisation of the intellectual potential of a host country or region. Particularly when associated with an increased focus on training and mobility at scientific, technical and managerial levels.

ESFRI's view is an integrated approach of the roadmap update towards 2015-2016 that also includes the regional strategy.

The regional strategy, i.e. the optimization of the regional impact and benefits from RIs, should be built around different options:

- i) Setting up nodes and hubs of distributed pan-European Research Infrastructures is an effective way to integrate local infrastructures in an international RI, sharing general standards and methodologies while maintaining control on the size and development plans of the node. This approach is possible in all domains and allows re-orienting existing regional/national/local infrastructures towards an internationally coordinated strategy.
- ii) Setting up, or upgrading, a specific national/regional/local facility with a technology and service link to a large scale European facility under the scheme of the Regional Partner Facilities (RPFs). This scheme can support a substantial increase in capacity in the field of the RPF while maintaining a focus on regional relevance.

To be able to adequately respond to the call for the ESFRI roadmap update, MS and AC should link their national RI roadmaps to the ESFRI roadmap and to Smart Specialisation Strategies in Structural funds co-financed research and innovation programmes, thus reinforcing the capacity of less favoured regions to host and participate in RIs of pan-European and international interest.

In the Roadmap Update process the Strategic Working Groups set up by ESFRI could additionally evaluate proposed regional RIs for which national/regional authorities are planning to use national funds including structural funds for investments and running costs. The proposed regional RIs could be nodes of distributed pan-European RIs or RPFs of pan-European RIs. They will be evaluated according to the same criteria as used for proposed pan-European RIs. These specific national or regional RIs should also be excellent on a global level, although they do not necessarily need to be unique at global or pan-European level, but rather increase the capacity of research and access. The proposed regional RIs should be of national or regional importance in terms of socio-economic returns, training of young scientists and attracting researchers and technicians from outside the country. The establishment as a node of a distributed pan-European RI will follow the same procedures of setting up or upgrading the relevant RI. The planning of a RPF should be carried out in full collaboration with the respective pan-European RI aiming at complementarity and increase of capacity.

The present version of the report differs substantially from that originally written by the Regional Issues Working Group of ESFRI. The report was extensively modified by the Executive Board to realistically reflect the strategy of ESFRI with respect to the evaluation of regional RIs and the future update of the ESFRI roadmap, thus fully integrating regional RIs in the ESFRI process. As such, this report has not been endorsed by all members of the Regional Issues Working Group, or by its Chair. The ESFRI Executive Board however believes that the report still contains useful information that deserves to be made public and that can form a sound basis for the future development of the regional strategy of ESFRI.

# 1. Introduction

Recent economic forecasts<sup>1</sup> show global socio-economic trends in which the currently dominant triad of the USA, EU and Japan will lose this position; assuming a balanced development of all its regions, the EU in 2025 would represent little more than 20% of the world GDP, while Asia may reach over 30%. Before 2025, China could become the second world economic power and India could be the sixth, ahead of Italy and just behind France.

This poses a challenge for the EU, currently undergoing a severe financial crisis, but aspiring to remain a strong player in the global knowledge competition. Effective and sustainable investments are required in research and innovation activities in all fields of science and technology. The current situation within the EU characterised by big disparities among countries, and by even bigger regional differences is counterproductive for the development of ERA. This is illustrated by the fact that 43% of Europe's total economic output is generated in 14% of its territory, and by other conclusions presented In the EU R&I report<sup>2</sup>, for example, the distribution of R&D intensity within the EU, shown in Fig. 1.

Also other data quoted in the report<sup>3</sup>, such as: Gross Domestic Expenditure on R&D (GERD) as % of regional GDP, country contribution to the most cited scientific publications, the EPO patent applications or the number of grants from the European Research Council (ERC) all underpin the notion of the RD&I divide in Europe.

The potential of many European regions, particularly low RD&I intensity MS, is clearly underutilised, which is detrimental to the development prospects and competitive position of the EU as a whole. This is further confirmed by the findings of the report sponsored by DG Regional Policy<sup>4</sup> where the Member States which joined the EU in the last decade (to so-called EU12 MS) are identified as the most vulnerable.

Research infrastructures of high international quality and outreach provide an ideal environment for the exchange of knowledge and experience, to keep, attract and fully realise the value of talents, thus enabling further building and integration of the European Research Area and then more growth and jobs for Europe as a whole. They also act as early adopters of cutting edge technology and facilitate interactions between research and industry. Lastly, they can be at the core of knowledge clusters developing the smart specialisation approach. For all these reasons the policy drive to develop excellent research infrastructures of pan-European dimension underpins the ESFRI strategy and provides rationale for its activities. These major and often expensive facilities developed mainly for international collaboration should be also seen in the wider ecosystem of research infrastructures in Europe,

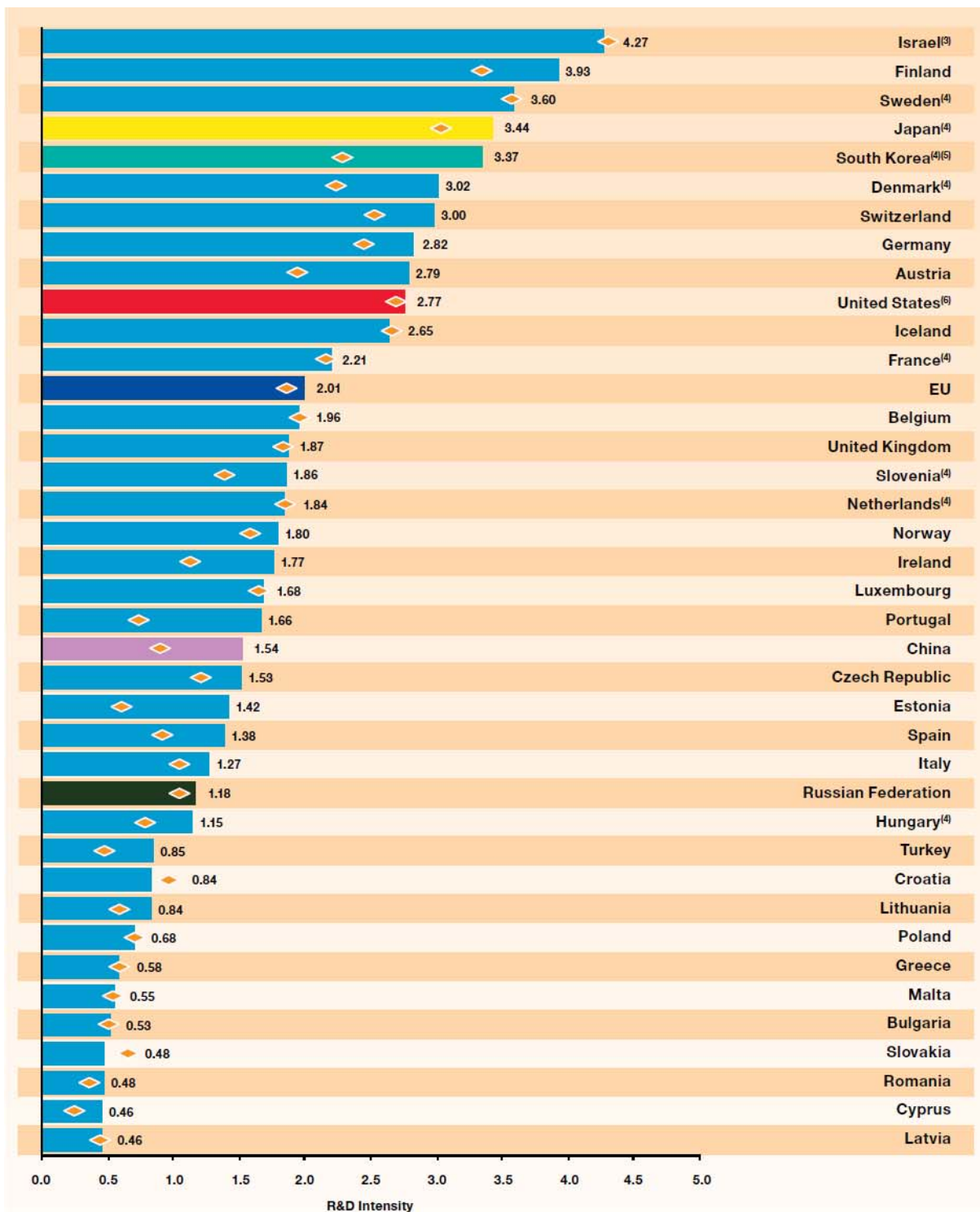
---

<sup>1</sup> The World in 2025. Rising Asia and Socio-Ecological transition. EU, Brussels, 2009.  
[http://ec.europa.eu/research/social-sciences/pdf/the-world-in-2025-report\\_en.pdf](http://ec.europa.eu/research/social-sciences/pdf/the-world-in-2025-report_en.pdf)

<sup>2</sup> Innovation Union Competitiveness report. EU, Brussels, 2011.  
[http://ec.europa.eu/research/innovation-union/index\\_en.cfm?section=competitiveness-report&year=2011](http://ec.europa.eu/research/innovation-union/index_en.cfm?section=competitiveness-report&year=2011)

<sup>3</sup> ibid

<sup>4</sup> Regional Challenges in the Perspective of 2020 – Phase 2: Deepening and Broadening the Analysis  
[http://ec.europa.eu/regional\\_policy/sources/docgener/studies/pdf/region2020\\_phase2/challenge2020\\_report.pdf](http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/region2020_phase2/challenge2020_report.pdf).



Source: DG Research and Innovation

Data: Eurostat, OECD

Notes: (1) SE: 1999; EL, NO: 2001; HR: 2002; MT: 2004.

(2) EL: 2007; IS, CH, US, JP, CN, KR: 2008; AT, FI: 2010.

(3) IL: GERD does not include defence.

(4) DK, FR, HU, NL, SI; SE, JP, KR: Breaks in series occur between 2000 and 2009.

(5) KR: GERD for 2000-2006 (inclusive) does not include R&D in the social sciences and humanities.

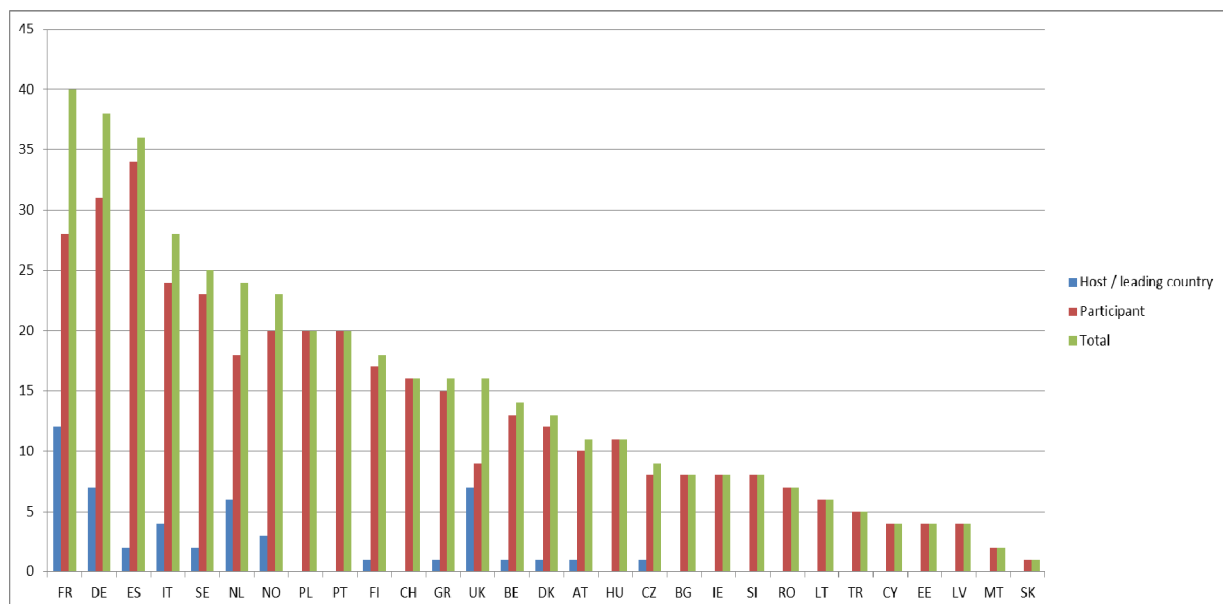
(6) US: GERD does not include most or all capital expenditure.

Innovation Union Competitiveness Report 2011

Fig. 1 R&D Intensity 2000 and 2009.

Europe as a whole should thus support at the highest level the increase of meaningful collaborations across borders, sectors and disciplines. This must be achieved especially in connection to the grand societal challenges, addressing strategic areas of global relevance such as energy saving technologies, sustainable development and climate change, health, food safety, security, etc. Such efforts should ensure access to global knowledge in a seamless and open European space for research and innovation, with research infrastructures being the hubs of such collaboration.

For past historical developments and economic reasons, the less intensive R&D countries have in parallel with the RD&I imbalance in Europe, a smaller endowment of competitive infrastructural resources, which leads also to the unwelcome fragmentation concerning the European RI landscape. See Fig. 2 showing involvement in ESFRI Roadmap projects per country (based on the participation in the PPP) and also Fig. 3 showing distribution of researchers mobility connected to research infrastructure projects funded by FP6.



**Fig. 2** ESFRI Roadmap projects per country (based on the participation in the PPP).

It has been convincingly argued<sup>5</sup> that if the less research intensive countries are not brought to the level that allows full utilisation of their intellectual potential, the situation of Europe as a whole may become peripheral and marginal on the world scene.

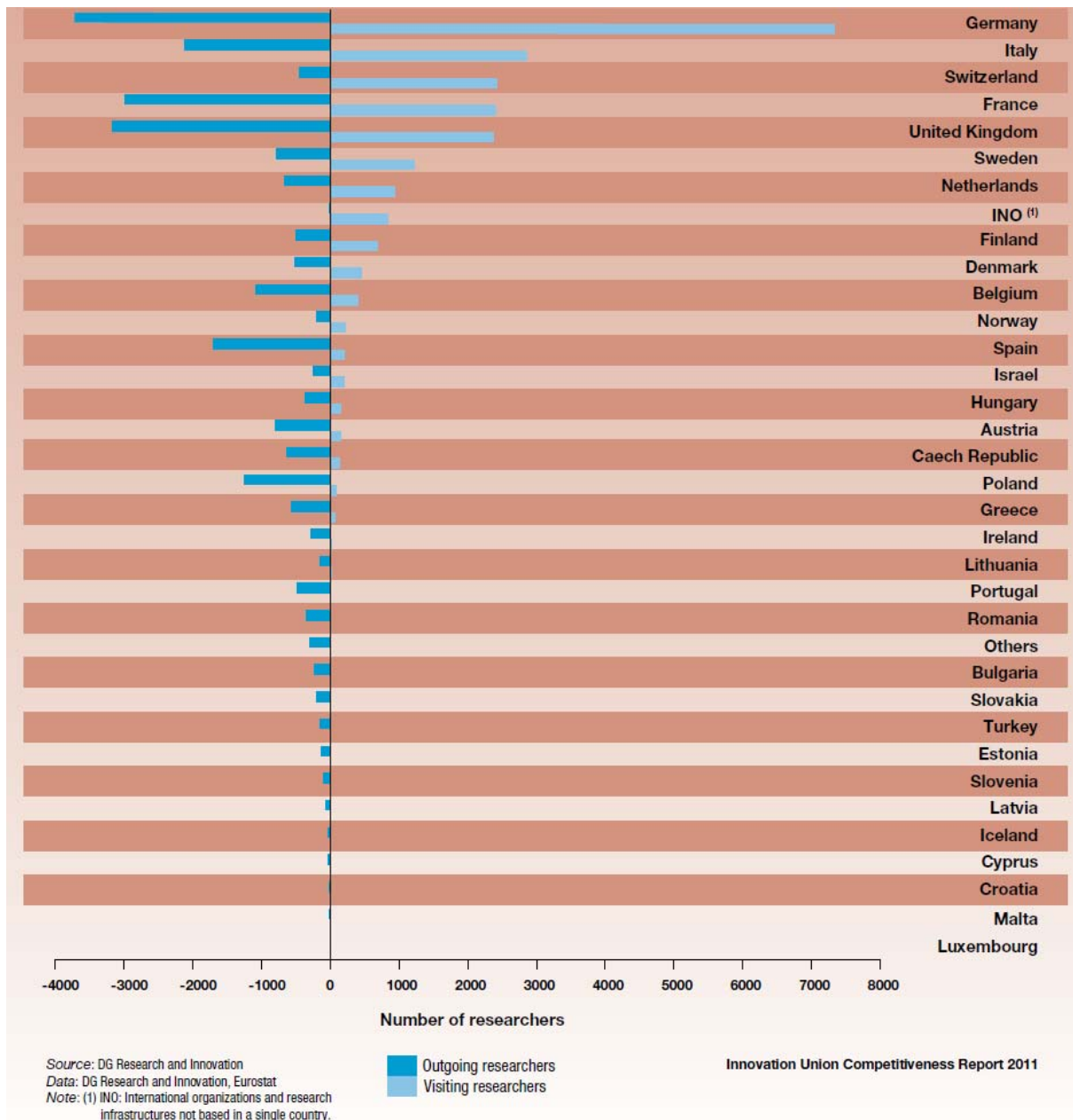
Within the context of ERA, this points to a paradox: the low RD&I intensity MS, which are an indispensable part of the competitive potential of the entire Europe for their capability to mobilize highly educated research and technical staff, have hardly any significant research infrastructures meeting the criteria of pan-European excellence. Furthermore, an inadequate number of the research infrastructures on the ESFRI roadmap involves participation of the less research intensive countries, thus

<sup>5</sup> Innovation Union Competitiveness report. EU, Brussels, 2011.

[http://ec.europa.eu/research/innovation-union/index\\_en.cfm?section=competitiveness-report&year=2011](http://ec.europa.eu/research/innovation-union/index_en.cfm?section=competitiveness-report&year=2011)

increasing the risk of further enlarging the gap and fragmentation between the high and low RD&I intensity MS.

Recognising that regions are an essential element for the research capacity building across Europe, the 2008 Council's conclusion<sup>6</sup> on the regional dimension of European research infrastructures emphasised that very high quality research infrastructures play a key role in the development of the European Research Area (ERA). This is being achieved by promoting excellence in science, enabling globally competitive basic and applied research, and furthermore contributing to dynamic and sustainable regional development, economic growth and social benefits.



**Fig. 3** Visiting researchers by operator country versus outgoing researchers by country of residence in research infrastructure projects funded by FP6.

<sup>6</sup> Competitiveness conclusions on “European Research Infrastructure and their regional dimension”. EU, Brussels, 2008. [http://ec.europa.eu/research/infrastructures/pdf/spring\\_council-conclusions\\_0608\\_en.pdf](http://ec.europa.eu/research/infrastructures/pdf/spring_council-conclusions_0608_en.pdf)



This implies that research facilities are key items in the regional development and therefore an integrated policy in this field is mandatory.

Following from these arguments and based on discussions within ESFRI on regional issues, in this report of the ESFRI Working Group on Regional Issues an enhancement to the ESFRI strategy for development of research infrastructures in Europe is introduced as an integrated approach with the updating of the ESFRI Roadmap. Section 2 examines the current ESFRI strategy with particular regard to regional issues. It takes into account the composition of the updated Roadmap 2010 and focuses on the distributed pan-European research infrastructures. In section 3 it is proposed, that the ESFRI strategy should be enhanced by including in the next roadmap update regional aspects prominently to develop research infrastructures capacities in all regions of Europe. This should be done in complementary ways – through support for the implementation of nodes or hubs of distributed pan-European RIs, and through the development of RPFs. The evaluation of such regional RIs will be integrated in the process of updating the ESFRI Roadmap according to the same quality criteria used for pan-European RIs to be included in ESFRI Roadmap. Section 4 provides guidance to the Strategic Working Groups for their evaluation. Conclusions are presented in section 5.

## 2. Context of the current ESFRI strategy

The ESFRI strategy presented in its recent version in the 2010 Report<sup>7</sup> includes the Vision 2020, the ESFRI's Action Plan as well as RI Roadmap, which contains a broad spectrum of proposed facilities, encompassing a wide range of disciplines and types.

The ESFRI's Action Plan includes, amongst many other important issues, promotion of greater regional cooperation. However, realisation of the objective of balanced RI distribution in Europe is not specifically mentioned in the strategy. The pan-European research infrastructures typically tend to be localized in an already well-structured territory (in the existing R&I ecosystem), with availability of financial resources and of both managerial and industrial capabilities – resources which less research intensive countries have not yet developed. This is the key reason why, so far, very few research infrastructures on the ESFRI Roadmap are sited outside the EU15 MS.

The main thrust of the ESFRI strategy is at present directed towards the implementation of the RIs included in the roadmap, as they will provide, on the one hand, a much needed environment for excellent research and innovation, and on the other, inject a long term stability into research and innovation activities. The projects are expected to attract the best researchers and technicians. They cluster the innovation potential of the regions and countries, stimulate mobility and transfer of knowledge.

### 2.1 ESFRI Roadmap

The ESFRI Roadmap represents a strategic approach towards the development of new pan-European RIs, which are not yet available in the European and global landscape. The ESFRI Roadmap was published for the first time in 2006 and twice updated since then. It is the outcome of a collective effort of all stakeholders - international research teams; international groups of evaluators; policy-makers; international organisations; etc.

The facilities included in the roadmap are expected to “...play an increasingly important role in the advancement of knowledge and technology. They are a key instrument in bringing together a wide diversity of stakeholders to look for solutions to many of the problems society is facing today. RIs offer **unique research services** to users from different countries, attract young people to science, and help to shape scientific communities”<sup>8</sup>.

The facilities included in the roadmap are principally of two types<sup>9</sup>: single-sited and distributed facilities. Distributed facilities, which are of particular importance with regard to the regional RI capacity, are defined as follows<sup>10</sup>:

A “**European Distributed Research Infrastructure**” is a Research Infrastructure with a common legal form and a single management board responsible for the whole Research Infrastructure, and with a governance structure including among others a

---

<sup>7</sup>European Strategy Forum on Research Infrastructures: Strategy Report on Research Infrastructures. Roadmap 2010. [http://ec.europa.eu/research/infrastructures/pdf/esfri-strategy\\_report\\_and\\_roadmap.pdf](http://ec.europa.eu/research/infrastructures/pdf/esfri-strategy_report_and_roadmap.pdf)

<sup>8</sup>ibid.

<sup>9</sup>ibid.

<sup>10</sup>ibid.

Strategy and Development Plan and one access point for users although its research facilities have multiple sites. It must be of pan-European interest, i.e. shall provide unique laboratories or facilities with user services for the efficient execution of top-level European research. It must bring significant improvement in the relevant scientific and technological fields, addressing a clear integration and convergence of the scientific and technical standards offered to the European users in its specific field of science and technology.

Many successes have been achieved with regard to implementation, which is demonstrated by the fact, that at the end of 2012 already 24 of the 48 roadmap projects are in the implementation phase. Some of them are in well advanced stage. However, further implementation of the roadmap facilities requires a considerable amount of resources and effort, and for this reason the next update of the Roadmap is not anticipated before 2015.

## **2.2 Regional dimension**

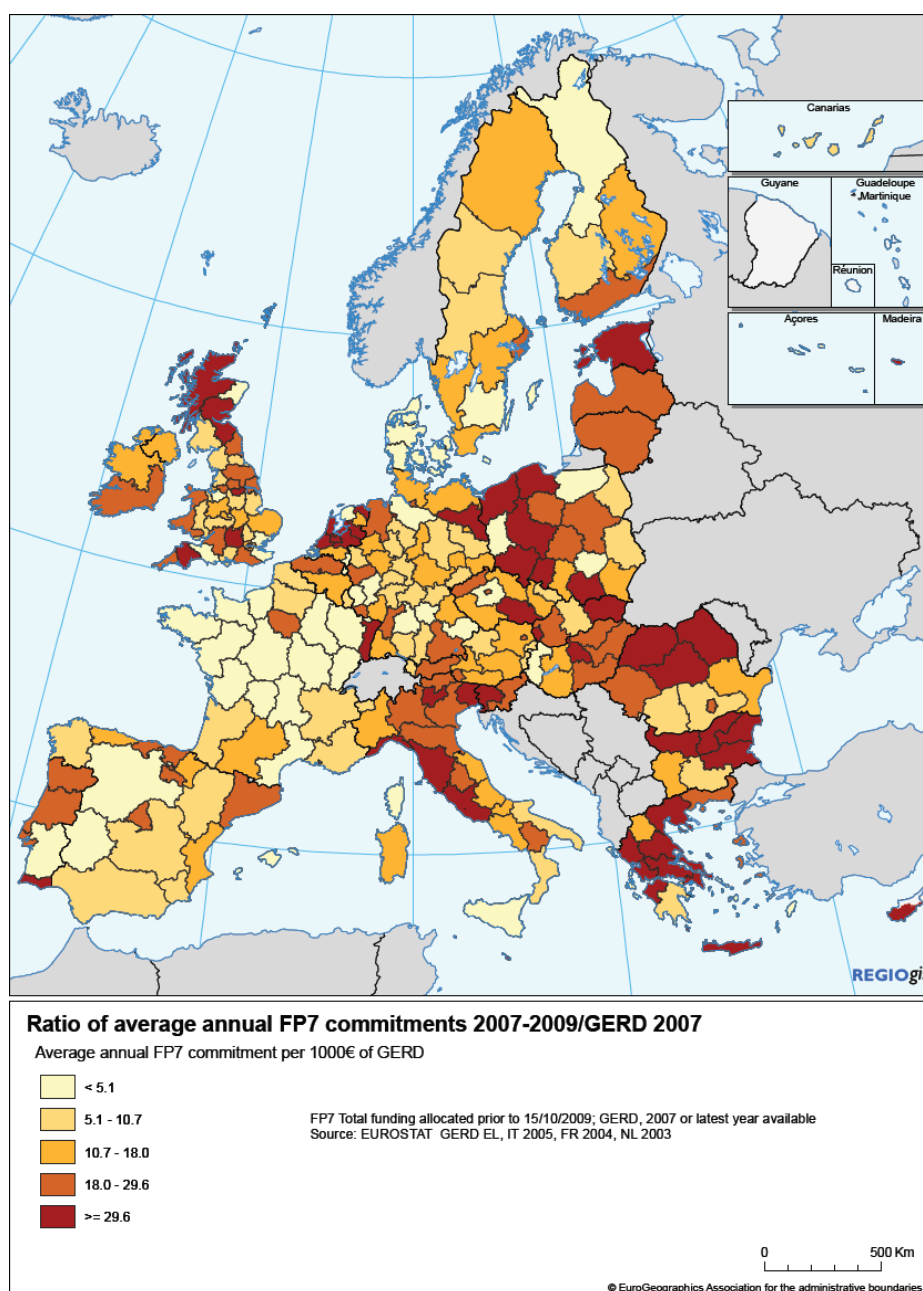
ESFRI's strategy is oriented towards a more even distribution of RIs all over Europe. On the one hand, the ESFRI Forum is aiming at a broader involvement of low RD&I intensity countries and regions in the pan-European RIs, with particular emphasis on the distributed facilities. On the other hand, the ESFRI Roadmap is a reference point for national roadmaps, assisting countries and regions in setting their priorities in research and innovation. A number of MS and AC have developed RI roadmaps; most of them include pan-European RI from the ESFRI Roadmap in addition to national facilities, needed for national or regional purposes.

However, the need for a more accelerated development of regional RIs in the low RD&I intensity MS has also been recognised. Consequently, the idea of Regional Partner Facilities (RPF) was introduced, with the aim to broadening excellence due to the association and collaboration with pan-European RIs (not necessarily on the ESFRI Roadmap).

### 3. Development of regional RI capacity

The solution to the issue of a balanced development of the ERA should be a more gradual, more elaborated and more extensive approach, where the low RD&I intensity MS are both encouraged and supported to substantially increase their investment effort in the area of research infrastructures.

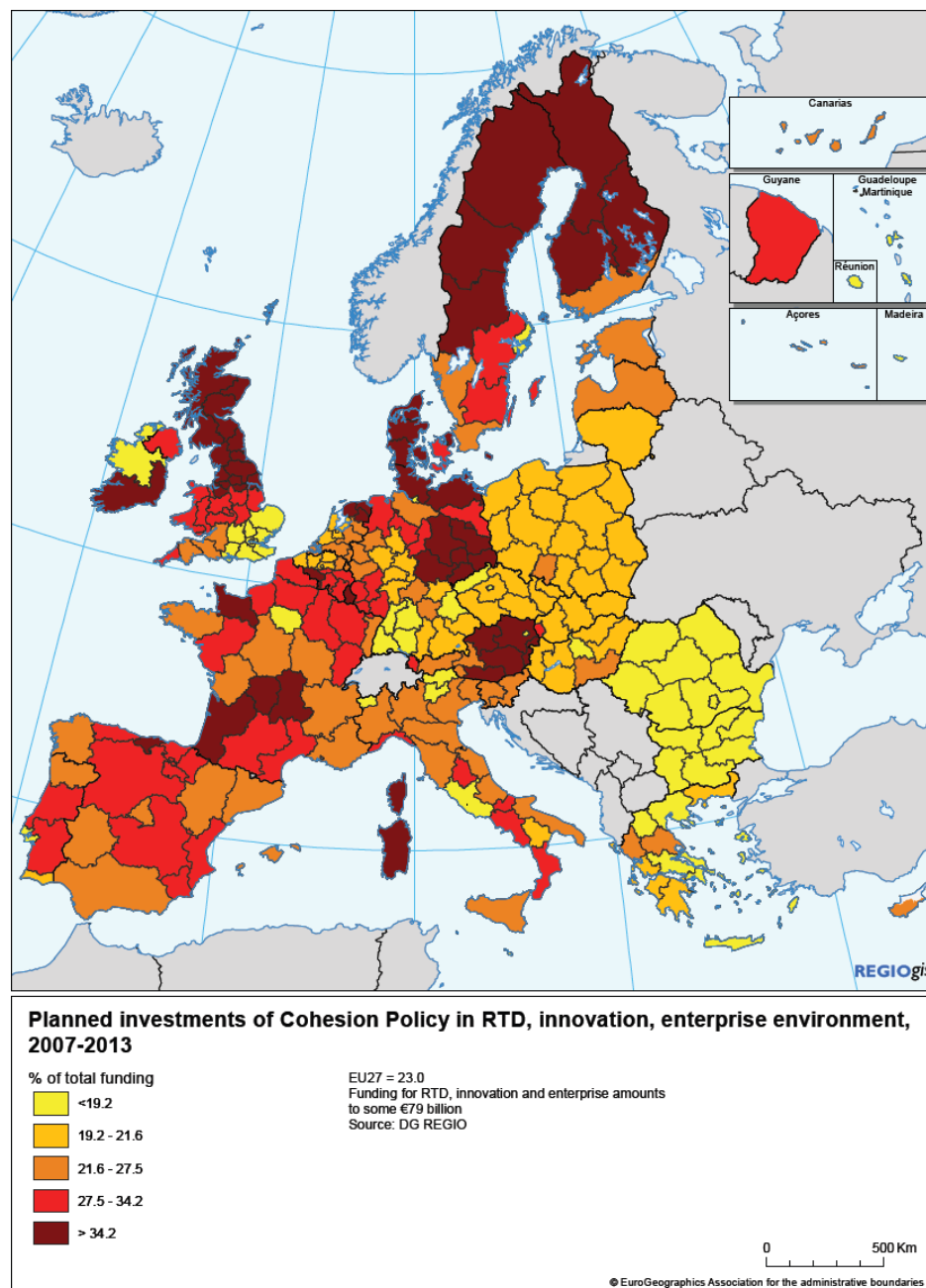
There are two key arguments which underpin such an approach. Firstly, low research intensity countries and regions use available financial resources with noticeable effectiveness. This can be illustrated by geographical spread of the ratio of average annual FPR commitments per 1000 GERD<sup>11</sup> shown in Fig. 4.



**Fig. 4** Ratio of average annual FPR commitments 2007 – 2009 per 1000 GERD 2007.

<sup>11</sup> Innovation Union Competitiveness report, 2011 edition.

Secondly, there is further potential in using structural funds for R&D in the less research intensive countries and regions. This is illustrated in Fig. 5 where relative distribution of planned investments in research and innovation using regional structural funds<sup>12</sup> is shown.



**Fig. 5** Regional structural funds: Planned investments in research and innovation.

The construction of new regional RIs (either as new facilities or as upgrades of existing ones), self-standing and/or in partnership to pan-EU RIs, should offer a huge potential to respond to the need of speeding-up the development of the science and innovation sectors of the low RD&I intensity MS and thus, by acting as the catalyser for the regional competitiveness. Such reinforced regional development, together

<sup>12</sup> Innovation Union Competitiveness report. 2011 edition.

with construction of major pan-European facilities, is necessary for the whole of Europe, to avoid the risk of falling behind in the present global competitive outlook.

### **3.1 Nodes of distributed RIs**

A “**node**” of a European distributed RI is considered to be a national facility acting as the regional partner centre and national entry point for the pan-European RI:

- having identifiable management structure,
- either having or planning to have adequate research facilit(ies)y in line with the RI profile,
- coordinating local research activities in line with the RI profile,
- offering competitive open access to users and an integrated and high specialised set of S&T services,
- contributing in kind and/or in cash to joint activities,
- collaborating in seeking funding for these activities and share such acquired funding,
- participating in development and implementation of a common IP policy,
- delivering important scientific data for the overall goal of the RI
- using the same procedures defined by quality standards and guidelines
- participating in outreach, promotion and marketing activities.

Nodes of distributed RIs are an important factor in assisting the less research intensive countries and regions to strengthen their research capacities in terms of scientific excellence and impact.

### **3.2 Regional Partner Facilities**

As already mentioned in Section 2.2 the initial concept of the Regional Partner Facility was proposed by ESFRI a couple of years ago, to allow less research intensive countries and regions to develop excellent research facilities within their territory, while at the same time to become, in a faster and more effective way, valuable partners in pan-European infrastructure consortia. It was further anticipated that RPF would represent extensions of the overall capacity of the RIs by contributing with preparatory experiments, complementary methods, and by training of young researchers, technologists and managers, who would then benefit from the experience and international contacts available at the parent facility.

The following definition of the RPF was adopted by ESFRI in the meeting in Brdo in 2008 and recognized as such by the Competitiveness Council in 2009:

A “**Regional Partner Facility**” (RPF) to a Research Infrastructure of pan-European interest must itself be a facility of national or regional importance in terms of socio-economic returns, training and attracting researchers and technicians. The quality of the facility including the level of its scientific service, management and open access policy must meet the same standards required for pan-European Research Infrastructures. The recognition as an RPF should be under the responsibility of the

pan-European Research Infrastructure itself (or the members of a to-be ERIC) based on a regular peer review.”

The RPF concept was further discussed within the ESFRI forum during 2011 and it was concluded, that a RPF can be a partner of either a single-sited or distributed pan-European RI.

The concept of RPF has been developed already some time ago, but has not been implemented so far as ESFRI projects need to be in an advanced implementation status before being able to act as the central part of a RPF.

RPFs as well as nodes of distributed RIs can play a strong role in the development of the Europe 2020 agenda, and can contribute both to the success of the ERA in the global context and for the regional development in the “smart specialisation” approach. They can contribute to the development of synergies between EU Cohesion as well as Research and Innovation policies and funding and can have a multiplying effect in attracting also public-private, EIB/RSFF and other national/transnational/international funds.

RPFs can facilitate better utilisation of structural funds. A recent study from the DG Regio and DG R&I shows that while 10 billion euros are reserved for funding projects under the Code 02 “RTD infrastructure and centres of competence in a specific technology”, hardly 10% are spent for the development of ESFRI facilities or regional RIs in EU12 MS. This is partly due to the fact that local authorities are still attracted by projects with clear local focus and short term effects, while current operational programmes are not yet developed in a way that they can meet the needs for a long term, smart and sustainable development envisaged by a research infrastructure project.

RPFs could in addition reduce excessive demand on Transnational Access (see report by C. Fotakis<sup>13</sup>), as many scientists would find adequate facilities closer to home. They could also stimulate transnational use of these facilities by researchers from highly research intensive countries thus supporting knowledge transfer to these regions. They would also facilitate concentrating regional human capital in such a way that the ensuing partnership with pan-European RIs or their development in a region becomes a real possibility. It is worth noting that most of the existing pan-European RIs have developed from pre-existing accumulations of know-how around smaller facilities.

In similarity to the RIs in the ESFRI Roadmap, the basic pre-condition for the success of RPFs and for nodes of distributed RIs is the excellence in research capabilities, fuelling and supporting the cutting edge quality of the technical and educational aspects (i.e. “global” capability, given by a global scientific level and a “local” socio-economic return).

To be recognised as nodes of distributed RIs or RPFs, the proposers should provide on the one hand a letter of intent from the envisaged pan-European RI and on the other hand provide information about adequate national and regional support and funding.

---

<sup>13</sup> FP7 Interim Evaluation: Analyses of FP7 supported Research Infrastructures initiatives in the context of the European Research Area by Costas Fotakis.  
[http://ec.europa.eu/research/evaluations/pdf/archive/fp7-evidence-base/experts\\_analysis/c.%20fotakis\\_-\\_research\\_infrastructure.pdf](http://ec.europa.eu/research/evaluations/pdf/archive/fp7-evidence-base/experts_analysis/c.%20fotakis_-_research_infrastructure.pdf)

After successful evaluation, these proposals may be eligible for funds both from the EU research budget (in the preparatory and eventually in the operation phase) and from the EU structural funds (in the construction/upgrade and possibly in the operation phase).



## Conclusions

- A more even distribution of Research Infrastructures all over Europe is important for the successful completion of ERA and for further strengthening the European competitiveness. To promote regional cooperation the setting up of national or regional nodes of distributed pan-European RIs or the setting up of RPF is encouraged.
- There is noticeable potential for MS/AC and regions to earmark higher percentage of structural funds available to these countries and regions for R&D in general, and for investment in Research Infrastructures in particular. This however requires close connection to regional policies, including the Smart Specialisation Strategy and national RI roadmaps, and securing the administrative and financial support from the local authorities.
- ESFRI proposes an integrated approach for the upcoming roadmap update in 2015-2016 including a regional strategy. In the Roadmap Update process, the Strategic Working Groups set up by ESFRI will evaluate proposed nodes of distributed RIs or RPFs for which national/regional authorities are planning to use national funding incl. structural funds for investments and running costs. Proposals will be evaluated based on the same criteria for quality as for the evaluation of pan-European RIs.
- ESFRI's integrated approach of the roadmap update towards 2015-2016, promoting also regional aspects, shall be based on two complementary elements, namely: the effective support for implementation of further nodes of distributed pan-European RIs and the identification of top quality Regional Partner Facilities.
- ESFRI's evaluation of proposed nodes of distributed RIs and RPFs is based on scientific excellence. Nevertheless, criteria like increasing the national training and educational strength aimed at synchronising regional capabilities with the regional education system could also be part of this evaluation.