

Key Learnings associated with the ERA-NET Scheme and the Way Forward

Effie Amanatidou

With contributions from

Roland Brandenburg

Imelda Lambkin

Wilfried Diekmann

Jan-Arne Eilertsen

Leila Häkkinen

Peter Hahn

Melike Sevimli

Günter Külzhammer

Christian List Barth

Birgit Mayer

Andre Schlochtermeyer

Sverre Sogge

Christiane Wehle

April 2011

Contents

Executive Summary	3
1 Introduction.....	6
2 Evolution of the ERA-NET scheme	7
2.1 The first steps	7
2.2 From FP6 to FP7	8
2.3 Facing disruptions and gazing at the future	9
3 Current context: in the service of Grand Challenges.....	10
4 Achievements of the ERA-NET scheme	12
4.1 Mobilisation and coordination of resources.....	13
4.2 Excellence and ERA structuring	15
4.3 Taking stock and capitalising on knowledge gained	17
5 Lessons learnt.....	19
5.1 Selecting the topics / areas for cooperation	19
5.2 Promoting excellence & enabling trans-national cooperation	21
5.3 Implementing trans-national research collaboration	22
5.3.1 Ensuring commitment and financial contributions	23
5.3.2 Alignment and harmonisation.....	24
5.4 Exploiting the business perspective.....	25
6 The way forward	26
6.1 Future of ERA-NETs.....	26
6.1.1 Towards self-sustainability	27
6.2 Positioning of ERA-NETs vis-à-vis other schemes	28
6.2.1 The landscape of ERA coordination instruments.....	28
6.2.2 Views on existing and new coordinating instruments	30
6.3 Governance and implementation of joint programming.....	31
7 Conclusions.....	32
8 References.....	34

Executive Summary

The ERA-NET scheme was introduced in FP6 to support networking, coordination and cooperation between national and regional R&D programmes of different EU Member States. The key objectives of the FP6 ERA-NET scheme were to step up the cooperation and coordination of national and regional research activities through linking the national and regional research programmes, including their mutual opening and the development and implementation of joint activities. The scheme continued in FP7 when two main changes occurred. FP7 ERA-NETs were introduced into the FP7 thematic work programmes thus moving the definition of ERA-NET topics from the community of programme owners and managers to the FP7 Themes. Another change in FP7 was the introduction of the ERA-NET PLUS instrument “topping-up” joint transnational funding with Community funds.

Despite the relative success of the ERA-NET scheme as well as the ERA-NET Plus, the current context in research and innovation policy is still characterized by fragmentation and duplication of efforts. The underperformance of our current research and innovation systems largely due to fragmentation and duplication is explicitly mentioned in the latest EU strategic documents where it is directly linked with the ability to cope with grand societal challenges.

Within this framework, ERA-NET is considered to have made considerable progress in reducing the fragmentation of national / regional research programmes in certain research fields. The annual volume of coordinated research is close to € 300 Million, with a total of € 1,4 Billion in 2004-2010. However, it is estimated based on 2009 data that only around 11.3% of the total public R&D funds¹ is being coordinated at the European level with the ERA-NETs and Art. 185 initiatives accounting for the 0.5%.

Nevertheless, several reviews and assessments of the scheme acknowledge success in relation to achieving its objectives, namely to foster cooperation between, and coordination of, national research activities through the linking of national research programmes. The scheme also created the conditions for opening up of national programmes to non-residents in some cases. At the same time, perceptions of benefits associated with transnational research cooperation were positively influenced.

Yet, the ERA-NET scheme had a catalytic function and the impact on national programmes was more important when there was strategic buy-in from policy-makers at national level. In the cases where national R&D policies and structures acted as constraining factors the impact on overcoming fragmentation of research in Europe was more limited.

Other ERA structuring benefits refer to the appreciation by the research community of the networking effects with international peers. New networks were also created and a number of

¹ Including civil GBAORD (government budget appropriations or outlays for research and development) of Total 27 MS + FP7 + EFTA countries

bilateral and trilateral cooperation agreements were also established as a result of ERA-NET participation within and outside the EU. Additionally, the ERA-NET scheme is also considered to have created the conditions for the opening up of national programmes to non-resident researchers, although there was less evidence of tangible actions relating to the “mutual opening” of national programmes.

Country participations are also significant as they refer to 51 countries while including also Third countries. Of the different country groups it is Associated Countries and larger EU15 Member States that seem to be clearly oriented towards developing and funding joint calls, while EU12 Member States primarily value networking with their peers.

The ERA-NET scheme has accumulated significant experience over the almost ten years of existence. This has quite successfully been gathered and elaborated through the ERA-NET support tools i.e. the ERA-LEARN support action under the ERA-NET Learning Platform and the NETWATCH information system. Appreciation of the quality and usefulness of these outputs and services is evident among the ERA-NET stakeholders.

Based on this experience certain lessons learnt are to be drawn. They relate to issues such as the selection of common topics of interest around which to support trans-national collaboration, challenges in trans-national cooperation in terms of promoting excellence and internationalising national strategies for research, and the implementation of trans-national cooperation.

The identification of topics should be a transparent and evidence-based process underpinned by a coherent policy. The selection of which initiatives to join, however, still remains an issue given the lack of national strategies for internationalisation of research in most cases. In this process it is important to be able to assess the relevance and appropriateness of certain initiatives and the tools developed by ERA-LEARN are quite valuable in this regard.

Promoting research collaboration is an evident achievement of the ERA-NET scheme. However, achieving research excellence is another issue which has not been studied in detail so far. The same stands for the degree and way of involving businesses. These two elements are worth studying in detail in the near future.

On the implementation side, significant progress has been made especially in setting and adopting common rules and procedures in implementing joint calls and evaluating proposals. Yet, several problems have been faced over the years. Not surprisingly, the most persisting ones refer to the levels of national commitment and ensuring financial contributions, harmonising timelines and funding procedures at the national level as well as cross-border funding. These problems appear across all different coordinating instruments.

The mobilisation and coordination of national research programmes and resources is of paramount importance in dealing with grand challenges. Special weight is given to such measures in the latest EU strategic documents and several ‘new’ coordinating instruments and concepts are

introduced alongside existing ones. Caution needs to be placed on not making the ERA-coordination landscape too complex. At the same time, careful consideration needs to be given to how the various instruments are positioned against each other to maximise synergies and complementarities and thus multiplying impacts.

How the ERA-NET stakeholders perceive the future of the ERA-NET scheme in the wider landscape is of paramount importance. Two, not mutually exclusive, options can be considered in this regard. ERA-NETs could be firmly integrated into, or even act as a catalyst for, larger scale joint programming approaches in the future following the politically defined bundling of efforts across European countries to support policies of the EU and to tackle defined grand challenges. Secondly, ERA-NETs could be kick-started in a bottom up fashion to continue structural change in Europe that follows the demands of the research and funding communities.

Adding to these options there are suggestions for the transformation into an ‘ERA-NET light’ scheme involving a more flexible role of the Commission or a totally new model reflecting a shift in the Commission’s role from the coordination of national programmes to the coordination of national and EU programmes in jointly addressing grand societal challenges.

There are different views, among ERA stakeholders on the usefulness of the various ERA coordination instruments. Nevertheless, there is absolute consensus that they should be carefully assessed before new instruments are created. In fact there is a general reluctance on the need for new instruments.

At the same time paying significant attention to the governance of the existing as well as new instruments is important as it plays a major role in the way they can be linked and coordinated. Overall, governance needs careful consideration to ensure effectiveness as well as inclusiveness. It is also important to accommodate national concerns in relation to joint programming activities. On the side of implementation, while a differentiated approach is required for the different instruments a shared core of rules may be possible to establish in view of simplification and efficiency.

1 Introduction

Communication aims at supporting the implementation of the ERA-LEARN objectives by making the consortium well-known, by awakening the interest of target groups (ERA-NET participants, the RTD community and policy makers), by responding to questions that are arising from this community, and by facilitating / providing assistance to newcomers. Dissemination focuses particularly on the ERA-NET coordinators and national programme managers and exploitation of the ERA-LEARN achievements is carried out within the programmes; transfer of good practices and benefits will include impact on national or regional organisation of funding due to streamlining of internal processes. These tasks are supported by open access to all material developed under ERA-LEARN through the NETWATCH portal.

This Communication paper on “Key Learnings associated with the ERA-NET Scheme and the Way Forward” aims to increase visibility of the ERA-NET achievements, and capitalise the knowledge and experience drawing upon useful lessons learnt and success factors not only from the ERA-NETs but also the other coordinating instruments. The target audience is primarily the ERA-NET community and policy makers but it may also be useful for communities using other instruments such as JTI and Article 185 etc and for the joint programming communities. The knowledge basis for this document includes the deliverables of ERA-LEARN as well as relevant policy documents, reviews and impact assessment studies.

The knowledge basis for this document includes the deliverables of ERA-LEARN as well as relevant policy documents, reviews and impact assessment studies, which are all referenced at the end of the document.

The structure of the report consists of five main sections (2-6). Section 2 sets off with a brief history of the ERA-NET scheme over time pointing also to the major changes that have taken place. Section 3 then tries to set the current policy context and framework within which the scheme is expected to evolve and take its future shape. Section 4 then tries to synthesise available evidence as well as value judgements on the achievements on the ERA-NET scheme (including ERA-NET Plus). These can be grouped under three main headings: Mobilisation and coordination of resources; Excellence and ERA structuring; and Taking stock and capitalising on knowledge gained. Section 5 deals with the lessons learnt all through the 10 years of existence of the ERA-NET scheme. These are structured along four main headings including Selecting the topics / areas for cooperation; Promoting excellence & enabling trans-national cooperation; Implementing trans-national research collaboration; and Exploiting the business perspective. The last main section of the report (Section 6) engages in a discussion about the way forward. This refers to both the future of the ERA-NET scheme as well as its positioning in the wider ERA-coordination landscape. It also addresses the central role for activities such as ERA-LEARN and NETWATCH in that landscape. Certain issues about the governance of implementation of joint programming activities in general are also discussed. Finally the report ends with the conclusions summarising the main points of the prior discussions and analysis.

2 Evolution of the ERA-NET scheme

The first ERA-NETs were created in FP6 in 2002. Since then ERA-NETs have been continuously supported through the EC Framework Programme. Naturally the scheme has gone through changes over the years. These are discussed in the following sections.

2.1 *The first steps*

The ERA-NET scheme was introduced in FP6 to support networking, coordination and cooperation between national and regional R&D programmes of different EU Member States. This came as a response to the need for a coordinated and collaborative design and implementation of national and European research programmes in order to overcome the fragmented nature of research activities across Europe as identified in the Communication “Towards a European Research Area” (CEC, 2000).

This was the first time that R&D funding bodies (programme owners and managers) were given the opportunity to network and engage in transnational cooperation backed by EC funding. The main stakeholders of the scheme were:

- Programme owners: national or regional authorities (i.e. policy stakeholders) that either ‘owned’ funding programmes and / or supervised a funding body or a department (e.g. programme managers) that implemented the national / regional programme.
- Programme managers: an agency, ministry, or a department within a ministry, responsible for managing a national or regional research-funding programme.

The ERA-NET scheme aimed at contributing to the creation of the European Research Area by facilitating initiatives to coordinate national and European research programmes in specific fields, and pool fragmented human and financial resources in order to improve both the efficiency and the effectiveness of Europe's research efforts. In summary, the key objectives of the FP6 ERA-NET scheme were to step up the cooperation and coordination of national and regional research activities through linking the national and regional research programmes, including their mutual opening and the development and implementation of joint activities. (Matrix Insight and Rambøll, 2009)

In order to achieve these objectives, the ERA-NETs were set to follow a four-step approach,:

1. Systematic exchange of information and good practices on existing programmes;
2. Identification and analysis of common strategic issues;
3. Development of joint activities between national and regional programmes; and the
4. Implementation of joint transnational research activities. (Matrix Insight and Rambøll, 2009)

In FP6, 71 ERA-NETs were funded in total corresponding to eight different thematic areas: energy, environment, fundamental sciences, industrial technologies and SMEs; international cooperation, life Sciences, social sciences and humanities, and transport. One additional horizontal “regional thematic area” was derived from a small number of ERA-NETs associated

with the Transport, Industrial Technologies and SMEs, and Environment themes. (Matrix Insight and Rambøll, 2009)

2.2 From FP6 to FP7

The scheme continued in FP7, with a large increase from 71 to around 120 ERA-NETs with a total public funding commitment of about €1,4 billion. (Annerberg, et. al. 2010) A change that marked the transition from FP6 to FP7 was the way the thematic portfolio of ERA-NETs was set. Under the Sixth Framework Programme (FP6), the ERA-NET scheme was implemented centrally within the EC with its thematic portfolio defined through a bottom-up approach inviting proposals on topics by Member States and their funding bodies. In FP7 the implementation of the scheme was decentralised with the integration of ERA-NETs into the FP7 thematic work programmes. This marked a more strategic approach to the definition of themes which became the responsibility of the Cooperation and the Capacities programmes. (Amanatidou, et. al. 2010)

Another change in FP7 was the introduction of the ERA-NET PLUS instrument within the ERA-NET scheme. The Plus instrument was designed to further enhance trans-national funding of research, building on the success achieved with the “Classic” ERA-NET instrument. The new dimension brought by the Plus instrument was that the Commission provided an incentive for the organisation of joint calls by “topping-up” joint transnational funding with Community funds. (Lock, et. al. 2010)

The ERA-NET Plus represented a significant incentive to develop trans-national funding initiatives that attract additional FP funds available for this purpose. Nine ERA-NET Plus proposals have been approved, involving 140 funding partners, with a total trans-national budget of €232 million and a FP contribution of €67.5 million. (Annerberg, et. al. 2010) Three of the actions were of horizontal nature, five address topics identified in different themes of the Cooperation Specific Programme and one is dealing with the area of "International cooperation" in the Capacities Specific Programme. (Lock, et. al. 2010)

Several ERA-NETs continued from FP6 to FP7 with a second grant motivated by a need to enlarge and consolidate their networks, and make long-term strategies. Others evolved into stable initiatives for cooperation over Joint Calls utilizing the ERA-NET Plus scheme. Some ERA-NETs also went, usually through the ERA-NET Plus scheme, to an Art. 185² initiative despite the ‘heavier’ process of implementation. (Landwehr and Guy, 2009) Proposals for the creation of Art 185 initiatives have to go through the co-decision process (i.e. submitted by the European

² Article 185 of the Treaty on the functioning of the European Union enables the Union to participate in research programmes of the Member States, aiming at the coordination of R&D in Europe and supporting a more coherent use of resources. Four Art. 185 have been adopted so far during FP7: Ambient Assisted Living (AAL) to enhance the quality of life of elderly and strengthen the industrial base for related industries through the use of ICT; European Metrology Research Programme (EMRP); BONUS Baltic Sea, supporting the European Strategy for Marine and Maritime Research; and Eurostars, for development projects in any field, with specific attention to research intensive SMEs. (Annerberg, et. al. 2010)

Commission for a decision of the Council of Ministers and the European Parliament) thus demanding a clear political mandate and sufficient scope for its implementation.

The majority of ERA-NETs funded under FP6 were still active after the end of the contract period although the absence of EC funding implied less ability to expand their networks with new members and fewer and smaller joint calls. Altogether, ERA-NETs have adopted very different strategies, for example associating with larger scale activities, choosing a light and flexible arrangement, or even stopping altogether. (Nielsen, 2010)

2.3 Facing disruptions and gazing at the future

ERA-NETs have to find their place among other instruments and concepts aiming at mobilising and coordinating national and regional resources. Apart from the Art. 185 initiatives such instruments are also the Joint Programming Initiatives and the newly introduced European Innovation Partnerships. The ERA-NET community widely supports the evolution of ERA-NETs towards more flexible relationships with the Commission, possibly through the development of a regulatory framework capable of reinforcing stakeholder ownership and control over both strategic direction and modes of implementation. The Commission's role in this is envisaged to keep being that of a facilitator, providing advice, developing procedural guidelines, maintaining and advancing mutual learning mechanisms. (Landwehr and Guy, 2009)³

The concept and role of the ERA-NETs have evolved and matured from FP6 to FP7. Currently the ERA-NET scheme has to adopt to new developments, in particular the Europe 2020 Strategy and the Innovation Union Flagship Initiative⁴. This offers opportunities for ERA-NETs to get involved in the implementation of such large-scale initiatives but also challenges them to demonstrate their continued relevance. (Nielsen, 2010)

The recent economic and financial crisis also affected the evolution of ERA-NETs significantly. Some Member States in a number of ERA-NETs withdrew or limited their contributions. In some cases, transnational activities suffered greater cuts than those suffered by national activities, showing clearly where the preferences of some MS still lie. Overall, there has been more systematic analysis of the funding portfolios in Member States as well as increasing interest in the 'national return on investment' of transnational activities in general. (Amanatidou, et. al. 2010)

³ The position of ERA-NETs within the landscape of ERA coordination instruments is analytically discussed in section 6.2.

⁴ The current policy context is discussed in the following section.

3 Current context: in the service of Grand Challenges

European countries have well recognised that the pressing challenges of today, in areas such as climate change, energy and resource efficiency, health and demographic change will lead to severe consequences for European societies if effective actions are not taken as early as today. Dealing with grand challenges has been placed at the core of EU research and innovation policies as expressed by the Europe 2020 Strategy⁵, the Innovation Union Flagship Initiative⁶ as well as the new Common Strategic Framework for Research and Innovation (CSFRI)⁷.

In the Europe 2020 strategy, the EU puts forward three mutually reinforcing priorities where emphasis is on smart, sustainable and inclusive growth. Developing of an economy based on knowledge and innovation, promoting a more resource efficient, competitive, greener and more competitive economy and fostering a high-employment economy delivering social and territorial cohesion are in the core of the European policies. At the same time, the Commission is proposing five measurable EU targets for 2020 that will steer the process and be translated into national targets in the areas of employment, R&D investments, climate and energy, levels of education and reducing poverty. (European Commission, 2010)

The ‘Europe 2020 Strategy’ explicitly places ‘knowledge and innovation’ at the heart of the type of growth envisaged to turn the EU into a smart, sustainable and inclusive economy acknowledging that the same challenges also provide powerful opportunities to develop innovative products and services, creating growth and jobs in Europe. The importance of putting innovation at the forefront in dealing with grand challenges is made explicit in the Innovation Union Flagship Initiative which urges to better link research and innovation while focusing more on challenges and outcomes to be achieved. The strategic and integrated approach to research and innovation advocated by Innovation Union sets the framework and objectives to which future EU research and innovation funding should contribute.

Following the spirit of Europe 2020 Strategy and the Innovation Union Flagship Initiative, the Common Strategic Framework for Research and Innovation (CSFRI) addresses the global societal challenges by strengthening the science base and the link of research with innovation, while at the same time aiming at retaining and reinforcing Europe’s competitive position in the face of globalization.

Global challenges, by definition, go beyond national borders and require a critical mass of trans-national research activities, resources and infrastructures. Yet, public research and innovation support is mainly organized at the national or regional levels. Some progress has indeed been made in coordinating national and regional resources mainly through the ERA-NET scheme and Art. 185. However, national and regional governments still largely work according to their separate strategies. Fragmentation of public research across nations and regions leads to

⁵ COM(2010) 2020, Brussels, 3.3.2010

⁶ COM(2010) 546 final, Brussels, 6.10.2010

⁷ COM(2011) 48 Brussels, 9.2.2011

duplication of efforts and waste of valuable resources. This cannot be afforded at any time, certainly even less at times of severely constraint public budgets. (Amanatidou, 2011)

As a case in point for the lack of efficient and effective coordination, it is estimated based on 2009 data that only around 11.3% of the total public R&D funds⁸ is being coordinated at the European level. Approximately 7% of this figure is attributed to FP7, approximately 4,5% is attributed to trans-national coordinated part of national GBAORDs, of which the ERA-NET scheme and Art. 185 amounts for 0.5% (€ 470 Million per year).⁹

The underperformance of our current research and innovation systems largely due to fragmentation and duplication is explicitly mentioned in the Innovation Union. Innovation Union directly links this underperformance with the ability to cope with the societal challenges identified. It characteristically notes that current fragmentation and slow pace of change can no longer be afforded given the scale and urgency of societal challenges and the scarcity of resources. Efforts and expertise on research and innovation must be pooled together and critical mass achieved. (CEC, 2010)

While commitment of the MS is essential for implementing the EUROPE 2020 Strategy, it is again the MS who are in the lead for making the concept of the ERA a reality¹⁰. Several challenges have to be tackled, among them, the compartmentalisation of public research funding in the EU and the inability of individual national research programmes to respond to major societal challenges that go beyond national borders.¹¹

Within this framework, ERA-NET is considered to have made considerable/remarkable progress in reducing the fragmentation of national / regional research programmes in certain fields. The ERA-NET scheme has been instrumental to the progress towards the European Research Area and the promotion of the so-called ‘fifth freedom’, i.e. the free circulation of researchers, scientific knowledge and technology¹². The relevant achievements of the scheme are discussed in the following section.

⁸ Including civil GBAORD (government budget appropriations or outlays for research and development) of Total 27 MS + FP7 + EFTA countries

⁹ “Coordination of national programmes: Lessons learnt from past implementation and future operational objectives”, Jörg Niehoff, Unit Joint Programming, DG Research and Innovation, Presentation at the Strategy Workshop, Brussels, 7th April 2011

¹⁰ Acheson, H. et al, “Optimising Research Programmes and Priorities”, Report of the DG Research ERA Expert Group”, February 2008 .

¹¹ Pauli, A., (2010), ‘A new era for ERA’, Key note speech at ERA-NETs on stage – Annual event 2010, Brussels, 23-24 March 2010.

¹² Pauli, A., (2010), ‘A new era for ERA’, Key note speech at ERA-NETs on stage – Annual event 2010, Brussels, 23-24 March 2010.

4 Achievements of the ERA-NET scheme

Since the first launch of the ERA-NET scheme in FP6 in 2002, 101 ERA-NETs were funded with € 340 Million. Through these projects more than 190 joint calls were launched resulting in more than 2000 transnational projects. The annual volume of coordinated research is close to € 300 Million, with a total of € 1,4 Billion in 2004-2010. The leverage effect of the EC funds on the volume of national research funds coordinated is on average five, i.e. the EC funds allocated results in five times more national funds for coordinated research. This rises to more than 10 in some ERA-NETs. (Niehoff as referred to in Amanatidou, 2011)

The most common rationales for participation were the creation and support of transnational R&D projects and building up of new relationships. Organisations from EU12 Member States were, to a large extent, seeking to network and to build new relationships with their peers in other countries. As for organisations in EU15 Member States and Associated countries, they were mostly interested in the creation and the support of joint calls leading to the funding of transnational research projects. (Matrix Insight and Rambøll, 2009)

In the ERA-NET Plus instrument, since its launch nine actions have been approved and are underway, covering a wide range of topics including metrology, nanoscience, humanities, systems biology and photonics. Two actions are focused on geographical areas. So far the total budget allocated for transnational joint calls stands at 232.7 M€, of which the Commission contribution is 67.5 M€. A total of 140 funding partners have been involved while approximately 6,000 research teams declared an interest in participating in the calls. Just under than 2,000 research teams were involved in proposals selected for submission to full proposal and 650 research teams have been selected for funding. (Lock, et. al. 2010)

The ERA-NET was considered a success even since its early days in FP6. The ERA-NET Review carried out in 2006 noted that it fulfilled a real need within the policy armoury of the EU in that it helped overcome barriers to the coordination of national and regional research activities. (Horvat, et. al. 2006) The assessment at the end of FP6 was as positive. The FP6 ERA-NET impact assessment study¹³ concluded that the ERA-NET scheme can be regarded a success in relation to achieving its objectives, namely to foster cooperation between, and coordination of, national research activities through the linking of national research programmes. The scheme also created the conditions for opening up of national programmes to non-residents in some cases. At the same time, perceptions of benefits associated with transnational research cooperation were positively influenced. (Matrix Insight and Rambøll, 2009)

Reflecting the main aims of the scheme, the benefits of ERA-NETs may be grouped under two main categories; those related to mobilisation and coordination of national resources, and those referring to the promoting excellence in research and structuring the ERA. These benefits are analytically discussed below.

¹³ European Commission, (2009), 'FP6 ERA-NET Study, June 2009.

4.1 Mobilisation and coordination of resources

The benefits that the ERA-NET scheme was expected to bring about included:

- establishing and strengthening of European research funding networks;
- reducing the fragmentation of the European research funding landscape;
- structuring of the research landscape via the opening up and coordination of national programmes; and
- setting up research programmes undertaken jointly by several Member States, including the participation in the structures created for the execution of national programmes.

The ERA-NET scheme delivered many direct and indirect benefits. This contributed to an overwhelming and widespread sentiment among participants that their participation had been worthwhile and reflects the advantages of following a real bottom-up approach in implementation, as initially intended through the design of the FP6 ERA-NET scheme. (Matrix Insight and Rambøll, 2009)

In relation to the coordination of national policies and programmes, ERA-NET participants reported the following key benefits:

- increased knowledge of, and cooperation with, funding agencies across Europe;
- greater understanding of R&D procedures in other countries; and
- development and adoption of new evaluation protocols and procedures.
- mutual learning about the design of joint activities between programme owners and programme managers thus enabling transnational R&D cooperation; and
- creating a forum for discussing R&D policy and priorities in specific research fields at European level.

The most tangible impact of the ERA-NET scheme on national programmes related to the creation of new opportunities for enabling transnational R&D activities. It filled a gap between national research policies and the transnational research agenda generated at European level through the Framework Programmes for research. (Matrix Insight and Rambøll, 2009)

There were clear changes in behaviour and perceptions of the benefits of transnational R&D cooperation as a result of ERA-NET participation. National policy-makers seemed to have taken account of the need for transnational R&D cooperation and this led to modest increases in the national budgets allocated to transnational cooperation. This was the case for half of participants and mostly within International Cooperation, Environment, Transport and Fundamental Sciences. (Matrix Insight and Rambøll, 2009)

The additionality of the scheme was also positive as the vast majority of ERA-NET coordinators indicated that the transnational activities (i.e. peer networking and joint calls) would not have been possible without EC funding. Many coordinators also felt that the transnational activities of their ERA-NETs could continue with reduced EU funding in the future, although about a quarter

of them were of the view that their ERA-NETs could only continue with the current levels of funding. (Matrix Insight and Rambøll, 2009)

The appreciation of the scheme as a valuable tool for transnational collaboration was also evidenced by the increasing number of countries engaging in the scheme. Today 51 countries participate in the scheme, which represent an increase of around 27% compare to 2008. Furthermore, approximately half of the new networks set up under the FP7 (including ERA-NET Plus actions) are continuation of previous ERA-NETs. (Pérez, 2010)

All Member States continue to be highly involved in the scheme. An increasing number of Third Countries are being involved in the networks. However, their individual participation is also rather symbolic, with less than 5%. Furthermore, it is interesting to mention the significant involvement of a group of small countries: Austria, Finland, The Netherlands and Belgium. The great majority of Associated Countries involved in the FP participate in the ERA-NET and ERA-NET Plus schemes, with a significant participation of Turkey, Norway, Switzerland and Israel. (Pérez, 2010)

The impact on higher-level ERA objectives, such as overcoming fragmentation of research in Europe is more limited in comparison to the achievements highlighted above. This was because it was constrained by national R&D policies and structures and the limited role assigned to the scheme by some national participants. The ERA-NET scheme had a catalytic function and the impact on national programmes was more important when there was strategic buy-in from policy-makers at national level. There was evidence of a reduction in duplication between national programmes and the inclusion of new themes in existing programmes, although to a limited extent. (Matrix Insight and Rambøll, 2009)

In relation to the ERA-NET Plus, the panel that reviewed the instrument noted that the additional funds provided by the Commission act as an incentive for member states to align their national resources to tackle specific research challenges. In this regard it was considered as the correct tool to enable stronger mobilisation of resources to occur, and encourage the coordination of Member States in selected areas. Yet, it made the point that it should not be misinterpreted as being a strategic tool, rather it is and should remain a support tool for dedicated coordination efforts. Further, there were caveats, such as the potential isolation of strong research groups located in Member States that choose not to participate. (Lock, et. al. 2010)

The ERA-NET scheme has also contributed to the development of Joint Programming Initiatives with the knowledge produced on the themes and areas covered. MS have used the input from ERA-NETs to identify possible themes upon which to develop JPIs. The first JPIs are already a reality and some of them have been based on experience and knowledge generated from relevant ERA-NETs. The step is now taken by the MS with the support of the Commission to develop framework conditions, i.e. administrative, normative and regulatory factors considered essential for the effective implementation and success of JPIs. In this regard the experience of the

ERA-NET community and the tools generated by the ERA-NET Learning Platform are much valued.¹⁴

4.2 Excellence and ERA structuring

Impacts from ERA – NETs in relation to research excellence refer to the impacts appreciated by the research community. In this regard it is the networking effects with international peers that are mainly appreciated. On the other hand, ERA structuring benefits relate to the degree of opening up of national programmes to foreign participants, impacts on the thematic areas addressed and country participation. A discussion on the total of these different aspects follows.

The FP6 ERA-NET participants reported intangible benefits in relation to access to enlarged scientific communities and structuring the ERA through networking of the research community, and opening up of national programmes. ERA-NET participants appreciated intangible benefits associated with networking with other European scientific communities, increased knowledge of scientific communities across Europe, new opportunities for transnational collaborative research, and creation of a ‘critical mass’ at European level for undertaking transnational R&D activities. (Matrix Insight and Rambøll, 2009)

The majority of ERA-NET participants stated that existing relationships strengthened and extended across the ERA. New networks were also created and a number of bilateral and trilateral cooperation agreements were also established as a result of ERA-NET participation within and outside the EU. This was most prominent for EU12 Member States in specific areas. Yet, pre-existing relationships between ERA-NET participants were not a sole determinant of success. (Matrix Insight and Rambøll, 2009)

The main target groups eligible for funding of the joint activities (mainly joint calls) developed by the networks are Higher Education Institutions (HEIs) and Public Research Organisations (PROs). Although private companies' involvement in research is essential for the exploitation and commercialisation of research results, they seem to be less pre dominant as target groups eligible as beneficiaries of the joint activities of the ERA-NETs. (Pérez, 2010)

The ERA – NET scheme filled a gap in many cases between the national programmes available and the research programmes offered at EU level. Opportunities were created for research beneficiaries who would otherwise be excluded from the regular EC Framework Programmes to engage in transnational research. At national level, there was also recognition of the value of national researchers joining forces with foreign researchers to undertake joint transnational research. (Matrix Insight and Rambøll, 2009)

ERA-NET also satisfied a demand that existed in the research community for an instrument capable of marrying the relative advantages enjoyed by national and regional programmes over

¹⁴ Pauli, A., (2010), ‘A new era for ERA’, Key note speech at ERA-NETs on stage – Annual event 2010, Brussels, 23-24 March 2010.

their international equivalents (e.g. the greater familiarity of researchers with indigenous administrative procedures and personnel) with the corresponding benefits associated with international programmes (e.g. access to broader pools of both complementary expertise and financial resources). (Horvat, et. al. 2006)

The ERA-NET scheme is also considered to have created the conditions for the opening up of national programmes to non-resident researchers during and after FP6, although there was less evidence of tangible actions relating to the “mutual opening” of national programmes. These included for example opened up facilities and laboratories to foreign nationals which was the case for a minority of ERA-NETs. Additionally, the ERA-NET scheme has to some extent influenced the adoption of new eligibility criteria in certain countries that allowed for funding of non-resident researchers. Based on the use of real common pots as the indicator for opening up of national programmes, then the results are more modest. The shares of financial contributions through a real common pot range from 45% in the case of the Associated Countries, to 24% for the larger EU15 Member States, and 16% for the smaller EU15 Member States, while it drops to 9% for EU12 Member States. As for the thematic areas, Fundamental Sciences and Social Sciences and Humanities demonstrated the highest degree of openness having channelled most of their funding contributions via real common pots. (Matrix Insight and Rambøll, 2009)

In terms of participation in joint calls, this was highest in the themes of Industrial Technologies and SMEs, Life Sciences, and Environment. These three domains accounted for over 70% of the cumulative joint call funding over the period from 2003/4 until 2010. The Industrial Technologies and SMEs, Environment, Life Sciences and Transport themes experienced the most long-term benefits from participation (e.g. higher quality of research generated, new types of projects generated, and access to foreign research communities). (Matrix Insight and Rambøll, 2009) All types of research (basic, applied and pre-competitive) are performed through ERA-NETs, but applied research is a clear priority. (Pérez, 2010)

In several ERA-NETs, in particular in the International Cooperation and Life Sciences thematic areas, the importance of the theme in national research programmes increased as a result of ERA-NET involvement. This also happened to some extent in the Industrial Technologies and SMEs as well as in the Social Science and Humanities fields. (Matrix Insight and Rambøll, 2009)

Key drivers for participating in the ERA-NETs were to learn from one another and to exchange good practices. The immediate effects of this knowledge-transfer and exchange of experience manifested itself in the adoption of practices such as the use of international evaluation panels for reviewing proposals that had previously been done domestically. Yet, the behavioural impacts originating from this knowledge-transfer are likely to be more visible in the longer-term.

Reflecting the main motivations for participation across different country groupings as presented above, organisations from EU12 Member States were involved in more activities (other than joint calls) than their EU15 counterparts and the Associated countries. These Member States were largely interested in developing new relationships and establishing specific cooperation

agreements with their peers in other countries. EU15 Member States and Associated countries, on the other hand, were more involved in activities leading to the funding of joint calls. Associated countries seemed to be clearly oriented towards developing and funding joint calls. EU15 Member States tended to be involved in all types of activities, with the smaller EU15 Member States less keen than larger EU15 Member States on joint activities (other than joint calls) such as joint training activities and personnel exchanges. (Matrix Insight and Rambøll, 2009)

4.3 Taking stock and capitalising on knowledge gained

While it is important to record the impacts and achievements from the individual ERA-NETs, it is of equal importance to assess the quality and outputs produced by the projects supporting the ERA-NET scheme, i.e. the ERA-LEARN project under the ERA-NET Learning Platform and the NETWATCH information system.

The ERA-NET Learning Platform was established in 2008 in order to support participants in ERA-NETs and provide them with a platform for mutual learning. The platform provides a structured framework for collecting and synthesising experiences and lessons to be learnt from ERA-NETs. This is done through the organisation of annual events – three such events were organised since 2008. Additionally, the platform aims at meeting the needs of relevant actors concerning the adoption of best practice and, where appropriate, the development of common procedures and practices.

The ultimate goal of the platform is to:

- Reduce “transaction costs” for the participation in cross border programme cooperation and integration and
- Increase the efficiency and stability of call implementation of multiple ERA-NETs towards a user friendly system. Namely for the researcher participating in transnational research cooperation, ensuring the submission and selection of the highest quality proposals.

ERA-LEARN exploits the experiences and acquired know-how with the perspective to identify good examples and to develop a set of recommended procedures. Based on a comprehensive analysis of existing and already validated procedures ERA-LEARN facilitates the identification of tools that are suitable for a broad use. The main outcomes of ERA-LEARN include:

- Mapping tools for participating programmes, generating a complete inventory of national and regional programmes participating in ERA-NETs and a general inventory of the specific scientific landscape within the partner countries;
- Manual & tools for call implementation, the central goal being to provide the ERA-NET community with a sound basis for the implementation of transnational calls for proposals, including general information, practical examples and templates;
- Tools for internal review of ERA-NET participation facilitating the definition of clear strategies for involvement in ERA-NETs based on thorough analyses of national and regional needs and priorities;

- Smart Coordination, supporting the stakeholders' choice when opting for one of the instruments based on an analysis of the complementarities between the ERA-NET Scheme and the Joint Technology Initiatives, Technology Platforms, Article 169 (new 185) Initiatives, EUREKA and other relevant instruments.

The second initiative, NETWATCH, is the European Commission's information platform on transnational R&D programme collaboration. It constitutes a central Information Platform on ERA-NETs within the ERAWATCH research inventory. NETWATCH provides a single entry point for information related to the ERA-NETs. It aims at enhancing the visibility of ERA-NETs, contribute to mutual learning amongst the members of ERA -NETs and support cooperation on R&D in Europe more generally. The current focus is on ERA-NETs, but the scope will be increased to include a broader range of programmes.

NETWATCH supports transnational R&D programme collaboration in Europe by:

- mapping ERA-NETs;
- providing information on Joint Calls;
- analysing the impact of programme collaboration;
- describing the scope and results of individual ERA-NETs;
- supporting mutual learning among transnational programme networks.

ERA-NET participants were consulted about the usefulness of these ERA-NET supporting tools at the annual events of the ERA-NET Learning Platform. First of all, they appreciated the ERA-NET Learning Platform and its annual events bringing together a significant number of ERA-NET stakeholders to discuss and exchange experiences and ideas. Overall, there was considerable degree of satisfaction with progress made to date with NETWATCH, ERA-LEARN, and the ERA-NET Learning Platform. Participants offered a range of useful suggestions for improving the functionality of the existing tools as well as for the design of other items scheduled for development. Advice concerning the monitoring and evaluation of ERA-NET activities is also be developed given that the ERA-NET stakeholders have paid little attention to these topics so far. (Landwehr and Guy, 2009)

The collection and exploitation of information and data about the ERA-NETs as enabled through ERA-LEARN and NETWATCH is of crucial importance. ERA-NET participants recognised the strategic value of up-to-date information on ERA-NET developments across the EU (Landwehr and Guy, 2009). Additionally, it is important to collect information about impacts and benefits of the ERA-NET scheme as this would also help establish the additionality and value of participation in ERA-NETs against other initiatives of similar nature. Meeting this need has become imperative given also the growing acknowledgment of the importance and necessity of transnational research cooperation by the Member States. The role of ERA LEARN and NETWATCH in this regard are of major importance. (Amanatidou, et. al. 2010)

The usefulness of the ERA-NET support tools and platforms was widely recognised. As the ERAC – GPC group wrote the setting up of NETWATCH addressed the need for a structural and organisational framework informed by the strategic vision of the role of ERA-NETs and other trans-national RTD initiatives in the further development of the European Research Area and geared towards the harmonisation of procedures and practices across all joint calls and programmes. (ERAC, 2011)

5 Lessons learnt

The ERA-NET scheme has accumulated significant experience over the almost ten years of existence. This experience includes both factors that have been identified as good practice as well as problems and challenges that need solutions or careful consideration. The elements are grouped into three groups. The first relates to the selection of common topics of interest around which to support trans-national collaboration and consequently the choice of which ERA-NETs to join on the side of national agencies. The second group relates to the challenges in trans-national cooperation in terms of promoting excellence and internationalising national strategies for research. The third group relates to the implementation of trans-national cooperation and addresses the issues of ensuring national commitment and aligning and harmonising national procedures. Finally the issue of accommodating the business perspective is also discussed.

5.1 Selecting the topics / areas for cooperation

ERA-NET stakeholders highlight that the identification of topics should be a transparent process, and the themes selected should be underpinned by a coherent policy. The point was also made that the selection of topics is evidence-based. (Amanatidou, 2011) The integration of the ERA-NET scheme under the FP7 themes may have hindered the application of this principle. While the ‘thematic integration’ may have worked for some ERA-NETs, participants noted that there was still need for a bottom – up approach in the identification of future ERA-NET themes that would be more innovative and closer to the interests of the research community, accommodating also the MS interests. They also noted that a budget for horizontal ERA-NETs should also be maintained. (Amanatidou, et. al. 2010)

At the same time managing multiple participations in several ERA-NETs or selecting which of the thematically similar coordinating initiatives to join remain issues that attract significant attention from ERA-NET stakeholders. This becomes even more problematic for smaller countries with low levels of available resources.

The ‘opportunistic’ behaviour that appeared at the beginning in joining as many ERA-NETs as possible is now gradually replaced by a more strategic approach applied by the national agencies. A shift is emerging towards focus on small numbers of strategically aligned ERA-NETs. Achievement of such a shift necessitates a structured approach to determination of engagement and/or continuation in ERA-NETs.

To this end, ERA-LEARN developed standardised review criteria to enable internal review of ERA-NET participation based on review of international policy reports; review of international academic literature; analysis of national involvement; and analysis of agency involvement in a core set of shared ERA-NETs. (cf. Tools for internal review of ERA-NET participation)

The application of such criteria should help to eliminate wasteful use of resources in projects that do not fit to defined priorities or do not meet the expected standard. These criteria should be applied within an overall strategy for trans-national cooperation. However, national strategies for internationalisation of research are still the exception rather than the rule.

The Model for Internal Review of ERA-NETs¹⁵ is described as a Tool for Analysis for application by a group of/ by a strategic person/s within the agencies. It includes consideration of a) existing ERA-NETs and b) potential new ERA-NETs. The criteria have been divided into two categories:

- NETWORK encompassing complementarity to other funding instruments; potential national added value; the long-term perspective; financial commitment; consortium composition and the running of Joint Calls.
- OUTPUT covering Joint Call outputs; other joint activities in the ERA NET; the learning effects and the cost-benefit ratio.

The ERA-LEARN organisations, all involved in multiple related ERA-NET participations, committed to testing of the internal review process with a view to achieving:

- Shared Categorization of ERA-NET activity;
- Defined fit with agency strategy;
- Provision/utility of networks;
- Client opportunities; and
- Overlap with other activities.

The internal review process has undergone testing in a pilot exercise involving a small number of high-performance organisations. The model enables a review across several ERA-NETs within a specific organisation; a review of specific ERA-NETs based on the participating organisations; provision of new insight into the progress of existing ERA-NETs as well as implementation outside the ERA-LEARN Agency Environment.

The Internal Review Model was presented to the broader community at the 2009 ERA Learning Platform Conference and again at the 2010 Conference. The criteria for evaluation and instructions for use were distributed to all TAFTIE agencies and were provided to the community at large through the NETWATCH web portal. In both cases the model was prescribed for 1) analysis of current ERA-NETs and 2) decision making for whether to join new ERA-NETs. (ERA-LEARN, 2011a)

¹⁵ The online toolbox is hosted by NETWATCH at <http://netwatch.jrc.ec.europa.eu/nw/index.cfm/static/eralearn/eralearn.html>

5.2 Promoting excellence & enabling trans-national cooperation

The ERA-NET Review (2006) noted that ultimately the success of the ERA-NETs would be demonstrated if the research community responded positively to the calls and programmes launched and produced research of high quality and relevance. (Horvat, et. al. 2006). To this end ERA-LEARN developed mapping tools for participating programmes, generating a complete inventory of national and regional programmes participating in ERA-NETs and a general inventory of the specific scientific landscape within the partner countries (cf. [Mapping tools for participating programmes](#)).

All elements, features, key factors and peculiarities of the national programmes are recorded and made accessible for the partners (and partly for the public, as this information also forms a part of the documentation and guidelines for joint calls). The results of this analysis will create a situation of common understanding among the partners and will serve as a basis for strategic and joint activities within the ERA-NET. It will also help to find a feasible procedure for the implementation of a first joint call. The inventory of partner information is considered step 1 (of 4) in the ERA-NET scheme.

The interest from the research community is well documented based on the evidence gathered on joint calls and level of resources leveraged. Yet, the quality of the research carried out is another issue and calls for impact assessment studies at the level of individual ERA-NETs. Such studies have not been done thus far but the worth of providing for them in the near future is valid.

Another indicator of success will be the extent to which trans-national research activities and programmes, or parts of programmes, become more firmly embedded in national and regional policy portfolios. In 2006 it was too early to comment on these issues, other than to say that adequate monitoring and evaluation mechanisms would need to be in place to assess them. (Horvat, et. al. 2006)

In 2010 the issue of developing national strategies for internationalisation of research was still a relevant recommendation. This need becomes imperative given the nature of grand societal challenges. The focus on grand societal challenges questions the appropriateness of the national research system's scope and mode of operation as they require joining efforts at international or cross-national levels in finding possible paths towards effective solutions. (Amanatidou, 2011)

The recommendations made in the early days of ERA-NETs in FP6 are still very much relevant. *Steps will also need to be taken to overcome some of the institutional barriers that still ensure that trans-national research activities continue to have a low profile in many national settings. If the ERA is to become a reality, there needs to be a renewed strategy discussion at the highest levels within Member States and Associated States of the relative importance of trans-national activities within the context of national policy portfolios.* (ERA_NET REVIEW, 2006) At the same time, the long-term commitment of resources at both national and transnational levels is crucial to the development and implementation of effective transnational strategies. (Amanatidou, et. al. 2010)

It is also important to accommodate national concerns in relation to joint programming activities. This is especially the case for smaller Member States. The perspective of small countries has to be taken into consideration if the aim of creating truly common, Europe-wide visions to addressing major societal challenges is to be materialised through joint programming. Small countries face a number of challenges and concerns in relation to the way joint programming activities are evolving. The perspective of small countries has to be accommodated if the aim of creating common, Europe-wide visions to addressing major societal challenges is to be materialised through joint programming. (Amanatidou, 2011)

5.3 Implementing trans-national research collaboration

The implementation of ERA-NETs and other coordinating instruments have faced several problems over the years of similar nature across the different coordinating instruments. Significant progress has been made especially in setting and adopting common rules and procedures in implementing joint calls and evaluating proposals. Yet, certain problems persist which not surprisingly refer to the levels of national commitment and ensuring financial contributions, harmonising timelines and funding procedures at the national level as well as cross-border funding.

To this end ERA-LEARN developed an online manual to provide the ERA-NET community with a sound basis for the implementation of transnational calls for proposals. The manual is based on experiences and realistic scenarios, provided as an interactive compilation of modules which reflect the different phases in the planning and operation of joint calls. The contents are based on past and ongoing ERA-NETs and may be used as blueprints, references or inspiration for future joint call activities (cf [Manual & tools for call implementation](#)).

Several factors have been identified that could lead to the success of these instruments. Some of the factors identified for the Joint Programming Initiatives are important to mention in this regard. While the following list refers to the joint Programming process, they are relevant also for the ERA-NET scheme and the other coordinating instruments given their generic nature (ERAC-GPC, 2010):

- Trust based on transparency, mutual give and take (being ready to give more), clarification of funding and clarity about strengths and weaknesses of each partner.
- Commitment from highest-political level. It will provide more stability and higher probability of continuity of the initiative and funding.
- Financial commitment.
- Ownership. If Member States demand results, JPIs are more likely to yield tangible results.
- EU top up/contribution acting as an incentive for leveraging national funds.
- Smart specialisation for small countries and regions enabling a selective approach based on their strengths.

5.3.1 Ensuring commitment and financial contributions

Ensuring commitment and financial contributions at the national levels is of primary importance for all coordinating instruments where the bulk of the funding is based on national contributions (ERA-NETs, ERA-NET Plus, Art. 185, JTI involving Member States as partners, JPIs).

In making the national financial contributions to the funding of joint calls and trans-national research activities, ERA-NETs can choose among common pots, in which participants contributed set amounts to a separate common pool; virtual pots, in which participants made their own arrangements to fund participants from their own countries or regions; and mixed mode-mechanisms, where various combinations of virtual and common pot regimes were deployed.

The ERA-NET Review (Horvat, et. al. 2006) noted that the ability to choose between different funding models was much appreciated by participants. However, they presented importance advantages and disadvantages. Virtual pots were relatively easy for participating programme owners and managers to implement, since they involved few changes of significance to internal structures and procedures. Yet, virtual common pots could not ensure funding for all good projects especially in the case where a project includes a research team from a country or region whose individual contributions to the scheme are exhausted.

On the other hand, common pots could ensure that all the best projects could be funded until the pot runs out. However, common pots could involve major changes and present real difficulties to some administrations hindering cross-border money transfers. Mixed-mode schemes offered a compromise. For example, virtual pots could be used until problems arose, and a common pot could then be used facilitating the transfer of money across borders under certain conditions. The Review suggested that within the context of FP7, newcomers to the ERA-NET arena should still be allowed to use virtual pot models if the barriers to cross-border funding are high, but for those with previous experience of ERA-NETs the use of mixed-mode and full common pot models was preferable. (Horvat, et. al. 2006)

The situation did not change much throughout FP6 or later in FP7. The FP6 ERA-NET Impact Assessment study noted that participants defined and adopted practices in line with their ability to engage in joint calls and funding models as authorised by national rules. In the majority of cases, this meant funding joint calls via virtual pots and targeting primarily participant countries' own researchers. Overall, national policies and landscapes imposed constraints on the opening up of funding to non-residents. Whereas the ERA-NET scheme created the conditions for opening up of national programmes to non-residents in some cases, the mutual opening of national programmes on a larger scale may require not only more time but also a behavioural shift by national policy-makers. The study concluded that to facilitate smoother implementation of joint calls, it would be good to ensure participants' understanding of the relative autonomy over funding held by other participants before committing to joint calls. (Matrix Insight and Rambøll, 2009)

This is a sensible precautionary step but does not, however, provide solutions in the cases where financial contributions are not made in line with initial commitments. Some suggestions were

made over time on ways to secure some resources before hand in order to cover for losses in national financial contributions. For example, a practice may be to reserve one third of national commitments and use it as a real common pot to cover for extra needs like funding excellent proposals in case of shortage of national funds in some MS. The suggestion was also made to publish national commitments together with each joint call for projects so that the MS are timely aware of them and can better plan a route to fulfilling them. (Amanatidou, et. al. 2010)

In the ERA-NET Plus actions the top up funding by the Commission was much appreciated, although it was not entirely clear that a top up on its own was sufficient to mobilise some partners to participate in the scheme. As in the ERA-NET, honouring national commitments is an important issue and requires a 'sensitive' approach. (Amanatidou, et. al. 2010)

Another issue for ERA-NET Plus referred to that of covering the costs for networking. The Panel that reviewed the instrument concluded that since the Plus instrument has been designed for a very specific purpose, that of launching a joint call, resources should not be provided for networking. Yet, for some smaller countries the additional administrative, management and networking costs might act as a disincentive to participation. Eventually, it was recommended that Plus actions should be "owned" by or have links with strong and well resourced networks. Networks will be in a position to build on and further develop the benefits that have arisen from the Plus actions. (Lock, et. al. 2010)

Similar difficulties have also been encountered in the design and implementation of the other coordinating instruments. Cross-border-funding problems have been experienced in all coordinating initiatives that build on ERA-NETs. Assembling funding pools has also surfaced as a challenge in Joint Programming Initiatives alongside hard management and decision-making procedures (Annerberg, et. al. 2010).

5.3.2 Alignment and harmonisation

Another shared problem among the coordinating instruments is the degree to which national priorities can be aligned and national procedures can be harmonized in relation to project funding. The FP6 ERA-NET Impact Assessment (2010) study stressed that for a successful implementation of ERA-NETs it was important to achieve early agreement on common principles, procedures and definitions between participants. Useful practices included early development of joint guidelines, common application forms, and common evaluation procedures for joint calls or, more generally, joined up dissemination strategies or common glossaries of definitions.

The evaluations of JTIs, ERA-NETs and Art 185 initiatives indicated a need for better alignment of Member States priorities at EU level and to further improve the harmonisation and synchronization of national funding programmes. (ERAC, 2011) Indeed the misalignment of national thematic programme priorities was seen as another obstacle for trans-national coordination of R&D programmes as well as national administrative procedures in funding

projects as evidence in the FP6 ERA-NET impact assessment study. (Matrix Insight and Rambøll, 2009)

In the recent years there has been a rapid development and changes in the coordination of national and regional research programmes. These include the shift from a bottom up ERA-NET approach to a more strategic application of multiple instruments and the advent of joint programmes. Transparency and clear description on the design of each instrument and the experience of the member states is necessary in order to have guidance to the choice of instrument when participating in joint programme activities.

To this end, the ERA-LEARN consortium gives an overview on the emerging trends in the coordination and mutual opening of national and regional research programmes with a view to the reasoning behind the choice of the respective instrument (cf. [Smart coordination](#)). In particular this includes an inventory of ERA instruments, as well as analysis of the complementarities between the ERA-NET Scheme and other ERA-coordination initiatives and instruments like the Joint Technology Initiatives, Technology Platforms, Article 169 (new 185) Initiatives, EUREKA and EUROSTARS. The analysis is based on specific criteria and indicators that were developed for the assessment of coordination-instruments and intergovernmental European networks.

5.4 Exploiting the business perspective

Turning grand societal challenges from challenges to opportunities for development requires an integrated approach for research and innovation that needs to be applied at the level of EU and national policies, much more so at the joint programming level. Engaging also industry and the end users in defining strategic research agendas is important as well as measures for stimulating innovation like through pre-commercial public procurement or building public private partnerships, and stimulating demonstration projects and prototyping. Nevertheless, stakeholders suggest that innovation is ‘outsourced’ in the sense that joint programming instruments should use existing innovation-oriented instruments to support the innovation related activities. (Amanatidou, 2011)

At the level of the different instruments the involvement of the business sector varies. At the governance level it is increased in instrument such as ETPs and JTIs which are public-private partnerships. Conversely, ERA-NETs and Art 185 are considered as public-to-public partnerships thus the involvement of business in governance is limited.

At the project level, the situation is mixed. For example, there are ERA-NETs specifically dedicated to SMEs (EraSME, CORNET, ETB) where the participation of businesses is naturally high. Other initiatives such as the Art. 185 on Ambient Assisting Living have achieved a high level of SME participation at about 40% compared with less than 20% in the first call of the FP7 ICT & Ageing Programme (Annerberg, et. al. 2010). However, the point is relevant that no thorough examination has been carried out in relation to the degree and the way the businesses are involved in the ERA-NET schemes. This gap is worth providing for in the future.

Furthermore, the suggestion was made to extend the scope of the ERA-NET scheme towards innovation in accommodating the perspective and involvement of businesses and especially SMEs. Additionally or alternatively, support of near-to-market activities could be considered at national level following up transnational projects. (Amanatidou, et. al. 2010)

6 The way forward

The mobilisation and coordination of national research programmes and resources is of paramount importance in dealing with grand challenges. Special weight is given to such measures in the latest EU strategic documents and several ‘new’ coordinating instruments and concepts are introduced alongside existing ones. Caution needs to be placed on not making the ERA-coordination landscape too complex. At the same time careful consideration needs to be given to how the various instruments are positioned against each other to maximise synergies and complementarities and thus multiplying impacts. Governance also plays a major role in existing and future initiatives as well as in the way they can be linked and coordinated. These issues are discussed in the following sections.

6.1 Future of ERA-NETs

In a survey conducted by DG Research, ERA-NET participants confirmed their commitment to continuing with ERA-NETs as an instrument in its own right as well as a contributor to larger initiatives. There was consensus that in principle the instrument has been and continues to be extremely important for enabling new ways of variable coordination and partly bundling of national funding. As to the future role for and conditions of ERA-NETs, the discussion showed that there is a demand both for

- ERA-NET to be firmly integrated into, or even acting as a catalyst for, larger scale joint programming approaches in the future following the politically defined bundling of efforts across European countries to support policies of the EU and to tackle defined grand challenges; and for
- ERA-NET to be kick-started in a bottom up fashion to continue structural change in Europe that follows the demands of the research and funding communities. (Nielsen, 2010)

Overall, the key word is ‘flexibility’ for the future implementation structures to enable more dynamic networks, allowing users to adapt the structure model according to their needs and evolve on their way. In this regard the ‘ERA-NET light’ concept was introduced. An ‘ERA-NET light’ structure model could potentially involve a limited number of core partners and a larger number of associated partners, with the latter only deciding to join in for limited periods of time and specific activities, e.g. the implementation of joint calls. It is important to remember that ‘structure follows strategy’ and that flexibility is key to the formation of dynamic networks. All partners would still have to contribute on a continuous basis to a networking budget and to the funding of joint activities, but there could be different rates for ‘core’ and ‘associated’ partners. (Amanatidou, et. al. 2010)

The ‘ERA-NET light’ structure model can possibly be combined with another development in terms of implementation structures, the so-called ‘umbrella ERA-NETs’ that are already appearing. These umbrella structures attempt to merge or cluster individual ERA-NETs around more all-embracing topics. Such a model serves the need for thematic coordination across some ERA-NETs. An important point in their construction involves the adoption of a simple management structure that avoids the ‘coordination of coordinators’.

Another option discussed for the future of ERA-NETs was the creation of an ‘optimised’ ERA-NET scheme by merging the ERA-NET and ERA-NET Plus instruments. This was considered to better meet the needs of future joint programming initiatives. (Amanatidou, 2011)

At the same time, it was noted that in achieving mutual benefits for both the national and European levels, joint programming should aim, inter alia, at building well working public-to-public partnerships (P2P) based on dialogue between Member States and EU and on shared responsibilities; and ensuring efficient delivery with matching financial commitments and appropriate instruments. A new model was suggested for support of joint programming between MS reflecting a shift in the Commission’s role from the coordination of national programmes to the coordination of national and EU programmes in jointly addressing societal and other grand challenges. This would recognise the importance of the Commission’s role in defining and selecting areas for joint programming while also providing substantial top-up funding to complement MS funding in selected areas. In fulfilling its role as instrument and funding provider the Commission could support joint programming with a reduced set of tools including (a) Art.185 initiatives for joint programmes (e.g. contributing to mature JPIs and possibly continuing initiatives launched under FP6/7), and (b) optimised ERA-NETs (merger of ERA-NET and ERA-NET Plus) based on simplified implementation. (Amanatidou, 2011)

6.1.1 Towards self-sustainability

The Panel for the ERA-NET Plus review (2010) also recommended that based on the experience they gained from the Plus instrument, funding partnerships should consider running their own joint calls, not involving funding from the Commission. The move towards self-sustainability was analytically examined in a specific workshop dedicated to ways on continuation of ERA-NETs.

While a number of ERA-NETs did not obtain further funding after FP6, only few of them completely ceased their activities. However, continuation without EC funding meant scaling down the scale and scope of activities with the risk of losing some of the project legacy. ERA-NETs with further EC funding were able to consolidate, expand their consortium and increase the scale of joint calls. (Nielsen, 2010)

The discussions revealed that the first among the pre-conditions for a successful self-sustainable network is the high level of commitment and trust among the partners. Organisational factors are also important, for example maintaining a secretariat and staying visible by maintaining links with the EC and other networks. Maintaining a legal status also is important, not least to remain visible to the outside world, but structures should be relatively ‘light’ and flexible.

At the same time, finding the resources to run the network, finding the workable balance between subscription fees and in-kind contribution, and ensuring financial commitment could be a challenge. Another challenge is to adapt to changes in external conditions such as the economic climate and relevant policy changes. (Nielsen, 2010)

6.2 Positioning of ERA-NETs vis-à-vis other schemes

The proliferation of instruments has increased the complexity of developing and implementing the ERA, but it also provides a suite of tools that can be used in a strategic way to advance the vision of ERA. However, efforts should be made to reduce the complexity of the current landscape of coordination measures and to improve their design in order to allow for the optimisation and full exploitation of their potential synergies. (Annerberg, et. al. 2010)

6.2.1 The landscape of ERA coordination instruments

The analysis done under ERA-LEARN of the differences of instruments relevant to coordination of national programmes (cf. [Smart coordination](#)) concludes that each of the instruments for programme coordination has a value on its own. The decision for the appropriate instrument depends on the needs and intentions of the stakeholders. The intention of the programme owners with regard to the level of integration must be regarded as the suitable criterion for selecting the appropriate instrument. (ERA-LEARN, 2011b)

The differentiation of the coordination instruments is based rather on the level of integration of the respective programmes and programme-owners than the thematic focus, the size or the financial envelope (i.e. the mobilized budget) of the activity. For example, the most successful ERA-NET coordination actions have been proven to mobilize and coordinate even more funds than some of the Art. 185 (ex169) measures even though ERA-NET budgets are usually lower.

ERA-NETs need shorter times from the development of the idea to the project start in comparison for example to Art. 185 which involves the ‘co-decision’ process. ERA-NET Plus has a low potential impact on the coordination of national programmes because there is only a single call to be published. The instrument would achieve higher impact if the implementation of a set of calls was possible. (ERA-LEARN, 2011b) Yet, another main difference exists between ERA-NET Plus and ERA-NETs is that no funds are provided for coordination activity, and it relies on pre-existing networks (Lock, et. al. 2010)

ERA- NETs are often used as a basis or predecessor for both, ERA-Net Plus and activities according to Art. 185. (Horvat, et. al. 2006). Yet, Article 185 Initiatives involves a full integration of national programmes, while ERA-NETs hardly go beyond the implementation of joint calls. ERA- NETs may also link to ETPs in terms of involvement of stakeholders and sometimes in the contribution to their strategic research agendas. (ERA-LEARN, 2011b)

JTIs¹⁶ are direct evolutions from the respective ETPs¹⁷ and the inter-governmental initiative EUREKA is clearly connected to JTIs given that EUREKA-clusters have been the starting point for two Joint Undertakings. EUROSTARS¹⁸ focusing on knowledge-intensive SMEs is attached to EUREKA¹⁹ combining the bottom-up approach of EUREKA with easier and faster access to dedicated national and EU funding. (ERA-LEARN, 2011b)

Joint Programming Initiatives²⁰ aim at contributing to responses to common societal challenges and deepen the research cooperation between member states. MS are to engage in JPIs defining, developing and implementing common strategic research agendas on a voluntary basis following the ‘variable geometry principal’ and based on a common vision on how to address major societal challenges.²¹ Certain criteria have been identified for selecting cases requiring adoption of the JP approach, among them the commitment from MS, the degree to which selected themes address a pan European / global (socio-economic or environmental) challenge, and the involvement of stakeholders (regional / national / European, private and public) for developing the themes to address.²²

Relationship links already exist between some JPIs and many ERA-Nets for example in the case of “Cultural Heritage & Global Change” (ERAC-GPC 2010). The strong link of ERA-Net and Joint Programming suggests that it is wise and useful to benefit from the ERA-Nets and their stakeholders with their know-how and experience. This could be done by e.g. applying them as starting points for implementing a JPI. (ERA-LEARN, 2011b) However, the main difference among the two instruments is that ERA-NETs are an FP instrument while Joint Programming is a Member State led process. (Annerberg, et. al. 2010)

Adding to these, the concept of EIPs newly introduced by the Innovation Union Flagship Initiative is another form of joint programming but giving emphasis to the engagement of the

¹⁶ Currently five JTIs exist promoting a more in the fields of innovative medicines (IMI), aeronautics (Clean Sky), embedded computing systems (ARTEMIS), nanoelectronics (ENIAC) and fuel cells and hydrogen (FCH) as well as the Future Internet Initiative.

¹⁷ http://cordis.europa.eu/fp7/jtis/about-jti_en.html

¹⁸ <http://www.eurostars-eureka.eu/>

¹⁹ www.eurekanetwork.org

²⁰ The first wave of JPIs, selected in 2009, is being created in the areas of Neurodegenerative Diseases; Agriculture, Food Security and Climate Change; Healthy Diet for a Healthy Life; and Cultural Heritage and Global Change. These initiatives are already preparing for the launch of the first joint calls for proposals. A second wave is under way with JPIs selected in 2010 in the areas of Demographic Change; Anti-Microbial Resistance; Connecting Climate Knowledge for Europe; Water Challenges for a Changing World; Healthy and Productive Seas and Oceans; Urban Europe, Global Challenges – Local Solutions. (ERAC-GPC, 2010)

²¹ CEC, (2008), ‘Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Towards Joint Programming in research: working together to tackle common challenges more effectively’, COM(2008) 468 Final, Brussels, 15.7.2008.

²² Competitiveness Council of the European Union, (2008), ‘Council conclusions concerning joint programming of research in Europe in response to major societal challenges’, 16775/08, RECH 411, COMPET 551, Brussels, 3.12.2008

business sector and the integration of research and innovation. EIPs are focusing on innovations that address the major societal challenges, pursue a broad concept of innovation which involve all actors and regions in the innovation cycle, i.e. not only major companies but also SMEs, including the public sector, the social economy and citizens themselves ('social innovation'), and which focus not only in a few high-tech areas. (CEC, 2010) The first pilot EIP is under way on Active and Healthy Ageing. The concept of the EIP is wider and placed at a more generic level than existing initiatives like JPIs, or Art. 185 initiatives. The Active and Healthy Ageing EIP builds on various relevant initiatives (JPIs, FP7 projects, Art. 185 AAL, and CIP projects) while providing an overall 'umbrella' under which these initiatives can multiply their effects. (Wintlev-Jensen as referred to in Amanatidou, 2011)

6.2.2 Views on existing and new coordinating instruments

There are very different views and experiences of the instruments available, mainly because some instruments are much older than others. Smaller countries and in particular the EU12-countries are more hesitant towards coordination instruments as they fear they create closed clubs and/or are too labour intensive to take part in. In addition these countries have problems with the national contribution to these programmes. The issue of real/virtual common pot is addressed by several delegations. (ERAC, 2011)

There is strong support of ERA-NETs as well as ERA-NET Plus. They have already enabled the coordination of national programmes at a level not known previously and give a good return on investment from a limited Framework Programme budget. In general it is proposed that experience from ERA-NETs should be used to develop other coordination instruments. Support for Art. 185 is less with several delegations pointing out that it should be used case-by-case and not seen as a continuation of ERA-NETs. (ERAC,2011)

There is also in general less support for JTIs but here it depends very much on the degree of involvement. Countries not involved, in particular smaller countries fear that these initiatives become closed clubs and advocates the use of PPPs implemented through calls in the Framework Programme. The JTIs initiated are also very different in nature which makes aggregated experiences even less and more difficult. It is also too early to judge JPIs and even more so EIPs which are seen in the best case to bring all relevant instruments together. (ERAC, 2011)

In their entity, the instruments form a robust tool box for the better co-operation and co-ordination of national and regional research programmes. In particular, they provide a means to perform the co-ordination of programmes in an evolutionary approach, starting from the provision of the structure for the exchange of information and loose a posteriori project clustering up to the full integration ("merging") of national activities. (ERA-LEARN, 2011b)

Nevertheless, and in view of the newly introduced concepts, it is now imperative to clarify concepts on joint programming and its instruments, and clearly define the complementarity and synergies of new types of instruments alongside existing ones. The positioning of all instruments

in the joint programming landscape is imperative before any discussions on creating new ones. (Amanatidou, 2011)

The need for creating new instruments has to be thoroughly considered before engaging in new endeavours. (Amanatidou, 2011) The FP7 Interim evaluation even suggested a moratorium on new instruments until the existing ones have been sufficiently developed and adequately evaluated. It was further suggested to apply the one-to-one-principle by which a new measure can be launched only if an equivalent one is removed from the portfolio. (Annerberg, et. al. 2010) It is important to make use of the existing toolbox of instruments and rely on experiences and good practice rather than to create new structures that hinder transparency for the coordination of national research programmes. (ERA-LEARN, 2011b)

6.3 Governance and implementation of joint programming

The governance of joint programming activities needs attention. It is unquestionable that all the major stakeholders should be engaged, civil society included. To operationalise this principle however, it is important to define clear mandates of representatives in the governing boards. The role of actors differs in terms of decision making and this has to be accommodated in the governance structures applied. Ensuring a sufficient level of commitment by member states and stakeholders was again noted as crucial for the progress of the initiative. The role that the Commission should play in future joint programming is still under discussion. (Amanatidou, 2011)

An associated issue is also the way joint programming topics are selected, and whether they should be targeted only towards "Grand societal challenges" or not. These are still open issues for discussion. The FP7 Interim evaluation (2010) noted that a sharper division of labour is needed between what is done at EU level and what is undertaken in national programmes. Addressing the 'Grand Challenges' confronting the European Union should increasingly be at the heart of EU research policy. This process could be structured according to who sets the research agenda:

- Science for science – the researchers set the agenda
- Science for competitiveness – industry sets the agenda
- Science for society – civil society actors set the agenda (Annerberg, et. al. 2010)

At the same time national delegations place caution on the strategic management and the governance of the instruments, while also stressing that a better interaction between instruments at EU level and national/regional level is needed. This will require that definition of national policies and programmes takes into account the existence of EU priorities and programmes and visa-versa. (ERAC, 2011)

On the implementation side, the simplification of participation and implementation rules across the different coordinating instruments has been put forward in several occasions. Several suggestions have been made in this direction:

- A basic set of simple rules that are common across all joint programming instruments would lighten the burden put on organisations. (Amanatidou, 2011)
- common rules, governance structures and decision making structures. (ERAC, 2011) or
- harmonised and ‘outsources’ implementation using the experiences from the Research Executive Agency (REA)(ERAC, 2011) or those of Eureka in the case of Eurostars or EIB in the case of RSFF (Annerberg, et. al. 2010)
- Simplified structures to allow ‘quick starts’ without lengthy contract negotiations and minimisation of the administrative burden of running ERA-NETs. (Nielsen, 2010)

Overall, governance needs careful consideration to ensure effectiveness as well as inclusiveness. On the side of implementation, while a differentiated approach is required for the different instruments a shared core of rules may be possible to establish in view of implementation and efficiency.

7 Conclusions

The significant contribution of the ERA-NET scheme in the mobilisation and coordination of national / regional programmes in certain research fields is widely acknowledged. Despite the progress made, however, the level of fragmentation is still an issue which becomes even more important within the policy framework of dealing with grand challenges through research and innovation.

Several challenges still have to be tackled. The ERA-NET scheme had a catalytic function and the impact on national programmes was more important when there was strategic buy-in from policy-makers at national level. However, national strategies for internationalization of research are still the exception to the rule. While the research community highly appreciates the networking benefits from ERA-NET projects with their international peers, the effect of the scheme on the opening up of programmes is relatively limited.

The experiences and lessons learnt from the ERA-NET scheme are valuable in guiding the evolution of the scheme as well as the design of newly introduced ERA-coordination instruments. The problems to solve are quite similar across the different instruments. A major issue refers to the way areas and topics for cooperation are selected and consequently how agencies can choose which initiatives to joint. Another issue is the lack of the internationalisation dimension in national strategies in research and therefore lack of buy-in in relevant initiatives. The third problematic area concerns the implementation of trans-national cooperation and includes the issues of ensuring national (financial) commitment, aligning and harmonising national procedures. Mobilising national budgets for transnational activities under carefully considered national strategies for internationalisation of research is still a challenge.

The proliferation of ERA-coordination instruments also needs caution not to increase complexity and overlapping, and even another type of fragmentation. The positioning of the various instruments needs to be clarified along with their complementarities and synergies. Governance

also plays a major role in existing and future initiatives as well as in the way they can be linked and coordinated. Overall, governance needs careful consideration to ensure effectiveness as well as inclusiveness. On the side of implementation, simplicity again is the key principle to be followed.

Sharing the experiences and knowledge gained under the long-standing ERA-NET scheme is crucial in finding solutions to common problems as well as in guiding future developments in joint programming which increasingly gains importance in view of dealing with grand challenges. In this regard, the ERA-NET Learning Platform as well as NETWATCH have proven quite valuable. The ERA-NET Learning Platform has successfully played its role in facilitating exchange of experience, identification of best practices, and developing common procedures and practices in the ERA-NET community.

At the same time, it provides the necessary space for deliberation in setting strategies and visions, and taking steps in making ERA a reality. NETWATCH is providing important evidence and analysis to support decision-making and strategy-formation. NETWATCH also has significant potential in becoming a very important evidence basis in relation to joint programming when its focus extends beyond the ERA-NET instrument. Continuation of support of the ERA-NET Learning Platform and the NETWATCH information system is thus of unquestionable value.

8 References

- Amanatidou, E., Boekholt, P., Guy, K., (2010), 'ERA-NETs on Stage 2010 Final Report', Annual ERA-NET Event, Brussels, 23-24 March 2010.
- Amanatidou, E., (2011), 'Strategy workshop on Innovation Union: Joint Programming and its instruments' Final Report, Brussels, 7 April 2011.
- Annerberg, R, Begg, I., Acheson, H., Borrás, S., Hallén, A., Maimets, T Mustonen, R., Raffler, H., Swings, J-P, Ylihonko, K., (2010) Interim Evaluation of the Seventh Framework Programme, Report of the Expert Group, Nov 2010.
- CEC, (2000), Communication from the Commission to the European Parliament, the Council, the European Economic and Social, Committee and the Committee of the Regions, 'Towards a European Research Area' Brussels, COM (2000) 6, 18 January 2000.
- CEC, (2010), Communication From The Commission To The European Parliament, The Council, The European Economic And Social, Committee And The Committee Of The Regions, Europe 2020 Flagship Initiative Innovation Union, SEC(2010) 1161, COM(2010) 546 final, Brussels, 6.10.2010.
- ERAC-GPC (2010), 'Joint Programming in research 2008-2010 and beyond' Report of the High Level Group on Joint Programming to the Council, November 2010.
- ERAC (2011), 'ERAC report on ERA-related Instruments' Draft report 10 March 2011
- ERA-LEARN (2011b) Work Package 4 - Final Report.
- ERA-LEARN (2011a) Deliverable D3.2 'Pilot implementation of the internal review process for ERA-NET participation'.
- European Commission, (2011), GREEN PAPER From Challenges to Opportunities: Towards a Common Strategic Framework for EU Research and Innovation funding, COM(2011) 48, Brussels, 9.2.2011.
- European Commission (2010) "EUROPE 2020 A strategy for smart, sustainable and inclusive growth", COM (2010) 2020 Brussels, 3.3.2010.
- Horvat, M., Guy, K. et al, "ERA-NET Review 2006. The Report of the Expert Review Group", December 2006.
- Landwehr, A., Guy, K., (2009), 'ERA-NETs on Stage' Annual ERA-NET Event Final Report, Brussels 31 March - 1 April 2009.
- Lock, J., Albaiges, J., Edler, J., Kolar, J., Lambkin, I., (2010), 'ERA-NET Plus Review 2010', Final Report of the Review Panel.
- Matrix Insight – Rambøll, (2009) 'Summary of the Impact Assessment Study of the ERA-NET scheme under the Sixth Framework Programme', European Commission, Jun 2009.
- Nielsen, K., (2010) 'Workshops on continuation of ERA-Net networks' Final Report, Brussels, 8th-9th November, 2010.
- Pérez S., E., (2010), 'Mapping ERA-NETs across Europe: overview of the ERA-NET scheme and its results' JRC Scientific and Technical Reports, 2010.