



European
Research Area

EUROPEAN
COMMISSION

Conference overview and conclusions of the parallel sessions

**Working together
to strengthen research in Europe**

European Research Area Conference

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European Research Area

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I. Conference synthesis

Aim and context of the event

This conference was the first major research stakeholder event on the European Research Area since 2007. It was also the first major event of its type organised in Brussels dealing with the wider ERA policy development agenda (rather than with the Framework Programme as such). Its aim was to contribute to the development of key ERA policy initiatives as well as other areas of the ERA policy agenda under development or under consideration such as specialisation, research policy in the post 2010 strategy, etc.

The conference was designed to achieve this aim with the aid of a programme advisory committee including representatives of the current and forthcoming Council Presidencies and of major research stakeholder organisations, which met three times over the year leading up to the event.

The conference took place over three days and featured two plenary sessions and 12 parallel sessions. This conference design aimed to provoke as much debate as possible and to obtain as many critical and constructive views from stakeholders on the way ahead, and depended upon a considerable amount of pre-event preparatory work being done for each of the parallel sessions:

- Each session posed a question, or set of questions for discussion by the session participants
- Session participants, in the majority of cases, consisted of a Chairperson, a Main Speaker, Discussants and a Rapporteur. Speakers (based in many cases on the work of Expert Groups and designed to respond to the questions posed in the session and propose preliminary policy options) and discussants (responding to the Main speaker paper) prepared papers in advance of the event.
- The papers were made available ahead of the conference via the web where conference participants and non-participants alike could provide comments on them via a blog. This aimed to raise the preparedness of the delegates and the quality of the discussions.

Participants

The conference was attended by over 600 delegates representing 40 countries. It was opened by the European Commission's Director General for Research, José Manuel Silva Rodriguez, and the Swedish Minister for Higher Education and Research, Dr Tobias Krantz and was closed by the European Commissioner for Research Janez Potocnik and the Spanish Minister for Science and Innovation Cristina Garmendia.

There were in total more than 600 participants at the conference with representatives from 32 European countries and 23 representatives from 8 countries including Canada, China, Egypt, Israel, South Africa, Taiwan, Turkey and USA. All the EU Member States were present with most representatives coming from Belgium, France, Germany, the Netherlands, Sweden and the UK. The profiles of the participants were also as varied as they came from the whole spectrum of sectors, activities and interests which have a stake in the European Research Area: national governments and administrations from the Member States and beyond; universities; research performing institutions; research funding organisations; philanthropic bodies; civil society organisations; eminent researchers and experts.

Summary of conference sessions

Main plenary sessions:

There were two main plenary sessions featuring keynote speeches and panel discussions. The first '*What are the long term perspectives for research and researchers?*' took a prospective view to 2030 building on keynote presentations of the European Research Area Board's (ERAB) recently adopted 2030 vision and views from the US on ERA as well as the current US administration's long-term view and current policies regarding research. An important message from the discussion in which views from industry, universities and funding organisations were heard, was that one of the most important achievements since 2007 is the much stronger awareness that ERA can only be developed successfully if all the partners work together. Europe compared to the USA is deemed to have a strong

asset in its RTD Framework Programme, which can also be seen as an instrument for 'science diplomacy' vis-à-vis other regions and countries.

Other points noted include: the importance of moving from R&D to RDD (research, development, demonstration and deployment) in responsible partnership between industry and academia; simplification of funding programmes is crucial at national level as well as at FP level; better policy coordination is needed between EU and Member State levels and between relevant EU policies; attaining research excellence (associated with competition) should be distinguished from the aim of raising research quality above a minimum threshold level (associated with co-operation), noting that the two are not mutually exclusive.

The second plenary session '*Research and innovation in times of crisis*'¹ centred on the response and views of industry to the crisis with a notable message being that private R&D investment is largely being maintained through the downturn – at least for the moment – as a means of exiting quickly when the recovery kicks in. Business is strongly aware of the importance of research and innovation in the present difficult times and of the need to use resources in the most efficient and effective way. Business also acknowledges that the crisis increases the emphasis on the importance of sustainability in areas where some of the biggest challenges exist: climate change, energy supply, health, pandemics and the aging population.

A number of speakers (ministers and representatives of industry, research-performing organisations) expressed concern and criticism during the plenary sessions on the Framework Programme and its instruments, calling for major simplifications to be implemented. However, the views expressed by industry (including in some of the parallel sessions), were, in this regard, relatively more balanced and nuanced – calling for simplification while at the same time acknowledging the importance and value of maintaining and further strengthening the Framework Programme as a vital implement of ERA policy.

Parallel sessions:

The core of the conference consisted of 12 parallel sessions divided into two series entitled '*Addressing the dimensions of ERA: how can we accelerate and monitor progress?*' and '*Towards the 2020 ERA vision*'. The first series of eight sessions dealt with current policy development issues specific to the five ERA partnership initiatives (researchers, research infrastructures, international knowledge transfer, open access, joint programming, international co-operation), and other important research policy topics on which substantial work is ongoing (funding conditions for research institutions, indicators to measure progress). The second series dealt with aspects of ERA policy which are either emerging or where the agenda is not yet set (the future of national and community research policy, science and technology specialisation and foresight).

The sessions devoted to joint programming, forward-looking activities and to priorities for national and Community policies stressed the growing awareness both of major societal challenges and of the need to mobilize actors to address them collectively. Several conference sessions dealt with how cooperation within Europe can also help us to cooperate better at a global level, be it at the broad level of international S&T cooperation strategies or at the level of concrete knowledge transfer and cooperation activities between business and other research partners.

Some salient points noted from the various sessions include:

- The prospects for improving the coordination of social security and pension rights by joint action of research, employment and social affairs Ministers are crucial to improve the careers and mobility of researchers;
- To develop world-class research infrastructures, the funding of operation costs rather than just building costs, and of developing links with and between the research communities concerned, going from training to technology transfer are fundamental issues to address;
- To strengthen research institutions, there was a consensus on the need for common principles for external funding. Some major stakeholder organisations – EARTO, EUA, TAFTIE and several national funding agencies - will work on developing these with the Commission facilitating the work;

¹ For a summary of the main points of this session, see <http://ec.europa.eu/research/conferences/2009/era2009/documentation/conclusions/plenary2.-research-and-innovation-in-times-of-crisis-conclusions.pdf>

- A number of issues critical to improving international (extra-EU) knowledge transfer were identified and for which common guidelines could be developed in partnership with stakeholders;
- Member States, stakeholders and the Commission were called upon to strengthen open access and the preservation of scientific information;
- For the joint programming process, it was apparent that considerable progress has been made since the ERA debate in 2007. There was a clear call to involve more the main shareholders and stakeholders – including industry – in addition to securing the commitment of participating countries and finding options for financially supporting future Joint Programming Initiatives;
- To progress with the Partnership for international S&T cooperation, the commitment of participating countries and again the involvement of stakeholders is seen as vital;
- On priorities for national policies, combining more investment with qualitative reforms to encourage structural change, and increasing the contribution of national level policies and action to the development of ERA – including through smart specialisation needs to be fostered and will benefit all;
- The need to further strengthen the links between research and innovation policies was particularly stressed in relation to Community policies;
- It was also proposed that the three main orientations discussed in a number of different fora recently – i.e. bolder: strong focus on societal challenges and for engaging the Member States, the Commission and other stakeholders in a more strategic manner; better: the need across all policy-making levels to make policies more efficient and more effective to get the most impact from the limited resources available; and bigger: major societal challenges need increased investment in research - constitute a useful guide to the development of research policies at both EU and national levels for the coming years;
- Forward-looking activities have a vital role to play in helping to design priorities for future research policies and programmes and the overall ERA strategy;
- It is vital to translate the complexity of the ERA system and its 2020 vision into a clear and comprehensive framework of strategic objectives, action-orientated indicators and simple targets with which to develop ERA policy at national and EU levels in the coming years, to monitor and analyse progress towards ERA and the contribution of research to the post 2010 EU strategy and against which policy actors can be held accountable.

ERA governance and the increased involvement of R&D stakeholders in the development of ERA policies and actions was an obvious cross-cutting theme for the conference as they are challenges common to European and national policy makers and for all the policy issues discussed. In addition to a stronger partnership between national authorities and the Community, efficient and effective ERA governance also requires the full involvement of concerned stakeholders. In this respect, the conference was a concrete illustration of the more systematic consultations that has started and which will be increasingly pursued on all ERA policy development matters at both EU and national levels.

Conclusions and recommendations from each of the conference also are available on the conference website where interested parties can contribute to ongoing discussions via specific blogs.

To access the conference's home page, which, in addition to session conclusions, also contains all the papers and presentations as well as recordings of the webcasts of the different sessions, please follow the link <http://blogs.ec.europa.eu/ERAconference09/>

II. Session 1.1

Research careers: how to improve social security coverage and working conditions in a borderless research area?

The session covered five interrelated topics concerning the research profession:

- 1) Information
- 2) Social security coordination
- 3) Supplementary pension rights
- 4) Flexicurity
- 5) Training and Skills.

1. Information

The issue and context

An impressive array of information systems has been build up in recent years to support the mobile worker in general (EURES) and the mobile researcher in particular (EURAXESS). 200 EURAXESS mobility centres provide a range of information services to mobile researchers.

Analysis of the challenges and European dimension

Despite the overwhelming offer of general information at European and national level, the individual mobile research worker often lacks detailed information, tailored to his or her specific situation. This constitutes a serious obstacle to researchers' mobility in Europe.

Conclusions/Recommendations

1. National Social security administrations should commit themselves to effectively provide client tailored information to individual mobile researchers.
2. This tailor made information should be made accessible via an interactive EURAXESS rights platform, for which the Commission should make provisions.

2. Social security coordination

The issue and context

Member States are free to work out their social protection systems as there is no specific European social security system. Conditions for insurance and entitlement to benefits solely depend on the very divergent systems of the Member States. These conditions can, however, have an adverse effect on the mobility of workers. Therefore the European legislator set up a co-ordination system. The primary objective of this co-ordination is to rectify the aspects of national social legislation that may have adverse effects for employed or self-employed persons when they cross national frontiers. This system has been laid down in EC Regulations 1408/71 and 574/72 but will be replaced by Regulation 883/2004 as of 1 May 2010.

In order to fine tune the implementation of the regulations, it will be necessary to analyse how researchers' career paths relate to the "new forms of mobility" currently under examination for all workers. Such an analysis will also have to explore to what extent it may be feasible to cover specific needs of researchers through implementation guidance, administrative procedures and, if none of these are sufficient, new legislative initiatives which would complement the new regulation. This could happen on the basis of the specific characteristics of mobility (e.g. the succession of several short contracts in several Member States). Main actors here are the Member States, the Commission, Council, Parliament and stakeholders.

Analysis of the challenges and European dimension

Existing EU regulations do not cover as efficiently newer forms of mobility of workers who frequently work on short-term contracts in different Member States. Since researchers are among the most mobile categories of workers and can often hold a series of short term contracts during their careers, they are particularly likely to be confronted with difficulties. The transnational nature of this problem calls for a solution at European level.

Conclusions/Recommendations

1. There was consensus that researchers who work as employees should join forces with other categories of highly mobile workers such as journalists, artists and engineers rather than claiming to be treated as a "special" category of workers.
2. The key principles of the EU legal framework on social security co-ordination should become better known. Ways should be explored to overcome the disadvantages caused by a strict application of current rules, in particular the lex loci laboris (i.e. regime of the workplace) for highly mobile workers, including researchers.
3. Social security bodies are recommended to make more and better use of the possibility of exceptions foreseen by EU Regulations ("article 17 derogations"), which allow Member States by common agreement to choose the most appropriate national regime for the mobile worker.
4. Some institutions and funders provide research grants to young researchers with little or no social security coverage. On the one hand, this allows institutions to engage larger numbers of young people in research activities. On the other hand, this practice makes the research career less attractive compared to other types of employment and could be considered as 'social dumping'.
5. A stakeholders' forum could help to raise the awareness and foster debate on social security coordination and other issues relevant for the research profession.

3. Supplementary pensions

The issue and context

While the accumulation of rights of the public pension system via the social security coordination mechanism (1408/71 and its successor) is addressed, there are still many issues outstanding for supplementary pensions which are not easily transferable from one country to another. This problem concerns Member States, researchers, funders, employers and pension providers.

Analysis of the challenges and European dimension

Workers increasingly rely on supplementary pension schemes in order to provide for their retirement. However, the conditions for acquisition, preservation and transfer of supplementary pension rights are often not well suited for mobile workers such as researchers. The transnational nature of this problem calls for a solution worked out by Member States, pension providers, funders and employers, cooperating at European level.

Conclusions/Recommendations

1. Member States and the Commission, working in partnership with other stakeholders, should explore the feasibility to ease transfer of supplementary pension rights for mobile workers, including researchers.
2. Member States, the Commission and stakeholders should actively promote the establishment of one of more pan-European pension funds for mobile researchers, building on the outcomes of the feasibility study conducted on behalf of the Commission in 2009-2010.

4. Flexicurity

The issue and context

The policy approach throughout the EU for making the labour market more flexible, while providing security to workers is embedded in the EU wide agreed flexicurity principles. The core of the concept is in facilitating transition on the labour market. Flexicurity is of particular relevance for researchers, who suffer from too many short-time contracts on the one hand (young researchers) and too much mobility-frustrating rigidity on the other hand (senior researchers). The flexibility approach is also promoted to weather the economic crisis and to lay the foundation for the new economic upswing. This issue concerns researchers, Member States, funders and employers.

Analysis of the challenges and European dimension

The economic crisis is forcing companies to cut back on their human resources including researchers. The question should therefore be raised on the maintenance of research relevant human capital. Some countries have initiated specific measures to avoid human capital destruction which could provide a good basis for mutual learning organised at European level.

Conclusions/Recommendations

1. Member States are encouraged to take measures to ensure that laid off researchers are kept in research positions in line with agreed flexicurity principles. The Commission could organise mutual learning activities on crisis measures taken by Member States.
2. Commission and Member States are encouraged to increase the scope for action and visibility of researchers and other knowledge workers in the follow-up to the Lisbon Strategy and its Integrated Guidelines. Particular consideration should be given to the career development of women researchers.
3. Employers could be asked to work 'in tandem' to ensure smooth transitions between different contracts in the spirit of 'flexicurity'.

5. Training and Skills

The issue and context

Researchers need to be fully equipped with the skills necessary to participate in a range of roles in the modern knowledge economy. Next to subject specific knowledge, they need generic competences like communication, problem solving and leadership, allowing them to easily transfer between institutions, countries and sectors. The European Partnership for Researchers calls on Member States to develop "National Skills Agenda's". These Skills Agenda's should fit the Bologna Framework for Qualifications in the European Higher Education Area and the European Qualifications Framework for lifelong learning (EQF). Successful skills agenda's involve all stakeholders, notably universities and employers.

In addition to the skills development of researchers themselves, there is also a need to consider the impact of research and innovation on skills' development for the working population as whole, as outlined in the "New Skills for New Jobs" initiative.

Analysis of the challenges and European dimension

Researchers' competences, particularly the generic competences, are not well known and appreciated inside and outside academia. Europe could make a much better use of this high level segment of its work force by promoting a common understanding of their competences across countries and sectors. A common understanding on researchers' competences, at various career stages, could help to facilitate geographical and intersectoral mobility and enhance the overall appreciation for the research profession. An agreed set of competences could serve researchers' career development and help to better organise research training both at initial level (e.g. research schools) as well as in continuing professional development.

Another challenge will be to anticipate and define the future needs, in terms of skills and competences, of the broader workforce, resulting from research and innovation, with a view to better match labour demand and supply.

Conclusions/Recommendations

1. Member States, Commission and stakeholders should work in partnership to reach a common understanding on a set of researchers' competences at various career stages, building on the work carried out by the ERA Steering Group Human Resources and Mobility and other stakeholders forums.

2. Experts and stakeholders should analyse and define the skills and competences needed by the future workforce to be well equipped to address the changes resulting from research and innovation.

3. The suggestion was made to explore the possibility of creating a new funding instrument to support a substantial number of European PhD's allocated to a number of European Research Schools. These schools would need to fulfil a number of criteria such as:

- Compliance with the European Charter and Code
- Full costing transparency
- Being active in the three legs of the knowledge triangle (following the EIT approach)
- Being involved in joint degrees with partners abroad (as seen under Marie Curie, Erasmus Mundus and the KIC's)

III. Session 1.2

What are the next steps in developing world-class research infrastructures (RIs) in Europe?

The issue and context:

Pan-European RIs are dedicated to the support of research excellence via service in frontier research. Their European added value consists in attracting and supporting the best researchers and technicians in the world, selected by merit-based, peer review competition in all science fields, from Humanities to Physics. This international service, in turn, generates cutting-edge technology, education and management in unique and innovative ways, drives innovation and brings economic benefits in the hosting Regions and in Europe. RIs are, therefore, the backbone in the construction of the ERA, and their existence pre dates the European Union. Their first development and contribution was to the Renaissance (the medieval libraries/abbeys which preserved and promoted the technologies and knowledge of the Arab, Greek and Roman civilizations) and then to the recovery after WW2 (e.g. CERN, ESA, EMBL, ESO, bringing back Europe to world competition after the damage of the war). These, and subsequent efforts, show that when Europe has been able to integrate its resources and to speak with one voice at international level, it proves itself a global force in the related fields of research.

The present endowment of RIs in Europe is large and unique in the world, numbering more than 300 effective or potential pan-EU RIs mostly nationally owned, for a total investment of over €100 billion. If this investment is brought into international competition, and used to attract the best researchers in the world, it could help to strengthen the ERA, and offset partly the decreasing share of Europe in world resources, due to the growth of the emerging economies.

The evolution towards a more integrated system of pan-EU RIs is already well underway, thanks to the efforts of the EC (catalytic funding of access, at about €0.25 billion per year on an overall annual expenditure of €10-15 billion by national resources) and of ESFRI (building trust and developing a 'Joint Roadmap Programming' by the EU Countries). However, this process is still too slow, and now is at risk due to the small scale of investment and to the lack of effective governance arrangements, with new or upgraded RI requiring long term commitments to fulfill their pan-EU role. This conflicts with the increasing rigidity of national budgets and the effects of the current financial crisis (e.g. this may induce a growing protectionism).

The question to be addressed in this session is: 'how can we identify and avoid the main bottlenecks in developing this integrated system, establishing priorities for the next steps?'

Analysis of the challenges and European dimension:

The problems/bottlenecks impeding a more rapid evolution of a pan-EU system of RIs can be listed in the following order of impact:

- 1) Funding and quality issues: the need to find ways to combine EU and National funding more effectively; this needs a stronger EU financial support for 'quality driven actions' and supporting peer reviewed access and related quality developments.
- 2) Evaluating and prioritizing the use of resources: we need to continue with the coordinated development of national roadmaps helping, in a more structured way, in the evaluation and prioritization of needs and resources.
- 3) The attraction, education and mobility of human resources (research, technical and managerial): these issues relate to the need to attract researchers and technicians/engineers at world level, to educate and train new researchers and technicians/engineers, as well as to ensure the development of the necessary managerial capabilities, and the EU circulation (under the appropriate status) of all the critical aforementioned human resources.
- 4) Governance structures: the need to build on the positive experience of the EIROFORUM members and of the ERC, keeping in mind that governance must include the capability to give

scientific motivation and challenges and that different aspects must be focused at the various appropriate levels (e.g. ERA-level and RI-level).

Conclusions/Recommendations:

A general discussion of these issues followed presentations from the chair of the ERA Expert Group on World Class Research Infrastructures and from four invited experts. This gave rise to the summarised points listed below:

1. There was general agreement about the crucial role that RIs play in developing and maintaining the ERA – and support for a deeply connected and extensive implementation and use of e-infrastructure and data-access, as being also central to this vision.
2. Funding in general and in particular funding of the open access operation could become increasingly difficult, as countries cut national budgets following the boost in public spending to aid recovery through 2009 and 2011. This makes it imperative that the strongest possible case should be made to stress the pivotal role played by RIs in maintaining/improving the overall quality of the EU research system, to ensure future economic and social development and wellbeing.
3. Open peer reviewed access to RIs is seen as a way of promoting competition and enhancing the international reputation of the ERA as a research friendly environment. But such access brings with it additional costs which must be covered, because overall sustainability cannot be ensured solely by the cost improvements achieved by pooling existing resources. Further consideration should be given to mechanisms that would assist this objective.
4. The issue of evaluation and prioritisation across all scientific domains and between existing and new RIs is an important one and the Expert Group and ESFRI should give further consideration to it.
5. RIs rely heavily on a wide variety of human resources – not just the trained researchers capable of utilising the services of the RI, but also to provide overall direction, management and technical support for the service. Fostering these human resources is key to efficient operation and the long term vitality of RIs. Steps should be taken to ensure continuity of accrued employment benefits for potentially mobile researchers and to promote management skills.
6. The close relationship between universities and RIs contributes to an effective educational and scientific eco-system, which can be attractive and supportive for industry. A significant increase in research funding across the EU, would require a concomitant increase in the output of trained researchers from the higher education sector, and RIs can contribute to this effort, helping the multidisciplinary training needed by the industry and to tackle the grand challenges.
7. In terms of international relations, there was a perceived need for a single point of contact representing pan-EU RIs. This would be more than a 'voice for European RIs'. It would provide a vital link between non-EU funding agencies, non-EU RIs and their European counterparts.
8. New models (financial, including new EC Financial Perspectives and Financial Regulation; legal; etc.), taking into account the non-economic character of Research, for funding RIs should be promoted (in particular the investments in their construction/upgrade), in order to stimulate regional development and facilitate better access to available funds (e.g. EC, SF, EIB, etc.).

IV. Session 1.3

How can funding conditions for research institutions be improved?

The issue and the context:

External funding is an increasing source of financing research and has become a key component of the funding mix for research organisations.

Funding conditions have a major impact on the capability of research institutions to achieve their goals. Research institutions set up strategies and mechanisms to benefit from competitive funding, to comply with the requirements of external funders, to pro-actively diversify their sources of funding. Across Europe, external competitive funding is currently provided by different types of funders, each of them with their respective strategies and expectations towards research institutions. To support their research portfolios, research institutions must be in a position to manage a huge diversity of external funding terms and conditions in order to access to funds. As for an example, University of Oxford complies annually with 800 different providers.

It is important to make sure that research performers are provided with the appropriate funding conditions allowing them to correctly deliver excellent research, as well as to fairly compete and easily cooperate across national borders. Fostering the strategic capacity of research institutions, as well as ensuring the long term sustainability of their research portfolios are major challenges in the ERA context.

In the current context of scarce resources, ensuring that research institutions can properly access external sources of funding is of utmost importance. The aim of the session was to address the respective responsibilities of the various actors (external funders, research institutions, public authorities), identifying the current impediments reducing the efficiency of research institutions as well as the ways to overcome them. The objective was to build a common vision for funding research in a responsible way, based on a mutual understanding between funders and research organisations, where greater clarity and consistency of funding conditions, based on an acknowledgement of the real costs of research, could mirror with an appropriate accountability and efficiency of research institutions.

This vision, to be defined and implemented, requires the recognition of a commonality of purposes and a strong commitment of actors. It also requires a gradual opening up of the national borders in the ERA context.

Analysis of the challenges and European dimension:

The wide range of existing opportunities for funding research is as such an advantage in the European Research landscape, at it offers different ways for research institutions to sustain their scientific activities with respect to their respective strengths and profiles.

However, the current lack of consistency among the terms and conditions of external funding creates complexity for research institutions. The absence of common concepts or common understanding of costing terminologies, combined with the complexity of conditions and reporting requirements (financial and technical) is a barrier to enhanced cross-border collaboration and to the optimisation of the efficiency and sustainability of research funding. This is an impediment for achieving a well functioning European Research Area.

Existing barriers shall be gradually removed. There is a need for building a shared vision for external research funding based on common principles. This vision, to be implemented, should be built by the stakeholders themselves. The Community level will strongly support the engagement of stakeholders in achieving concrete results.

In the ERA context, at the time where Joint Programming is to be implemented, the consistency of funding conditions will be of great interest. Shared acknowledgement of the real cost of research and

shared simplified principles for reporting will greatly simplify the cross border collaboration and hence Joint Programming.

Conclusions/Recommendations:

The discussion stressed the central role of Universities and other research Institutions as key players for the achievement of the ERA. It particularly stressed the impact of funding conditions on research institutions' capabilities to deliver excellent research, and it underlined the joint-responsibility of actors – performers, research funders, national authorities – in ensuring the long term sustainability of the public research base and in overcoming national barriers preventing research institutions from a smooth cross-border collaboration.

The discussion emphasized the need for moving towards greater simplification, consistency and cross-border compatibility of competitive research funding terms and conditions. At the same time, full costing (ability to identify the real costs of activities²) was underlined as a key component of an institutional financial management expected from Universities in the ERA context. The acknowledgement of a commonality of purpose between research funders and providers and the need of promoting a culture of trust across the ERA were mentioned as important conditions for success. One of the panellists pointed out that many research and technology organisations already use analytical full cost accounting.

A consensus was reached among the panellists on the appropriateness of identifying common principles for responsible external research funding in order to achieve greater consistency and compatibility amongst the terms and conditions of external research funding in Europe. Major umbrella organizations representing European research institutions and European research funding bodies, namely EUA, EARTO and TAFTIE expressed their readiness to develop such common principles. They also explicitly called for a strong support from the European Commission to move into this direction.

The concept of a 'European Grant Union' suggested by EuroHORCs was perceived as relevant for the future of ERA.

The catalytic role of Research Ministries was strongly pointed out for promoting greater clarity on the costs of research and stimulating a mutual dialogue with the view of better securing the long term sustainability of the public research base.

The panellists recall the timely opportunity to come up with agreed shared principles for external funding at a time where they could possibly also be taken on board in the design of the future Framework Programme of the EU.

² Knowledge of the true costs is a transparent basis for the justification of research subsidies. It is also a pre-requisite to correctly price with business contractors.

V. Session 1.4

International knowledge transfer

The issue and context:

EU public research institutions are increasingly engaging in cooperation activities with non-European partners, which are not only important from an economic perspective but which can also, through the establishment of longer-term relationships, bring new ideas and improve the quality of European public research.

The Commission Recommendation on the management of intellectual property in knowledge transfer activities and Code of Practice for universities and other public research organisations (COM(2008)1329) was prepared in order to provide guidance for Member States and for research organisations to improve knowledge transfer practices in Europe and encourage a more consistent approach. Until its adoption, mainly national initiatives existed. The Recommendation called for a European approach to knowledge transfer not only within Europe but also in the context of international knowledge transfer. This Recommendation and Code of Practice were welcomed and endorsed by Council in May 2008.

However, the Recommendation and Code of Practice did not address specifically knowledge transfer between European public research institutions and non-European public/private partners. Due to the added complexity in this area of knowledge transfer there is a need for further guidance, addressing issues of intellectual property management and the fair and equitable treatment of results in a manner which brings mutual benefits to all involved. As a follow-up to the Council Resolution, Member States, Associated countries and the Commission have recently begun to work on such guidelines in partnership via a CREST working group, which was established to promote the take up of the Commission Recommendation and Code of Practice and develop further guidelines where justified.

The purpose of this session was to identify and discuss with stakeholders the issues which affect knowledge transfer between European public research institutions and non-European public/private partners, to examine their effect, and to identify how they may be addressed, through guidance, support measures and/or other means.

The speakers were experienced in different aspects of "international" knowledge transfer, and the Chair of the session is also the Chair of the CREST working group on knowledge transfer in which discussions on these and other subjects are taking place between Member States and Associated countries.

Analysis of the challenges and European dimension:

Cooperation between European research institutions and non-European partners is increasing, and, in a growing global knowledge economy will continue to do so. However the significant differences in legal systems, different cultural approaches and divergent business practices affect this cooperation and need to be addressed properly. It is important to raise awareness of the issues which affect this cooperation and help research institutions develop policies for cooperation with non-European partners

At present, advice and support offered at a European level does not fully address the needs of European research institutions as well as SMEs wishing to engage in knowledge transfer with non-European partners. The provision of guidelines in combination with other support mechanisms (e.g. interactive IT tools, Helpdesks), for example, could help to raise awareness and provide the necessary guidance on knowledge transfer in an international context and therefore facilitate a more consistent European approach. The implementation of common European guidelines could also ensure fair and equitable treatment of European research institutions in international research projects whilst mutually benefitting all partners, making cooperation with European research institutions more attractive.

Conclusions/Recommendations:

The following issues were identified as being important considerations to research cooperation with non-European partners:

- Building trust. Cooperation should extend beyond the reliance on contracts and/or often abstract legal frameworks. Common practices, such as the development of a “code of conduct” used by partners from both countries, could help.
- Cooperation should be carefully planned beforehand, and a strategic approach should be adopted, addressing issues including "why undertake cooperation? Where? With whom?"
- Organisations need to be clear about what they want to achieve, and whether a potential partner can deliver.
- Guidelines should reflect that, even in individual countries, a great deal of regional diversity exists and that individual approaches may be required to reflect that diversity.
- Existing intellectual property provisions in international research cooperation agreements should be evaluated.

To address these, policy makers could work together with stakeholders to develop guidelines aimed at helping public research institutions to develop strategies for cooperation with non-European public/private partners, and update them as necessary. Such guidelines could be used by the Commission to complement the Code of Practice, and could address in particular the following aspects:

- Differences in IPR systems which may affect knowledge transfer, such as:
 - Ownership
 - Access
 - Dissemination
 - Use/exploitation
- Problems arising from different legal systems and cultures, including:
 - Enforcement of IPRs
 - Different approaches to contract negotiation and agreement
 - Different approaches to knowledge transfer at the institutional level
- Building trust between partners

Member States, stakeholders and the Commission could promote these guidelines at national and European level, and ensure that adequate support measures are put in place for their implementation.

A dialogue could be developed and maintained with non-European partners as part of the process of promoting and implementing the guidelines.

VI. Session 1.5

Open Access and Preservation

The issue and context:

- The Web has changed the way science is communicated, allowing for much faster, wider, deeper dissemination of 'traditional' outputs, such as articles in journals, and of data (raw, derived, reduced, etc).
- Progress on improving the efficacy of dissemination by Open Access is hindered by a number of things – researcher unawareness of opportunities, researcher misunderstanding of copyright issues and what they are allowed to do with their outputs, publisher obstruction particularly by manipulating the copyright issue in their own favour, lack of understanding of the opportunities in research institutions and by research funders
- Some progress has been made in terms of policy developments by individual funders and institutions, but this is patchy
- Industry, which innovates upon basic research, has poor access to that research in Europe
- The Commission, as a funder, has mandated that Open Access be provided for 20% of FP7-funded outputs
- The Council of Ministers produced recommendations for Member States in late 2008 that, according to the CREST survey, have been acted upon only minimally, with some MS more active than others and some leading the world in this regard

Analysis of the challenges and European dimension:

Looking forward to a new Framework Programme needs to take into account that, in future, the way research will be carried out will have profoundly changed from what it is today. Computerised methods and machine applications will play a major role in data-driven science. The use of machines and computerised science is the major rationale behind the growing trend to provide all kinds of research information in an open, re-usable format. Open Access is a transformative principle in research communication that can improve the efficacy of the scientific effort in ERA and worldwide.

Since Open Access is not a means in itself, but only a gateway to the exploitation of research results, three major challenges need to be met:

1. It is necessary to motivate the provision of any research results in an openly accessible format that also ensures re-usability by others throughout Europe and the world – and all of this for a very long time.
2. Digital research publications, data, software and tools to manipulate the data need to work together seamlessly. This requires a European research communication ecosystem of efficient infrastructures that enable and encourage a culture of sharing.
3. The open provision of research results and data will only lead to economic growth in Europe and the world if highly efficient search and retrieval functionalities are put in place that allow the discovery of all relevant material and present it in useful ways. This kind of service is needed not only by the research community, but also by stakeholders in industry, especially SMEs, which build upon the results of scientific research.

The following recommendations answer to these three broad fields.

Conclusions/Recommendations:

Theme: the need to provide research outputs (articles, books, datasets etc) in an openly accessible and easily re-usable way

- Continue and expand the Commission's mandatory policy on providing Open Access to 20% of FP7-funded research articles: the policy should cover 100% of articles and datasets
- Require a data management plan for each EU-funded project and promote best practice on data provision, care and storage
- Explicitly acknowledge this need for proper data management by allowing an element of funding in each grant awarded to be spent on ICT activities relating to preservation of data outputs (we anticipate that this may amount to 10-15% of the cost of the project in some disciplinary areas)

- Mindful of the increasing importance of machine readability and manipulation of research outputs in future research and data generation, take steps to discourage PDF as a science output format and encourage and enable the use of XML as the common standard
- Address the issues of rights of use, and of article and data ownership. A legal regime is needed in Europe that enables reusability and creates a culture of sharing of scientific outputs, and new copyright rules are needed that are appropriate to academic research requirements, taking into account the requirement not just to access but also to re-use research outputs
- With regard to long term preservation of articles, develop a pilot e-journal registration service so that libraries can be sure which material is being formally looked after for the long term by other agencies and which they themselves need to take steps to preserve
- Work on the establishment of financial mechanisms to enable Open Access publication

Theme: the need to provide an integrated system of science communication – an ecosystem of infrastructures – that ensures the optimal functioning of the system

- Encourage *research institutions* across Europe to adopt common policies and standards that allow sharing of all research outputs (noting that the institutions fund and maintain the infrastructural components of the system but that individual research disciplinary communities will need to develop guidelines on good practice, since this will vary between disciplines). Institutions should be the locus for collection of the original research outputs and centralised (perhaps disciplinary-based) services should harvest, mash-up and re-present content in ways that suit disciplinary needs
- Act upon the aspiration to make ERA the world leader in establishing a culture of research sharing: currently the focus is on national-level policies and practices and coordination is lacking across Member States
- Support and reward researchers who participate in the culture of sharing. New systems of assessment, recognition and reward need to be developed, along with the tools to provide them. In particular, address the need for new metrics to measure worth and performance of individual scientists, derived from the usage and impact of both publications and data outputs
- Joining the system up properly at technical infrastructure level will provide the means to develop these things. One component is already in place – the CERIF metadata standard that provides the syntactical foundation for describing not only the research information/outputs themselves but also the context in which they are produced. Encouraging the development of further technical standards that address similar issues is essential in building the foundations to enable true interoperability across the European repository network
- Coordinate the development by Member States of facilities to store and preserve outputs, including complex objects, at a decomposed level, enabling future generations of scientists to access and re-use individual components of the outputs

Theme: the weak link between the basic research sector and innovative industries in ERA

- Take the necessary steps outlined above to collect and present scientific information in an openly-accessible form for innovating SMEs to use
- Provide assistance to innovating SMEs to enable them to discover, find and obtain research material that they need to create future wealth

VII. Session 1.6

Towards Joint Programming in research: For whose benefit?

The issue and context:

This summer the Lund Declaration furthered a debate launched by the 2008 Ljubljana Process stating that "*European research must focus on the Grand Challenges of our time, moving beyond current rigid thematic approaches. This calls for a new deal among European institutions and Member States, in which European and national instruments are well aligned and cooperation builds on transparency and trust. [...] It will require Member States to develop more pro-active strategies on research priorities at regional, national and Community level.*"

This comes in perfect resonance with conclusions of the 2008 Spring European Council, in which the contribution of science and technology to solving major societal challenges was invited through initiatives for Joint Programming in research. Joint Programming is a structured and strategic process whereby Member States agree on a voluntary and à la carte basis common visions and strategic research agendas in a partnership approach to addressing those challenges.

National research currently makes up 85% of all European public research funding, and so the potential for raising in short to medium term the impact of the entire research fabric lies much more in Member States selectively pooling their resources and better coordinating their efforts than in looking for additional support.

State of play:

Political support for Joint Programming is growing steadily. However, some parts of the scientific community voice concerns, fearing that top-down programming will crowd out bottom-up research funding.

The development of the **Joint Programming pilot on Neurodegenerative diseases**, including Alzheimer's disease, **is promising.** Representatives from 21 countries have joined in the Joint Programming Initiative (JPI) management board and 6 October, under Prof. Amouyel's chairmanship. The JPI Scientific Advisory Board is about to be established to further define the initiative's vision and its Strategic Research Agenda.

The **selection of themes for Joint Programming is underway.** A high-level group of Member State representatives (**GPC**), set up early 2009, is working on identifying "a limited number" of themes for Joint Programming amongst the some 20 presented. The adequate involvement of regional and local governments, the science community and industry is being ensured via national stakeholder consultations. The GPC is expected to deliver to the Council its first set of priorities by the end of 2009. The identification of mature themes will be a continuous process.

The development of Framework Conditions has started. The GPC has decided that work on these issues will be carried out under its auspices, with close involvement of the Heads of the Research Councils (EuroHORCs) and possibly with the involvement of other stakeholders such as TAFTIE, RPOs and industry.

The role of the Commission is getting clearer. Regarding the work of the GPC, the Commission is a member and supports the group's work within the remit of its competence, providing a state of play of European research for each of the chosen JP themes, putting forward recommendations on selected themes, and analysing the use of existing instruments.

Highlights from the session:

Discussions in the session highlighted:

- That evident progress has been made since the last ERA Conference (Lisbon, 2007) – 'mind sets' have become more positive; Member States have proactively taken steps and trust is growing.
- It was necessary to clarify early in the session that Joint Programming is a process providing a framework for co-operation.

- Whilst high-level political support *is* important there remains the need to involve more shareholders, (Research Councils, Ministries other than Research) and stakeholders (i.e. the main actors affected by relevant socio-economic challenges)

The session clarified that Joint Programming poses different challenges to different countries who in many cases seek to primarily build on existing public research strengths. Where an emerging JP theme corresponds more to sectoral strengths, countries are considering when and how to involve industry. Furthermore, depending on the state of 'maturity' of national and regional research systems the challenge remains as to how to calibrate with emerging JP themes.

A very real issue related to the current trend in research programming by governments between Top-down approaches (also called "society-driven" or "strategic", based on multi-annual programmes such as in the Community Framework Programme and Joint Programming) or bottom-up ones (responsive to research drive like in the ERC)

- The Session concluded that top-down and bottom-up is not an "either or" option however there are clear roles around either approach with policy makers having the primary responsibility for identifying societal challenges, articulating the vision and setting out the objectives. Evidently it is for the researchers and subject experts to set out the Strategic Research Agendas to achieve the aforementioned objectives and to help realise the vision.
- Those who are used to programming for themselves may have problems to redirect their multi-annual programmes;
- Those who do not readily practise programming in a targeted way can identify opportunities (several countries are seen to move towards more strategic approaches);
- But strongly "strategic" countries in the past (CH, AT, EU) are also introducing more bottom-up components.
- Whatever approach finally prevails, the need for competition based on excellence remains

A major point was that, like FP6 coordination tools introduced by the Commission (Art.169 initiatives, ERA-NET scheme), the wider Joint Programming approach, may bring more programmes and programming modes in the ERA, with two significant differences however:

- Joint programming themes will be deliberately cross-sectoral (different to the Framework Programme), and
- The same Member States will find themselves programming both for their home-based activities and for the JP initiatives with which they become associated.

This might create an opportunity to streamline/rationalise the existing portfolio of funding instruments and rules at regional, national and EU level and help to counteract unnecessary fragmentation. The Framework Conditions discussed by the GPC have an important role to play here and particularly in relation to their deliberations regarding a peer review system which the session concluded absolutely needs to be accepted and trusted by all concerned.

Whilst the question of 'money' has not yet been addressed by the GPC, it certainly was a discussion point in this session. As JP is about optimising our investment in certain areas with the objective of achieving greater socio-economic impact, it was widely agreed that in the current economic climate we need to show the EU tax-payer that their money is being well spent before researchers can expect any new money.

Main conclusions from this session:

Three conclusions can be drawn from the session:

- Considerable progress has been made on Joint Programming since the ERA debate in 2007.
- More awareness of the JP-process is needed in order to build up more confidence and trust in the relevant communities.
- Whilst for this first round it is understandable that the identification priorities is done in an ad hoc manner, future prioritisation processes need to be done using more coherent and robust mechanisms.

Two questions in particular need further debate:

- At what stage of the JP-process would it be appropriate to involve industry in the dialogue on research priorities?
- What are the options for financially supporting future Joint Programming Initiatives

VIII. Session 1.7

How can the European partnership for international science and technology cooperation be driven forward?

The issue and context:

The world is facing global societal challenges such as coping with climate change, ensuring energy security and safeguarding the environment, which require answers from science and technology. The complexity of these challenges requires the involvement of the best expertise from various disciplines from all over the world.

In its Communication on a Strategic Framework for International S&T Cooperation of September 2008 (COM(2008)588) the Commission pointed out that in view of increased globalisation, economic interdependence and common challenges international cooperation becomes ever more important to improve Europe's position as an attractive place to perform S&T.

Increased international cooperation by research funders and performers is largely driven by those developments. It is therefore crucial that stakeholders are substantially involved in realising the new European Partnership for international S&T cooperation which was initiated by the Competiveness Council in December 2008. The Council invited EU Member States to facilitate consultation between interested stakeholders in order to identify opportunities for and, where appropriate, obstacles to the development of scientific and technological cooperation activities between the European Union and the rest of the world.

While EU Member States and the European Commission have already started to work in partnership in the Strategic Forum for International S&T Cooperation (SFIC), the engagement with stakeholders needs to be improved. To this end SFIC has set itself the objective to identify and develop regular contacts with relevant stakeholders worldwide.

The purpose of this workshop was therefore to identify ways and means to better engage S&T stakeholders, such as public and private research organisations, agencies, universities, and industry, with the strategic discussions of Member States and the European Commission within the Strategic Forum for International S&T Cooperation (SFIC).

Analysis of the challenges and European dimension:

The global research landscape has changed substantially. S&T policies and strategies at national and European level are entering to a new phase where international cooperation will play a key role. While Europe is still a major S&T player on a global scale there is nevertheless a need to move forward in joining forces and acting in a coordinated manner to improve efficiency and to generate a higher impact for European research.

S&T stakeholders must be at the core of developing such a strategy as they form the backbone of the European Research Area (ERA). When referring to stakeholders - also within the context of international cooperation - it refers to research funding organisations and agencies, research performing organisations, universities, scientific societies, and their national and European umbrella organisations, technology platforms, the private sector, and others.

To generate a critical research mass vis-à-vis our third country partners requires that S&T stakeholders define together, rather than in isolation, priority research and technology areas where a coherent EU effort would have more impact.

At the same time enhanced strategic political priority-setting at national and European levels triggers top-down approaches. This challenges S&T stakeholders with their own distinct priorities and bottom-up activities need to be reconciled with such top-down approaches.

Summary of discussions, conclusions and recommendations:

There was general agreement that:

- Opening the ERA to the world' requires a more systematic and broader involvement of stakeholders whenever strategic policy decisions are prepared, discussed and implemented (such as in the Strategic Forum for International cooperation and its related Task Forces)
- the policy level (for example the Member States and the European Commission) ensures strong interactive links and communication channels with major actors at all levels (national, European, global as well as between different scientific areas/disciplines)
- a longer term perspective to define what to do with whom needs to be developed and necessary resources need to be allocated
- more evidence based policy making, with systematic data collection, indicators and statistics are needed at Member States and European level
- International S&T activities with our major partner countries need to be based on mutual interest and mutual benefit.

Furthermore it was stressed that this new European partnership for international S&T cooperation must be based on a joint ownership by all those who will be actively involved in its implementation. This can be developed by:

- building on what already exists, what works well and learning from good practice;
- using and enhancing existing national, sectoral and European mechanisms and instruments. This includes cooperation in multi-national research activities, sharing research infrastructures, joint doctoral programmes and double degrees, joint institutes established with major partner countries, etc.;
- expanding bi-lateral cooperation to a multi-lateral level and reconciling top-down and bottom-up initiatives;
- providing funding streams designated for fostering international cooperation activities of scientists ;
- making further progress in removing barriers for international mobility for starting and advanced scientists;
- stimulating and facilitating actions which support the identification of international research agendas.

Panellists and participants put forward the following recommendations:

- National policy makers should ensure that the international dimension is taken into account in national policies and programmes and reflected in the respective legal and regulatory frameworks, e.g. opening up national programmes, adapting IPR and tax systems.
- National funding agencies should allocate resources for international S&T cooperation. So far, joint activities between national funding agencies involve mainly two countries with the exception of the European Science Foundation (ESF), the Nordic countries in the context of NordForsk and the German-speaking countries in the frame of D-A-CH. The latter multi-lateral examples might form models for the extension of bi-lateral partnerships into broader cooperation initiatives. Opening of funding programmes, establishing common pots and "funding follows researcher approaches" are some of the means supporting cross-border cooperation. The EUROHORCs, ESF and also TAFTIE are appropriate platforms for discussing such developments.
- European universities and other research performing organisations and their European umbrella associations should be key actors in international S&T cooperation. This holds for individual universities and their associations but increasingly also for university partnerships such as e.g. the International Alliance of Research Universities, the Global Alliance of Technical Universities, the World University Network or the Alliance for Global Sustainability. However, it has to be ensured that such networks are not closed clubs.

- Technology Platforms and Joint Technology Initiatives are developing international strategies and activities and should be taken as examples of good practice. This would also allow for enhancing links to the business sector.
- Scientific societies are well positioned to analyse grand challenges and to define S&T roadmaps for international cooperation. They should therefore be involved in strategic discussions at an early stage. An example of best practice is the European Plant Science Organisation (EPSO).

An example of structured stakeholder involvement is the recently formed European Energy Research Alliance (EERA) which is part of the SET-Plan and e.g. has already become active in cooperation with the US. The European University Association (EUA) is a partner in the Executive Committee of EERA. In addition, EUA has launched a University Platform for Energy Research in that context.

The Strategic Forum for International S&T Cooperation will, hence, not work in a vacuum. It will involve S&T stakeholders actively to identify appropriate priorities and harness research cooperation for the mutual enhancement of European and our major international partners and also to identify most appropriate topics and instruments for joint initiatives.

IX. Session 1.8

Which indicators to measure progress?

The issue and context:

This parallel session addressed the question on the development of an evidence-based monitoring system on progress towards the ERA and a knowledge-based economy. This work forms part of the overall governance system of the Ljubljana process and contributes to the post 2010 EU strategy for Growth and Jobs.

The discussions were based on a report elaborated and presented by the expert group "ERA indicators and ERA monitoring". The debate was further enriched through presentations by the discussants of the group and by the Chair of the session.

Discussion:

The expert group report is considered as a good basis for work on developing an evidence-based monitoring system of ERA and its contribution to a more knowledge-intensive economy in Europe. The concrete indicators proposed are very useful and relevant, but they constitute proxies that will be progressively improved.

Indicators

It is important to specify the concept of ERA when setting up a monitoring system. Three complementary focus can be distinguished: a) ERA as the European internal market for research; b) ERA as a tool to achieve a knowledge-based society (Lisbon objectives); and c) ERA as a sum of structural components defined in the ERA Vision for 2020.

Indicators serve as a tool, a trigger to achieve better understanding but also to communicate, to mobilise, to ensure accountability of the main actors and to evaluate the impact of actions. The evidence-base has therefore to be elaborated in a simple and understandable way, but must still cover a comprehensive set of issues in order to represent the reality in a valid manner.

In this sense a comprehensive monitoring system should include "input" indicators, "system efficiency" indicators and "outcome and impact" indicators. In addition, there should be a systemic approach in the sense that no indicator should be seen independently. The session therefore welcomed the proposal of three corresponding sets of indicators. Some indicators proposed in the report of ERAB were also mentioned as useful (such as an indicator on the structural funds and on public procurement) as well as indicators on innovation (venture capital or an indicator on the growth of firms were mentioned).

Objectives

A monitoring system does not consist only of indicators. Each indicator should be linked to a policy objective. There should be an effort to ensure 1 indicator for 1 objective, and if there would be two or more indicators for an objective, the indicators should be complementary, not alternatives. For the objectives of which the realisation implies a wide set of activities, a composite indicator constitute also an alternative to be considered.

The reconciliation between complexity and communication can indeed be enhanced by some composite indicators. This is also an instrument for "mobilising" the public and foster accountability. These composite indicators should be carefully designed both with respect to their individual components and for the weighting of each component.

Targets

An important variable in the choice of policy targets is the issue of accountability: who is responsible for progress? Other aspects to consider on target-setting are the normative aspects of indicators (indicators are tools, not targets in themselves) and the reflection on what is the ideal situation (Is "more" always "better"?). The discussion stressed both the need for evidence-base and the realisation that the "optimal" level is mainly in the end a political decision.

One challenge is how to translate ERA targets at Member States level. The session discussed the need to make country grouping and the criteria to make meaningful groupings of Member States. Indicators that underline differences between countries are important in this context. When setting and interpreting progress towards targets it is important to take country-specific characteristics into account. Countries could be grouped based on countries with similar industrial structure, size, etc. The country grouping is also important to fully grasp the cohesion aspect of progress towards ERA. The taking into account the country specificity should avoid reducing the degree of ambition for each group of countries.

Conclusions/Recommendations:

- 1) The session broadly agreed on the structure proposed by the expert group report and on a majority of the proposed indicators.
- 2) An evidence-based monitoring system need to reconcile complexity with simple communicable policy messages, a more comprehensive understanding of reality with a clear accountability of the key actors.
- 3) A monitoring system needs to include both "input", "throughputs" and "outputs and impacts" dimensions.
- 4) Further work is needed to develop composite indicators
- 5) The ERA monitoring system must also include measures of efficiency of ERA in fostering knowledge-based society controlling for different patterns of specialization. This concerns also the innovation gap.
- 6) For national target setting, specificities of countries must be taken into account without unduly reducing the degree of ambition.
- 7) The stakeholder consultations are key to ensure common understanding of the indicator and for ownership and mobilising effects of the targets.

X. Session 2.1

Which priorities for national research policies post 2010?

Context of change and opportunity:

- We are in a time of change: economic downturn, emergence of new global competitors and facing a number of global challenges
- We are in a completely new situation – the Lisbon Treaty is opening up opportunities for ERA:
 - to design new framework for implementation,
 - new partnership between the Commission and Member States, e.g. a new comprehensive strategy on patents
 - Political ownership by national parliaments is important
 - Opening ERA to the world
- Need for more optimism – Europe needs to emulate the optimistic spirit of US and acknowledge its own achievements e.g. success of FP

Discussion:

- 3% target for R&D to be maintained – 1% for publicly funded research and 2% as indicator of how effective the improvement of framework conditions and incentives for business are in generating business funded R&D.
- Knowledge triangle investments are important, in particular increased funding for universities and research performers
- Broad consensus that considerably more investment in the national education systems is necessary. However, there was a lively debate whether to focus on the Higher Education part (with a target of 2% of GDP) or whether to target the whole education system in line with the life-long learning concept.
- Each of the KT corners has different spatial characteristics. The EIT can play an important role as a flagship demonstrating within the KICs, the synergy of research, education and innovation activities.
- Priority should be given to member states efforts to ensure the stability of funding
- The specificities of member states need to be taken into account, but without decreasing the overall degree of ambition

Agreement on:

- Need to ensure sound market demand for innovative products, processes and services, if companies are to invest in R&D.
- Priority needs to be given to structural reform, structural change and innovation-friendly environment through demand-side policies:
 - innovative procurement and pre-commercial procurement of R&D services, lead markets and venture capital, standardization, affordable European patent, state aid, tax policy
- Stakeholders call for changing the EC financial regulation applied to Research funding similar national rules to reflect high trust approach and to encourage further development of public-private sector R&D partnerships such as JTIs

Proposed actions:

- Combining qualitative and quantitative efforts to meet 2020 challenge, accompanied by related targets.
- Launch of lead research initiatives with Europe taking the lead in emerging technologies
- Investing in and reforming universities and lifelong learning and education
- Support poles of excellence, KICs and research and innovation driven clusters, based on a comprehensive policy for - open innovation and use and sharing of IP - EIT and KICs as stimulating agents for innovation at European and national level

- More innovation-friendly and competitive environment for business
- Reinforced environment for new technology and innovative spin-offs and start-ups has become a matter of priority - Fast track system for innovation-led Knowledge Intensive Firms to lead global sectors
- Award for entrepreneurs

XI. Session 2.2

Priorities for Community Research Policies

Introduction:

The main speaker in this session presented some of the recommendations which were in the process of being finalised by the Expert Group on "The Role of Community Research Policy in the Knowledge-based Economy", due to present its report at the end of October 2009. In turn, the four discussants offered some of their own priorities for future Community research policies, with the audience at the event invited to do likewise. The policy suggestions presented below thus reflect not only the recommendations likely to be made by the Expert Group, but also those suggested during the session and in discussions with participants immediately afterwards.

These suggestions fall into three groups. The suggestions in the first group deal with the problems research can be expected to address; those in the second deal with policies designed to strengthen and improve the position and performance of researchers in various settings (e.g. universities, RTOs, industry etc.); while those in the third group deal with the governance of research-related policies and their delivery.

A final section picks out three dominant themes that could form over-arching orientations for both Community and Member State research policies post-2010.

A Problem-oriented Approach to Research Policy:

- Focus on major societal problems, particularly those that require joint research to resolve and that involve the creation of new markets
- Place greater emphasis on altering the direction of technical change
- Use existing instruments (Cooperation programme, ERA-NETs, Joint Programmes, JTI, International Cooperation etc.) to tackle 'Grand Challenges'
- Set the overall direction for research to follow, but incorporate bottom-up elements in project generation, ensure excellence via competition and support high risk research
- Link supply and demand elements via lead market initiatives and greater use of research and innovation-friendly procurement instruments

Improving Research Performance:

- Increase the commitment to research and innovation, especially at the highest levels of governance
- Set new targets for public expenditure on research (1%) and higher education (2%)
- Strengthen individual components of the research system and corresponding infrastructures in order to meet new challenges
 - Encourage modernisation of universities via the introduction of competitive institutional funding schemes that reward progress towards greater autonomy, transparent accounting systems, leading edge PhD training schemes, entrepreneurship courses, research group leadership etc.
 - Support high-tech start-ups via targeted schemes that encourage them to carry out high risk research
 - Support the development of infrastructural elements (e.g. a Community patent system) that encourage and facilitate open innovation
 - Build truly European institutions by strengthening the ERC and the Knowledge and Innovation Communities of the EIT; exploiting the new legal framework for establishing European Infrastructures; and launching a new Joint Research Initiative scheme
- Strengthen the links between research and innovation actors, especially within clusters and between countries

- Continue to support collaborative R&D projects that involve a diverse range of R&D and innovation performers, intermediaries and users
- Launch a new scheme targeted at research relevant to the needs of actors in the service sector
- Work with other Directorate Generals (e.g. DG ENTR and DG REGIO) to support the research component of cluster development schemes
- Develop a truly European strategy for International Cooperation via SFIC
- Continue to develop mobility schemes, particularly those that promote global brain circulation
- Support the opening-up of national programmes via time-limited Community contributions to programmes demonstrating movement in this direction

Governance and Policy Delivery:

- Improve policy delivery via greater efforts to reduce administrative burdens
- Encourage the spread of an evaluation culture by supporting appropriate training schemes and networks
- Make a special provision for research in the Financial Regulation that recognises its risky nature and helps to rebuild a relationship based on trust between the Commission and the research community
- Ensure greater policy coherence and links between supply and demand policies, and between policies affecting research, education, innovation and market development
 - Make greater use of Pre-Commercial Procurement
 - Encourage the participation of high-tech start-ups and entrepreneurial SMEs in research and innovation-friendly procurement initiatives
 - Set an example to Member States by launching joint initiatives involving DG EAC, DG ENTR and DG REGIO and supporting similar initiatives at a national level
- Support the evolution of differentiated strategies for different countries and regions, focusing in particular on smart specialisation
 - Devise schemes that will help regional policymakers to devise smart specialisation strategies
 - Work with DG REGIO to ensure that a greater proportion of Structural Funds are devoted to the development of knowledge economies
 - Make the provision of Structural Funds conditional upon a commitment to smart specialisation and progress towards it
- Further promote joint programming between Member States via Community contributions to resultant initiatives

Overall Orientations for Community and Member State Research Policies

- Adopt three overall orientations for Community research policy post-2010 that could also be shared by Member States
- In short, develop policy portfolios that can be described as:

Bolder

The opportunity to exploit win-win situations by focusing research on areas likely to lead to both the resolution of major societal challenges and the growth of new markets for innovative goods and services should be grasped firmly and promptly

Better

Research system performance at national and European levels needs to be continually improved if the goal of a fully functional ERA is to be realised. Moreover, in the light of the current financial crisis, the efficiency with which existing resources are deployed also needs to be improved

Bigger

Investment in research and research infrastructures needs to be expanded if the EU is to continue to make headway in its attempt to become a leading knowledge-based society.

XII. Session 2.3

Which future for S&T specialisation?

The issue and context:

In order to have an appreciable impact, R&D efforts must reach some 'critical mass'³ threshold. For many disciplines, technologies or other 'thematic areas', however conceived, this threshold can be quite low, and in that sense it is quite easy to reach. There are instances, however, where individual regions or countries are unable to reach critical mass in a specific area (e.g. nanotech, biotech) without sacrificing others (often potentially promising areas), or even instances where they can never hope to reach critical mass on their own (e.g. fusion research).

One issue is the spreading of resources. It is frequently alleged that national and regional authorities in EU Member States sometimes allocate their efforts in too many thematic areas, even when the successful development of all these areas is beyond the means of each of them individually. Coordination, networking and, to some extent, consolidation and concentration of thematic priority-setting (by whatever means and at whatever level) are therefore put forward as possible solutions in current policy discussions. These discussions have stirred a lively debate⁴ and raised a number of questions: Does the observable overlap in national and regional specialisation patterns represent fragmentation and duplication or – alternatively – healthy diversity and competition? What are the benefits and risks of specialisation-minded policies? What, if any, governance mechanisms might be used to enact such policies?

Another issue relates to benefiting from emerging knowledge areas - including those that have yet to emerge. Not all thematic areas are equally "fertile": Some, especially novel, paradigm-setting ones such as Information and Communication Technologies (ICT) and biotechnology, present many more opportunities for making significant discoveries than do others. A given investment of R&D efforts in those areas would result in proportionately greater returns - be they scientific, technological, or economic. New knowledge domains emerge all the time and the fact that scientific and technological diversity (or, contrarily, lack of specialisation) is an important predictor of where the new big breakthrough might come from (and where the benefits might accrue to *first*) means that these two, otherwise distinct issues, must be studied jointly and constitute a common policy theme. How can policy re-orient systems and shift resources to the most fertile areas? How can policy reconcile specialisation with diversity? What instruments and governance mechanisms – and at what level, European, national, regional - become relevant in this setting?

Analysis of the challenges and the European dimension:

Thematic priority-setting is still largely developed with national or regional considerations in mind, often failing to reap the full benefits of the opportunities offered by an enlarged ERA. Some commentators believe this is leading to an unnecessary duplication of R&D, which stands as an obstacle to achieving 'critical mass' at a European level.

One of the explanations put forward for this situation is that regional and national policy makers simply imitate the most 'fashionable' thematic priorities – be it biotech, ICT or nanotech – resulting in a European landscape with "enormous uniformity"⁵. This notion of the problem carries with it the policy

³ For a similar conceptualisation of the issue see the ERA Rationales Expert Group report (Georgiou, 2008): http://ec.europa.eu/research/era/pdf/eg7-era-rationales-final-report_en.pdf

⁴ see contributions to IPTS workshop on R&D Specialisation in "The Question of R&D Specialisation: Perspectives and policy implications": <http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=2339>

⁵ Dominique Foray and Bart van Ark (2007) "Smart specialisation in a truly integrated research area is the key to attracting more R&D to Europe", Expert Group Knowledge for Growth, Policy Brief No. 1, http://ec.europa.eu/invest-in-research/pdf/download_en/policy_brief1.pdf

prescription of 'particularisation', where regions and countries identify their strengths and focus their efforts in order to match their abilities to contemporary or anticipated demands⁶.

However, records of recent policy discussions on the issue show that there is a lot of uncertainty about the underlying facts, their interpretation and the desirability of possible remedies⁷.

As several participants to the session pointed out, there are often important educational needs which call for maintaining a minimum level of R&D across disciplines. Universities in particular play important roles in regional economies, especially in areas such as health and environmental sciences. One of the session participants posed the challenging question: "*Can a regional university do without a Physics department?*". At the European level too, it is unclear to what extent the currently observable overlap in thematic/disciplinary priorities can be conceived as wasteful duplication or, contrarily, healthy competition. Even in an integrated knowledge area, regional and national authorities may have ambitions that consciously embrace 'duplication' as part of their particular R&D development strategy.

In his presentation, Ramon Marimón pointed out that there are several advantages to being specialised, including full exploitation of comparative advantages and the increasing returns associated with deepening and integration into extensive divisions of labour. Specialisation can be a disadvantage though too, in periods of rapid and unexpected change. He contrasted the case of 'natural' specialisation (of the kind that occurs without policy intervention), with deliberate specialisation strategies. Ramon Marimón suggested that greater integration into the ERA is likely to magnify *ex ante* comparative advantages and introduce commensurate risks of creative destruction⁸. Conscious specialisation strategies could help mitigate some of the risks and help regions and countries prepare – but as Ramon Marimón reminded us, carry risks of their own, including betting on the wrong area, crowding out private entrepreneurship and political short-termism.

In his presentation Anastasios Giannitsis⁹ emphasised the numerous challenges facing the EU at present, including the aftermath of the financial crisis and the 'Grand Challenges' in the form of climate change, energy and demographic shifts. Giannitsis argues that there is a clear role for policy in guiding specialisation in those domains. He pointed out that all choices are made with incomplete information, and that policy will, inevitably, have to take some risks. He proposed that specialisation choices can be understood as a special case of risk management, where portfolio approaches that embrace variety, diversification and selection can become valuable tools.

It is often the factors guiding the specialisation decisions that fall outside the policy planner's own domain – such as those of companies and individual scientists – that are the most important. In his presentation Constantin Ciupagea¹⁰ suggested that the capacity of public authorities to influence the structure of private R&D varies greatly between member states, in most cases being rather limited. In fact, in countries where public decision making on industrial matters is constrained (especially newer Member States) the role of private actors can become quasi-monopolistic – raising an obvious risk for the long-term development of the economy. Appropriate policies can help minimise this risk – and there may be a role for European interventions there - but one should be wary of top-down industrial plans that leave individual actors little room for manoeuvre.

There is certainly a lot to be said about policy that can tap a region's comparative advantage, strengthen it over time and align it with a fertile paradigm of knowledge production. Martin Hinoul's presentation¹¹ of the Eindhoven, Leuven, Aachen (ELA) triangle demonstrated that a strategy that is

⁶ See 'smart specialisation' concept by Prof. Dominique Foray, or the concept of the 'learning region', popular in regional science.

⁷ In addition to the ERA Rationales Expert Group report and work by JRC-IPTS, see policy briefs produced in the frame of the "Knowledge for Growth" Expert Group: http://ec.europa.eu/invest-in-research/monitoring/knowledge_en.htm.

⁸ c.f. the so-called "new trade theory", for instance: Andrew Bernard, Stephen Redding and Peter Schott (2007), "Comparative Advantage and Heterogeneous firms", *Review of Economic Studies*, 74, pp. 31-66

⁹ "Identification of methods and criteria for guiding choices, Overview and main points", paper by Anastasios Giannitsis

¹⁰ "Identification of the most appropriate governance structures to carry out specialisation policies and make them evolve over time, including stakeholder involvement", paper by Constantin Ciupagea

¹¹ "The ELA Triangle Critical Mass through cooperation", presentation by Martin Hinoul

bottom-up and demand driven combined with a long-term vision and ambition can serve as a potent focusing device. Emily Wise¹² showed how tangible policy initiatives are leveraging "smart specialisation" or "networked specialisation" in pursuit of critical mass and long-term visions. These include Singapore's National Research Foundation Strategy and the Finnish National Centres of Expertise and Centres of Excellence. Approaches of this kind could represent a way for public R&D to become more relevant to the needs of global industry. As pointed out during the discussion though, such approaches do not always work – so universally effective specialisation policy remains elusive.

On a somewhat positive note, there was agreement that specialisation will be promoted as a natural by-product of the on-going construction of ERA. Economic theorists as far back as Adam Smith have postulated that specialisation within a division of labour is a function of 'the extent of the market'. In a European research analogy, greater specialisation will come about as a by-product of increased integration into pan-European divisions of labour: the opportunities offered by an enlarged, open and competitive research space and the guarantees offered by cohesion policies for the redistribution of accruing benefits.

In that respect, the apparent lack of R&D specialisation may be a reflection of slow progress towards (the equivalent to) a common 'market' for knowledge and, as pointed at by several indicators¹³, an increasingly stagnant process of European integration in R&D. Understood as such, the real problem lies not with lack of specialisation *per se*, but with the extent of true *integration*. This notion essentially questions whether one should be attempting to remedy what may after all be the *symptoms* (overlapping specialisation patterns) of the apparent problem and, perhaps more appropriately, be concerned with the *causes*, including the appreciably slow progress towards the ERA vision.

Specialisation strategies are of importance for the very long-term too. Insofar as they imply a commitment to a choice made sometime in the past, they constrain responsiveness to new challenges. Over the last few decades Europe has been slow to respond to emerging fields of science and technology, leaving other world regions to be protagonists in and reap the majority of the benefits from their emergence and development. Europe's diversity, not only in terms of thematic/disciplinary priority setting, but also of approaches, mentalities and institutional frameworks becomes a particular strength in this setting. The question there is how to mobilise them effectively and how to avoid specialisation policies that may result in, to use a biodiversity analogy, dramatic (and largely irreversible) extinction events.

To that question, participants provided some tentative answers: Anastasios Giannitsis presented an account of the risks carried by specialisation-minded policies and proposed, among other things, an approach of "evolutionary targeting", i.e. the promotion of virtuous co-evolutionary processes between the business sector and public policy. Emily Wise argues that policy makers can nurture shifting capacity by adopting policies that go beyond hi-tech and promoting institutional change. The example of the US "New Biology for the 21st Century", a multi-agency, multi-year and multi-disciplinary initiative is indicative of the kind of interventions that may be needed.

Conclusions/Recommendations:

(1) *An appropriate balance between specialisation and diversity will need to be encouraged depending on strengths, experiences and major goals.*

Much of the discussion was devoted to the right balance between specialisation on the one hand and diversity on the other. *Can you afford not to do some things? Can you be a world-class star in something?* In other words, what extent of specialisation may be considered optimal? These are difficult questions with no straightforward answer. Given a specific context and particular assumptions (of the 'all else constant'-type), policy analysis could provide tentative answers to such questions, which are certainly worth exploring further.

¹² "Policies Supporting Specialisation of Research and Innovation – good practices and policy mixes", paper by Emily Wise

¹³ c.f. Science Technology and Competitiveness Key Figures Report (2008), http://ec.europa.eu/research/era/pdf/key-figures-report2008-2009_en.pdf

(2) Strengthening the evidence base will be necessary before a comprehensive EU policy on specialisation is developed.

In his presentation on the ELA triangle Martin Hinoul used detailed statistical information, the equivalent of which at the European level is, regrettably, unavailable. We need more and better ways to measure R&D and S&T specialisation across EU regions and countries. At present it is still easier to measure the structural composition of outputs than *inputs* – with R&D expenditures and the skills of researchers of course being of particular relevance, as policy makers are called to take decisions precisely about them. This is somewhat of a paradox, as at least the public side of inputs is within the policy-maker's area of leverage.

(3) Specialisation choices need to be attached to broader political goals, with the notion of 'Grand Challenges' being especially relevant.

As stressed by Anastasios Giannitsis, the identification of governance mechanisms and criteria for guiding choices cannot occur in a policy vacuum. While the discussion in the session has highlighted examples of best practices and governance methods for seeking consensual, long-term strategies, the final choice is a political decision which cannot be pre-empted. There is a need for clear visions and goal packages in framing the discussion.

There was some agreement that the notion of the 'Grand Challenges', that is research oriented at tackling the major risks that Europe and the world are faced with in the form of climate change, energy and demographic shifts, may be an appropriate area to foster specialisation. A common goal on a matter of urgency can act as an umbrella, focusing research not only on the front-line issues, but also uniting a whole ecology of related research topics and capacity building.

(4) Specialisation strategies will apply more to the public side of R&D. Structural changes in the private sector appear best served by promoting a well-integrated, open and competitive ERA, including the changes in the framework conditions that would entail.

Is specialisation, something that policy can change in a way that would produce the desirable outcome in a timely and efficient manner? Constantin Ciupagea's experience of the ability of policy makers to influence industrial structure in various member states gives some hope but leaves ample room for doubt. This is much more contestable ground, as it deals with the limits of government intervention in the research process and - to the extent that research is a means to an end – in the economy at large.

There was agreement that policy has a role in nurturing the framework conditions that allow specialisation to emerge naturally. As Ramon Marimón pointed out these include an open, well-integrated and competitive ERA and pushing forward with the several and in many cases painful reforms that are required to make this happen. Education will have to play a key role, with a special focus on entrepreneurship. Institutional changes that strengthen the responsiveness of research systems to emerging fields of science and technology will also be needed. The different response of national and regional systems to the ERC calls for starting and advanced grants shows how local openness can play an important role in attracting talent and achieving new forms of specialisation.

(5) Special policy provisions will need to be made for catching up countries, with cohesion policies playing a central role in capacity building.

As specialisation strategies imply changes in the distribution of R&D resources, they can give rise to inequality. Specialisation strategies need to be accompanied by policies that help build capacities and level the competition field. More broadly, there was agreement that political choices about specialisation will vary both between levels of governance (EU, national and regional authorities) and between the various members of those levels.

XIII. Session 2.4

Which forward looking activities can support the future development of ERA?

- Forward looking activities should underpin EU and national policies.
- Research and innovation policy making, ERA strategy, Joint Programming, etc. need forward looking activities to ensure that priority setting is well taking into account long term trends of society and its main global drivers such as interdependencies between economic development, scarcity of natural resources, climate change and the intensification of communication.
- Forward looking activities do not start from scratch: concepts, methods and tools exist and have been subject to several applications in the past by the Commission (cf. Barcelona objectives, FP7 Impact Assessment, energy and climate change policies). Forward looking activities have also been applied at different levels to better inform programme planning and to support structural changes within the member states.
- The new challenges are:
 - the application of forward looking concepts, methods and tools to global contexts and drivers ("The World in 2025" is a good example);
 - the purposeful use of forward looking activities for developing visions and articulating targets in research and innovation priorities within the ERA (cf. ERA 2020 Vision and Lund declaration).
 - the deep engagement of the relevant stakeholders and users in such forward looking activities and priority-setting processes.
 - the stability and long-term funding of resource demanding modelling and databases of importance to ERA forward looking activities.
 - the joint investments in common forward looking infrastructures and projects of key importance to underpin ERA priority-settings.
- European forward looking activities should be strengthened. Policy-makers, industry, civil society organisations, including citizen's representatives, should be involved in the forward looking exercises ("shared visions and targets") to become genuine owners of the results. The European frame of forward looking activities should be provided by the European Commission in collaboration with Member States, stakeholders and citizens.
- As forward looking activities are heavily context-dependent, there should be a good balance between bottom-up and top-down in European, national and regional exercises, as well as between expert-based and user-based exercises.

Next steps:

- A common EU platform or infrastructure for forward looking activities, including modelling, should be developed.
- The relevant stakeholders should be involved as active participants in forward looking activities, as this is key for having the results implemented (cf. Joint Programming).
- Designing the appropriate platforms or infrastructures, as well as the appropriate processes of particular relevance for ERA priority-setting should be a major focus.
- The responsibilities in this should be shared by the Commission and the Member States, which calls for more ambitious and targeted joint actions.