EUROPEAN SCIENCE FOUNDATION
SETTING SCIENCE AGENDAS FOR EUROPE

EUROHORCs
EUROPEAN HEADS OF RESEARCH COUNCILS

EUROHORCs and ESF Vision on a Globally Competitive ERA and their Road Map for Actions

Contents

Foreword

The Heads of European Research Councils (EUROHORCs) and the European Science Foundation (ESF) wish to play an active and concrete role in shaping a European Research Area of Excellence. Following the publication of the *EUROHORCs and ESF's comments on the European Commission's Green Paper 'The European Research Area: New Perspectives'*, they therefore decided to produce a Road Map to excellence in science in Europe.

The EUROHORCs Assembly and ESF Governing Council, in their April 2008 meetings, approved a Vision Statement on the goals to be reached in the next five to ten years to build a globally competitive European Research Area (ERA). This Vision Statement was complemented by an outline for a Road Map for the actions which could be taken by EUROHORCs and ESF Member Organisations, as well as partners, to help build such an ERA ideal.

These outline actions have now been further elaborated, identifying the main goals and their timelines. Some actions are already quite concrete and committing, others require more preparation and study. This reflects that this is a document describing a process, rather than a final statement.

It is important to stress that the Road Map is an action plan where EUROHORCs and ESF Member Organisations have a primary role. It does not intend to give a full policy agenda for all actors in the ERA.

It is a pleasure to recommend the Vision Statement and the Road Map for your consideration and support for our joint efforts. Member Organisations of EUROHORCs and ESF will take the lead in the implementation of action lines of the Road Map.

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The EUROHORCs and ESF Vision

Introduction

A globally competitive European Research Area (ERA) is a necessity for the advancement of science and for a knowledge-based society in Europe. Building such an ERA requires complementary actions of national and European research organisations, national governments, the European Commission (EC) and the private sector. The European Heads of Research Councils (EUROHORCs), the European Science Foundation (ESF) and their Member Organisations commit to playing a key role in shaping this ERA.

Visions

A globally competitive European Research Area (ERA) of excellence, to facilitate the advancement of science and help create a knowledge-based society in Europe, requires:

1. An effective European research policy, capitalising on cultural, geographic and scientific diversity;
2. A stimulating education system;
3. A single European labour market for researchers;
4. Adequate funding for top-quality, curiosity-driven research;
5. Transnational funding, benchmarking of quality and shared scientific priorities for strategic research and researcher-driven programmes;
6. Excellent research institutions;
7. World-class research infrastructures;
8. Open access to the output of publicly funded research and permanent access to primary quality-assured research data;
9. Effective and trusted bridges between science, society and the private sector;
10. Openness to the world.

The vision above, which outlines the bigger picture of the future ERA, includes issues which cannot be tackled with the same impact and effectiveness through actions by EUROHORCs and ESF, as they require leadership outside the membership or have to be dealt with at the political level. Others, such as the EC, the universities, the private sector, all have to play their role and take their responsibility. EUROHORCs and ESF and their Member Organisations will take their responsibility in contributing to the construction of the ERA and will initiate the following actions, involving others as appropriate:

1. Strengthen the relations between science, society and the private sector and intensify the dialogue between research organisations and political actors at the European level by:

- Promoting pairing schemes such as those initiated by the European Parliament for interaction of scientists with European parliamentarians;
- Coordinating ESF and EUROHORCs Member Organisations when briefing their national ministers before these meet in the Council of Ministers;
- Developing a forum for discussion of research objectives at the European level between EUROHORCs, ESF and the private sector;
- Developing best practice in the relationship with societal players by exchange of information between practitioners in different countries and in different research domains;
- Developing participatory communication employing a variety of channels, including the web.

2. Promote European research careers by:

- Developing a common vision on the research career structure for the ERA;
- Ensuring ongoing career development for the individual researcher, including international or inter-sectoral mobility;
- Creating attractive conditions for a research career;
- Creating equal opportunities for male and female researchers from all backgrounds;
- Ensuring that transferable skills are developed.

3. Develop scientific foresight and use its results as a basis for joint strategy development by:

- Continuation and further development of ESF Forward Looks into a high-quality instrument for research strategy.

4. Create a European Grant Union by promoting:

- The Money follows Researcher scheme;
- The Money follows Cooperation Line scheme;
- The Lead Agency procedure;
- The ESF European Collaborative Research (EUROCORES) scheme.

5. Address peer review of proposals at the European level by:

- Developing a web-based Peer Review Guide;
- Creating a shared and quality-controlled Referee Database;
- Introducing (not necessarily financial) incentives for peer reviewers.

6. Develop common approaches to ex-post evaluation of funding schemes and research programmes by:

- Inter-comparison of national evaluation practices;
- Improving evaluation studies and conducting studies on the effect of evaluation.

7. Create ERA Connect and Regional Clusters of Excellence to shape collaboration between research performing organisations and other research institutions.

8. Develop shared funding and exploitation of medium-sized research infrastructure by:

- Establishing an ESF Member Organisation Forum;
- Continued updating of the inventory of national research infrastructures with European significance;
- Using ERA-Instruments as a pilot project for collaboration in medium-sized research infrastructures.

9. Implement a common policy on Open Access to research results and Permanent Access to research data by:

- Developing a joint policy and a statement on Open Access and putting it into action;
- Supporting the necessary infrastructures for Open Access;
- Promoting awareness of the importance of Open Access amongst researchers and administrators;
- Initiating a dialogue with other national and European associations and possibly other non-European research organisations and with publishers to redefine the responsibilities and cost distribution of the publishing system;
- Ensuring that permanent preservation and Open Access will be the rule for data repositories.

10. Connect European research to the world by:

- Streamlining collaboration between research groups from EUROHORCs and ESF Member Organisations with non-European counterparts;
- Simplifying contacts between research organisations in Europe and those outside Europe;
- Organising joint meetings with Heads of non-European research organisations;
- Building a Global Research Area, GLOREA.

These actions are further elaborated in the next chapter, identifying the main effects, the actors concerned and the resources required. Some actions are already quite concrete and committing, others require more preparation and study. This reflects that this is a document describing a process, rather than a final statement.

The Road Map for Actions to Help Construct the ERA

EUROHORCs, ESF and their Member Organisations will initiate concrete actions in 10 domains to help in constructing the ERA. These domains will be described below with an indication of the actions and resources required. Organisations in the EUROHORCs and ESF membership will take lead responsibility for the implementation of these actions involving other organisations as appropriate.

The Road Map aims first of all to advance excellence in research at the European level. In this respect, creating synergies with the complementary actions of other stakeholders, especially of the private sector or the European Commission, will be sought. But within this Road Map those synergies cannot be developed further.

This will be done by the Member Organisations when implementing the Road Map actions. Thus, the Road Map can only refer to these complementary actions.

It is only natural for the Member Organisations that the implementation of the relevant actions described below will be carried out within a variable geometry.

It is also important to stress that the order of the actions does not reflect any priorities. The priority setting will be decided by the Member Organisations through their usual procedure and might change in the course of the process.

1. Strengthen the relations between science, society and the private sector and intensify the dialogue between research organisations and political actors at the European level

Addresses Vision points 1 and 9

1.1. What is the issue?

Research and society interact in at least three ways:

- The generation of new knowledge requires freedom and autonomy as important conditions for its quality. At the same time accountability for the quality and for the proper priority setting, as well as a functioning system for ensuring research integrity, are important conditions for society to give its trust to the scientific community;
- The demands of society for science to satisfy its needs in important areas such as health, nutrition, environment and security, require responsiveness of the scientific community and its organisations;
- The consequences of scientific discoveries may be a source of concern for the public. The scientific community has a responsibility to reflect and communicate about the potential impact of its discoveries.

At the national level, structured interactions exist between research organisations and the political levels and policy makers. Internationalisation of research, research policy and funding pose new challenges to these interactions as accountability, communication and policy making must more and more be addressed at the European or even global level. This requires that new international mechanisms are created. In doing so, it is important to be sensitive to cultural, ethical, political and economic diversity.

Much can be done at national level to improve the way in which science is communicated and in which the research community engages in debate and interacts with society. EUROHORCs and ESF can help to ensure that their Member Organisations develop common approaches towards all sectors of society, including national and European policy makers.

1.2. What are the actions?

Intensify interactions between science and society at the institutional level

- Promoting pairing schemes, such as those initiated by the European Parliament for interaction of scientists with European parliamentarians;
- Coordinating ESF and EUROHORCs Member Organisations when briefing their national ministers before these meet in the Council of Ministers can result in more effective European policies;
- Developing a forum for discussion of research objectives at the European level between EUROHORCs, ESF and the private sector. Developing stakeholders' fora around research on societally-sensitive or important topics (for example, patient associations in health and biomedical research). Duplication with European Technology Platforms and Joint Technology Initiatives should be avoided;
- Developing best practice in the relationship with societal players by exchange of information between practitioners in different countries and in different research domains.

Developing participatory communication

Two-way communication, using a variety of channels including the web, can strengthen the ties between science and society at all levels. Areas where action will be taken range from structures for the expression of needs and concerns by society to communication about the practice of research itself, as well as developing venues for the debate on its results. Examples include citizen participation in scientific research, such as that pioneered by the web-based projects on protein folding or galaxy classification or through open, self-organising scientific discussion fora ('wikis'), which permit harnessing the collective brainpower of the public. Involving the public in decision making, especially about sensitive issues such as in biomedical research or in nanosciences, can also help bring together the two sides of the debate and lead to better decisions with greater acceptance.

Institutional communicators will assist in maintaining consistent messages and seeing the bigger picture. Scientists will be stimulated to explain to lay audiences the specific aspects of their own work but also to be engaged on a long-term basis on broader strategic issues.

EUROHORCs and ESF will develop an action plan for participatory communication, based on a Forward Look to identify specific objectives and map out strategies to promote a closer relationship between research and the rest of society.

1.3. What is the envisaged effect of the actions?

The long-term aim is to create a science system that is more open to society in order to speed up the use of results of research in society and in the private sector and in order to intensify the mutual inspiration between science and society. The strengthening of the institutional interactions aims to produce more effective science policies.

1.4. Who are the actors?

The actions require the engagement of the scientists themselves and the research institutions that employ them. In addition, there is a need for professional communications experts working within research organisations in order to develop relationships with the societal actors. At the institutional level the heads of organisations and their senior staff will be involved.

1.5. What resources are required to successfully achieve the actions?

Communicators whose legitimacy is based on their achievements in science and their ability to conduct a fruitful dialogue with the partners of science in society: their role would go well beyond that of traditional "Public Relations" officers and would focus on engaging institutions in the societal dialogue and encouraging other scientists to participate.

A reward system for scientists for their implication in society: scientists value a positive relation with society, but expect positive signals from their institutions to become involved. Public involvement should be considered an essential contribution of scientists and enhance their career in the same way as their publications or other scientific activities. Research funding and research performing organisations (as employers) will create incentive systems.

2. Promote European research careers

Addresses Vision points 2 and 3

2.1. What is the issue?

The promotion of research careers is key to the mission of research funding and research performing organisations and to the overall success of the ERA. For Europe to remain competitive in retaining and recruiting the brightest and most creative researchers, it is urgent to adopt a common strategy to ensure the attractiveness of research careers. At present, research career policy in Europe is very largely determined at national, regional and even single university level. Fragmentation and even confusion remain widespread.

Neither just overcoming fragmentation, nor just creating uniformly structured career paths are sufficient to ensure the attractiveness of research careers. Creativity and originality in approaches, taking account of specific needs, are required, allowing capable scientists to pursue their careers in a variety of ways.

2.2. What are the actions?

Launched in November 2007, the ESF Member Organisation Forum on Research Careers serves as a platform for the development of strategic concepts to be applied at national and supranational level. The Forum will present its findings and recommendations by the end of 2009 in the style of an ESF Forward Look, i.e., mapping and identification of issues, followed by recommendations for action. Recommendations will focus on three areas:

Research career structure and development

The key issues which will be addressed are:

- Reaching a common vision on the research career structure for the ERA;
- Ensuring ongoing career development for the individual researcher including international or inter-sectoral mobility. How to allow for flexibility and security in this respect?
- Creating attractive (e.g., personal, social and economic) conditions for a research career.

It is most fruitful to describe examples of best practice whilst recognising that conditions will differ according to the specific environment of an institution.

As a number of these issues transcend the scope of research organisations and have to be tackled at the political level, close interactions are taking place within the Forum with the European Commission, especially in view of its recommendation on "Realising a Single Labour Market for Researchers" and the "Partnership for Researchers" strategy.

Gender and diversity issues

In order to meet the ever increasing demand of the knowledge-based economy, Europe must realise the full potential of its human capital. Attracting and retaining more women at all levels of research is of great importance in this context. A greater involvement of women in science is also important from a perspective of exploiting diversity and creating equal opportunities. There is still a significant gender gap as far as career advancement and reaching the higher levels of the career ladder are concerned, particularly in elite research establishments. Very significant investments in training and personal opportunities are still wasted. Many of the issues pertaining to the work-life balance, whilst receiving attention in relation to women, also impact men and their career choices. The following questions will be addressed in the final report by the Member Organisation Forum on Research Careers, "Research Careers in Europe – Lanscape and Horizons":

- What can be done to avoid negative effects on research careers after breaks or due to part-time work for family reasons?
- How can sustainable improvement in careers be achieved by providing adequate organisational structures towards, for example, a better work-life balance including parental leave and equal opportunities, for instance for dual career couples?
- How can inherent or hidden biases, for example, in peer review, be countered and thus how can equal playing fields be created for persons having taken breaks, etc?

These questions apply equally to the issue of attracting and retaining people from diverse ethnic backgrounds.

Transferable skills

On the supply side it is essential to ensure that enough researchers have the skills demanded by the knowledge-based economy. Understanding how transferable skills for researchers are developed in different countries and what the connection is to researchers' future careers is a central aim. Key questions being addressed in this respect are:

- Are policies on transferable skill provision in place in the different European countries and how are they implemented?
- Which aspects of transferable skills are included and to what extent are these skills internationally transferable?
- Which organisations are responsible for delivering the agenda in each country and how do they interact?
- What is the particular policy and role of the respective research funding or research performing organisation?

2.3. What is the envisaged effect of the actions?

Implementing the Road Map for research career development in Europe will create and improve European-level and coordinated national policies and programmes for different career stages and paths. This should eventually raise the international visibility of the ERA as a common high-quality labour market for researchers.

2.4. Who are the actors?

ESF and EUROHORCs Member Organisations, the European Research Council, the European Commission and universities in Europe, for example those represented by the European University Association (EUA) and the League of European Research Universities (LERU), which participate in the Forum. An interface with individual stakeholder groups, such as early career researcher networks, will also be established.

2.5. What resources are required to successfully achieve the actions?

Actions require mainly coordination and new policies for existing investments. Resource requirements, therefore, are political will (at national and organisational level) and operational commitment in putting revised actions in place, rather than major additional finance.

3. Develop scientific foresight and use its results as a basis for joint strategy development

Addresses Vision points 1 and 5

3.1. What is the issue?

Jointly charting the roads for scientific excellence to meet the scientific and societal grand challenges creates a basis for joint action of research organisations which have no hierarchical or organic link. Foresight provides a mechanism for this, starting with a clearly expressed strategic demand of a group of research organisations, followed by a foresight project to define elements of a long-term research agenda. Foresight normally involves a wide spectrum of scientific fields and their interactions, and requires the participation of a broadly-based and representative sample of the research community as well as policy makers and other stakeholders. Developing such a shared vision of the overall research landscape, of the challenges and of the future evolution of the research frontier is particularly important (and difficult) for emerging fields.

A foresight exercise always has an important international dimension since research is increasingly carried out in transnational collaborations, pooling talents and resources through networking, and because advances in science in one country have a strong impact on other countries.

This implies that foresight is best carried out on a supra-national level, bringing together the expertise and viewpoints of all the Member Organisations of EUROHORCs and ESF, a feature that enhances, at the same time, the validity and scope of the foresight exercises.

3.2. What are the actions?

Continuation and further development of ESF Forward Looks

ESF has built foresight experience in about 20 Forward Looks. ESF and EUROHORCs will engage with other stakeholders to further develop the current ESF Forward Looks into a high-quality foresight instrument and to ensure their impact. Such an instrument will be characterised by the quality of the contents, the quality of the participating scientists and policy makers, the quality of the foresight methodologies. It will provide clear recommendations about priorities. An analysis of the impact of ESF Forward Looks could point the way to improvements.

For fields that have reached the stage of maturity, a vision of the future will be built based on their expected results and their relation to perceived or anticipated economic or societal needs. Here an active involvement of potential users in the foresight is essential.

For fields that are still in the emerging phase, the outcomes of research are difficult to predict and their relation to societal needs uncertain, implying that the vision of the future cannot just be based on the utility of the research field for society. Since the principal driving force behind the research activity is the research community, motivated by its desire to leave its mark through knowledge generation and dissemination as well as academic excellence, the research community itself, together with the other stakeholders concerned by the topic, will be at the origin of building a vision of the challenges and of the future through a foresight exercise.

As foresight aims at the long term, its outcome should not be formulated in terms of expected results to be obtained, but in terms of the grand challenges, the big questions to be answered, starting initially with the questions that the researchers themselves would like to address and ending with the questions that society would find relevant. This feature makes foresight pertinent for exploring forefront research questions and for developing long-term strategies, such as for the recruitment of tenured scientists, for the development of large-scale facilities, for decisions on the establishment of new research centres, as well as for helping to orient university and graduate school-level educational policies through the close interaction between research and higher education.

3.3. What is the envisaged effect of the actions?

All members of EUROHORCs and ESF are public national organisations with a national mandate to support research for the national benefit. Clearly, the action of each organisation within its national territory will be much more effective if it is in tune with that of its European partners, based on a shared vision. The shared vision should permit national organisations to identify their niches of excellence and make strategic decisions to reinforce them, rather than spread their resources thinly over a broad area for which conditions are not as favourable. The full European “ecosystem” of research organisations can better afford taking risks than the individual national systems. Therefore, a shared vision permits national agencies to foster risky new and untested ideas to emerge and develop towards achieving breakthroughs. It is also a powerful tool to identify areas where joint programming is valuable or even mandatory. Finally, a shared vision will permit a benchmarking of national approaches and strategies even if the social context is different in the different countries, leading to

an understanding of their diversity and bringing forth complementarities or inducing re-orientations. Joint Programming, as currently developed, would much benefit from shared visions on research priorities developed through foresight.

3.4. Who are the actors?

The main actors are EUROHORCs and the ESF Member Organisations, including Academies, and the large pan-European stakeholders such as the European Commission and the European Industrial Research Management Association (EIRMA).

3.5. What resources are required to successfully achieve the actions?

No major additional financial resources are required, as many organisations already undertake foresight activities at their own expense, the issue being more one of coordination and synergy. However, in order to provide a professional and sufficiently timely service, investment should be made at the European level, at the ESF, for example, to ensure the availability of the necessary expert staff and tools.

4. Create a European Grant Union

Addresses Vision points 3, 4 and 5

4.1. What is the issue?

Research in Europe is funded through a variety of sources at the national and European levels. Each of these sources operates according to its specific rules and procedures. This introduces barriers to transnational collaboration and benchmarking of excellence across national boundaries. Research cooperation and excellence will be enhanced by enabling researchers to form collaborative projects and networks which will compete at the highest quality level for support, free from bureaucratic constraints on personal and financial mobility. The European Research Council (ERC) is a first — but so far quantitatively small — step to meet this vision through a centralised budget. Lessons also emerge from the ERA-NETs attempting to create 'common pots', as well as Article 169 initiatives in the Seventh Framework Programme. Creating more synergy and introducing flexibility into national research instruments and procedures can contribute to this vision to an even higher degree as national organisations spend around 20 billion € annually.

4.2. What are the actions?

EUROHORCs organisations will initiate actions to simplify transnational collaboration under the current national funding schemes.

The Money follows Researcher scheme will be signed and implemented by all those EUROHORCs members that have not yet done so. A regular monitoring of all cross-border transfers of grants within this scheme will be established in order to follow the effect of the scheme.

Following an analysis by a EUROHORCs working group of the rules and conditions to be applied and of the effectiveness of the current experiment in the German, Austrian and Swiss cooperation, the following actions are to be completed by 2010:

- **The Money follows Cooperation Line scheme**, opening — under certain conditions — the national funding programmes for applicants from other countries, and thus strengthening cross-border cooperation, will be supported by all EUROHORCs Member Organisations by signing a further common Letter of Intent.
- The EUROHORCs members will sign a Letter of Intent on the **Lead Agency procedure**. Partners of a bi-or multinational research project will only have to apply to one funding organisation which takes responsibility for the whole administration, including international peer review. The relevant researchers are still financed

by their national funding organisations, which base their funding decision on the proposal of the Lead Agency. The advantages are evident: the risk of "double-jeopardy" for the researchers is avoided, confidence-building between the partner organisations is fostered, bureaucracy is reduced and the administration is made more efficient.

- **The ESF European Collaborative Research (EUROCORES) scheme** will continue to be further developed into a flexible and high-quality mechanism for joint programmes, both for researcher-initiated themes and for strategic research organisation driven topics, such as these identified by ESF Forward Looks.

4.3. What is the envisaged effect of the actions?

The actions will enable funding agency cooperation to enhance impact by maximising investment in excellent research wherever it may be undertaken. They will enhance mobility and strengthen cross-border cooperation, and thus foster European networks and improve the quality of research in the ERA.

The schemes will become cornerstones of the envisaged European Research Grant Union, enabling researchers to apply for funding in one European country and then take their grant approval letter to another country to exchange it there for a grant paid by the host country.

4.4. Who are the actors?

EUROHORCs and ESF Member Organisations.

4.5. What resources are required to successfully achieve the actions?

Substantial investment will not be needed as the European Union would address pre-existing programmes and grants schemes – indeed some synergy savings may be possible. However, resources would be needed from the national organisations to closely monitor and put into place the implementation of these schemes and a coordination group at EUROHORCs level.

5. Address peer review of proposals at European level

Addresses Vision point 5

5.1. What is the issue?

Public and private funding organisations at the national and international level face the challenging problem of setting up and maintaining systems to assess the quality and potential of research proposals with their own scientific individuality and coming from different research cultures. Such systems must be credible for all funding agencies involved, minimising the burden on the peer review system and especially on the peers themselves. Achieving this goal demands pan-European quality criteria for peer review. Such criteria should take account of the size of the grants applied for.

For national research funding organisations, European-level peer review could play a powerful role in setting quality standards and in benchmarking national scientific communities to enable them to operate in a global context. Sharing resources could help enhance the quality of the peer review and reduce the burden for the reviewer.

The ESF Member Organisation Forum on Peer Review has developed an Action Plan that forms the basis for the EUROHORCs-ESF Road Map actions on peer review.

5.2. What are the actions?

Develop a Peer Review Guide

The Guide is for use by European funding agencies, councils, private foundations and charities and is intended to increase the quality and effectiveness of grant peer review processes. It will include the mapping of current peer review practices, highlighting exemplars and developing good or better practice guidelines and recommendations.

The Guide will take the form of a "tool box" where for each issue one will find core principles and recommendations as well as references to good practices. The guide will be published on the ESF web site and maintained by ESF staff.

The following issues will be addressed:

- Introduction and structuring framework for the Guide with core principles;
- Establishment of a model peer review system with the following elements:
  - The role of *ad hoc* and standing peer review panels, achieving standardised rankings
  - Selection and recruitment of peer reviewers (including time burden and conflict of interest)
  - Quality assurance of individual reviews

  - Quality assurance of peer review processes
  - The right to reply (rebuttal) before funding decision – advantages and disadvantages
  - Multi-, inter-, and trans-disciplinary and breakthrough research and related peer review issues;
- Guidance for reviewers.

Referee databases: quality of contents and interfaces

The aim of the action is to agree on recommendations which facilitate exchanges of data between databases of different European organisations. Focus will be on two issues:

- Contents of referee databases:
  - adopting common criteria for the selection of high-quality referees to include in the databases
  - developing methodologies for the identification and matching of suitable reviewers
  - adopting a common classification of research expertise in data base records
  - identifying individual conflicts of interest and monitoring the time burden for peer reviewers
  - developing mechanisms of achieving and maintaining information actuality and accuracy
- IT formats, novel solutions and legal issues (e.g., freedom of information and data protection issues).

ESF and EUROHORCs Member Organisations will be encouraged to adopt the recommendations. The ESF will implement them for its Pool of Reviewers to ensure that the Pool is recognised as a quality tool for peer review in Europe.

Incentives for peer reviewers

Based on the survey of peer review in the biomedical sciences conducted by the European Medical Research Councils at the end of 2008, a study of practices regarding incentives for peer reviewers will be commissioned by ESF and EUROHORCs. Possible incentives could be fees or non-financial rewards, for example explicit acknowledgement by institutions of their peer reviewing employees. This last incentive in particular requires intensified dialogues with the academic and research institutions where the contributions of scientists and researchers are materialised, assessed and valued in shaping their careers. Involving these institutions will also help to bring back a more self-organised and self-motivated system of peer review.

On the basis of the study, European research organisations (initially ESF and EUROHORCs members, preferably joined later by other organisations) will adopt a joint policy agreement on recommended practices. A coherent policy within Europe will help both research councils searching for referees and researchers faced with very different practices. To stimulate the discussion about the role of research institutions in the peer review system, a joint statement or an article should be published in major scientific journals.

5.3. What are the envisaged effects of the actions?

The actions promote the development of common quality criteria, interfaces and resources which will enable benchmarking of national peer review processes and will develop the necessary trust in joint funding schemes. Also, the outcome of nationally conducted peer review should be comparable. This will benefit the implementation of schemes such as the Lead Agency procedure.

Raising awareness within academic and research institutions will bring to light their inherent role and natural position for steering the peer review system towards more self-organisation and sustainability.

5.4. Who are the actors?

The ESF Member Organisations and other stakeholders, including the EC, who have already been involved in the Member Organisation Forum on Peer Review. ESF Member Organisations and EUROHORCs members who have not yet participated in the Forum will be encouraged to join these actions.

The main actors to be engaged in the long term in a new dialogue about their own roles would be universities, research performing organisations, academies and ministries.

5.5. What resources are required to successfully achieve the actions?

The actions require dedicated staff time from ESF and/or from participating organisations. Building a shared database will require substantial staff effort. The overall coordination of all actions could be ensured by the ESF Office.

The study of practices regarding incentives for peer reviewers requires funding for commissioning this study.

6. Develop common approaches to ex-post evaluation of funding schemes and research programmes

Addresses Vision point 5

6.1. What is the issue?

Getting the evaluation of funding schemes and research programmes right to improve both the internal operations and the external accountability of funding agencies and research organisations is gaining importance. There are increasing demands to demonstrate their excellence and efficiency as well as their impact and the achievement of scientific and policy goals. At a more general level, there is a need to provide objective evidence of the importance of continued investment in science in Europe. This should provide information on appropriate intercomparable metrics, to be usable by EU Ministers and the European Commission.

The procedures and organisational integration of evaluation activities are rather different across Europe. For example, some funding organisations have established in-house units to prepare evaluations of schemes and to oversee them when commissioned externally, while others have opted for long-term partnerships with evaluation agencies. The choice of criteria and indicators can determine the outcome of evaluation exercises and are therefore of greatest importance for steering decisions and ultimately for the research landscape.

The actions described below build on the work of the ESF Member Organisation Forum on Evaluation of Research Programmes, which gathers together best practice and provides the opportunity for the relevant actors to exchange experiences.

6.2. What are the actions?

Exchange knowledge and share experiences

The ESF Member Organisation Forum on Research Evaluation will prepare a mapping report of current evaluation activities, highlighting differences and commonalities. This report should be regularly updated, further elaborated and disseminated. Furthermore, personal contacts among evaluation officers will be facilitated by networking events.

Research evaluation is a small, highly specialised field and, on a national level, there are only a limited number of actors involved. Therefore, the exchange of knowledge and sharing of experiences of evaluation strategies on an international level is valuable and the prerequisite for benchmarking purposes.

Improve evaluation studies

The ESF Member Organisation Forum on Research Evaluation will continue as a structured network providing the opportunity for evaluation scholars working on the development of indicators and practitioners to consult each other. The success of evaluation activities depends on the acceptance of their results among decision makers and the research community being evaluated. Therefore, evaluations must meet the highest quality standards. Factors enabling this are:

- A dialogue between decision makers, methodological and evaluation experts and researchers about adequate indicators, insightful methodology and quality standards for evaluation studies;
- Improvement of databases, indicators and methodologies;
- Adequate funding for evaluation activities.

Internationalisation

Since research is becoming more and more international, benchmarking exercises and mutual learning cannot stop at national borders. After identifying comparable funding schemes, the ESF Member Organisation Forum on Research Evaluation therefore proposes to design and commission multinational studies which allow for comparisons of framework conditions and effects of funding schemes in different research landscapes.

Observe the effects

Research evaluation must be tailored to the specific programmes being evaluated and should be adaptable to new insights and developments. Equally important is the analysis of the incentives and effects of evaluation exercises on researchers. Therefore the ESF Member Organisation Forum on Research Evaluation proposes to initiate longitudinal studies and meta-studies of evaluations to track developments within the wider research system.

6.3. What are the envisaged effects of the actions?

The actions will increase the efficiency, transparency and accountability of the operations of funding agencies and research organisations. Further work on sophisticated actual and potential impact measures and methodology will greatly strengthen and sharpen strategic decision making for both individual organisations and collective, European-level decision making. In the long run, the improvement of funding schemes resulting from insights gained in evaluation studies will help to better meet the interests of researchers.

6.4. Who are the actors?

The main players are funding organisations and research performing organisations which commission evaluation studies and use their results. The ESF will coordinate activities and support the dissemination of information. Since a common understanding of evaluation standards and methodology in the European Research Area is crucial, communication with the European Commission, the European Research Council and networks of evaluation experts (for example, the Organisation for Economic Cooperation and Development [OECD] and academies) has already been established and will be further strengthened.

6.5. What resources are required to successfully achieve the actions?

The actions do not require major financial investments since most organisations are already conducting evaluation activities. Increasing use of evaluation studies and a more elaborate methodology (including, for example, time- and cost-intensive bibliometric studies) might, however, raise the level of funding needed.

Coordination of the actions should be supported by expert staff, e.g., located at the ESF. The invitation of experts should also be centrally organised and funded. Commissioning pilot studies will require funding by the partners involved.

7. Create ERA Connect (ERAC) and Regional Clusters of Excellence

Addresses Vision points 5 and 6

7.1. What is the issue?

The ERA currently lacks an effective mechanism to launch joint European programmes between research performing organisations, including universities, in which funding is operated according to simple procedures that maintain the focus on excellence, encourage initiative and combine flexibility with accountability for the researchers involved. The Knowledge and Innovation Communities (KICs) that are being initiated by the European Institute of Technology are more politically driven and focus on areas of societal importance, rather than being driven by science needs.

7.2. What are the actions?

Create ERA Connect (ERAC)

The research performing organisations in EUROHORCs will create a new European funding scheme, the so-called ERA Connect, in which institutions — research performing organisations and universities — which have developed a strategic vision of their actions through foresight or otherwise, can embark on a common programme. The networking and the mutual opening of research institutions require an evolutionary approach. The total duration of a given ERAC action could be seven years and, with a positive interim evaluation after five years, up to ten years. Furthermore, ERAC consortia should be open to participants from outside Europe.

Detailed rules for management and evaluation in the funded transnational programme will be defined by the institutional participants. The ERAC scheme will be implemented through some pilot projects among EUROHORCs and ESF members and could be an important new funding scheme within the EU's 8th Framework Programme (FP8) with strong support among the scientific community if the need for science-driven implementation and management were accepted.

Regional Clusters of Excellence

EUROHORCs and ESF would like to see Regional Clusters of Excellence in Europe in which European research performing organisations and universities jointly finance and organise new research topics which are to be dealt with urgently within Europe and beyond and which are, where relevant, supported by research funding organisations. These clusters could be modeled on the regional clusters recently created in France,

Germany or Spain[1], regionally anchored but not confined by national borders. These clusters could serve as nuclei for gathering critical mass in a specialised field, creating European centres of excellence, while at the same time preserving the identity of universities and research organisations and bringing them into contact with industry. The goal is to install first-class research centres in Europe which are "real institutions" and implemented over a long-term period but not permanently.

7.3. What is the envisaged effect of the actions?

The actions are intended to foster joint European initiatives for long-term oriented frontier research with autonomous governing structures as part of the European innovation chain. The new scheme will create a new form of European cooperation on an institutional level in which the elements of project and programme funding are merged.

7.4. Who are the actors?

Research performing Member Organisations of EUROHORCs and ESF could run a number of pilot projects before the European Commission is possibly asked to play a crucial role as catalyst for establishing these funding schemes in FP8. The realisation of ERA Connect and Regional Clusters of Excellence will have to be defined and approved by scientists before they are implemented.

7.5. What resources are required to successfully achieve the actions?

The ERAC scheme will have a long-term perspective and will be flexible in order to allow for the different ways in which research organisations are organised in different countries in Europe. These actions will typically bring together participants from five or six different research organisations with a clear financial commitment. The total budget might be topped up by additional funding of up to 40% by national or European funding organisations. Another promising way for the realisation of ERAC might be the cooperation with the European Commission for the restructuring of the funding instrument "Networks of Excellence (NoE)". The evaluation reports on the funding instrument NoE and FP6 show a practical path for how ERAC might be implemented for FP8 in cooperation with the EC and the Member States.

The financial resources for the Regional Clusters of Excellence should follow the national approach, however, with the overall objective being to reach a sufficient European dimension. Possible funding might be provided by different sources: the respective regions, including national research funding organisations, institutional participants such as research performing organisations, universities, industry and the EC (structural funds of the European Union or the Framework Programme for Research).

1. For example the *"Pôles de Compétitivité" in France, the "Excellence Initiative" in Germany and the "Regional Clusters" in Spain.*

8. Develop shared funding and exploitation of medium-sized research infrastructure

Addresses Vision point 7

8.1. What is the issue?

Research excellence requires excellent research infrastructures (RI) which not only support research but also lead its development into new directions and create an attractive environment for world-class researchers. Operating at a level different from the EU Member States' European Strategy Forum for Research Infrastructure (ESFRI), many EUROHORCs Member Organisations fund and operate research infrastructures of national and European importance. As these are not the focus of ESFRI, there is a need for a network of stakeholders for funding and operation of medium-sized research infrastructures, including mid-sized instrumentation (which can be financed bilaterally or nationally but should be discussed on a European level — costs are normally between ~500 k€ and ~20 M€). Research infrastructures and instrumentation within the remit of ESFRI are excluded, as are research infrastructures and instrumentation of small financial size (~<500 k€) which are of limited, national importance. However, research infrastructures in the Social Sciences and Humanities are an emerging interest, deserving special attention. In these domains the size boundaries traditionally applied to natural and life sciences research infrastructures are not highly relevant.

8.2. What are the actions?

An ESF Member Organisation Forum on Medium-Sized Research Infrastructures will be created as a platform for discussing joint investments in the creation of, networking, and access to medium-sized research infrastructures, as well as evaluation and benchmarking. The Forum will develop comprehensive tools for the adequate treatment of research infrastructure related topics (funding procedures, access rules, running costs, personnel, replacement, etc.). The Forum will analyse the impact of the approaches developed by ESF Expert Committees and Boards (e.g., the Nuclear Physics Committee NuPECC, the ESF Marine Board, the European Polar Board). The aim is to gradually evolve the Forum into a network through stakeholder workshops, by initiating research infrastructure specific user-meetings and interaction with scientists and instrument suppliers to identify new developments. The Forum will develop recommendations on requirements for research infrastructures and study the merits and applicability of the European legal framework for research infrastructures proposed by the European Commission.

Maintain the inventory of national research infrastructures with European significance which has been made by EUROHORCs, the EC and ESF. The inventory can be accessed through the RI Portal[2] which will be kept up to date.

The **ERA-Instruments**[3] could be a pilot project and its results analysed. Using the experience, the initiative will be expanded to other areas where medium-sized research infrastructures and instruments are important.

8.3. What are the envisaged effects of the actions?

The actions will improve access by scientists to modern research infrastructures and identify new cutting-edge developments at an early stage, reducing the time delay for scientists to have access to the newest techniques and research infrastructures.

Funding efficiency and decision making by stakeholders will be improved by engaging them in European-level discussion of RI funding and use of joint investments where appropriate, and exchanging expertise in operating and optimally exploiting research infrastructures.

8.4. Who are the actors?

EUROHORCs and ESF Member Organisations, typically research performing and research funding organisations, as well as the European Commission. A number of initiatives, such as ERA-Instruments and other ERA-Nets, and ESF Expert Committees and Boards, provide research infrastructure focussed platforms for their stakeholders and it will be necessary to carefully coordinate with these groups. The ESF Member Organisation Forum on Medium-Sized Research Infrastructure, through its flexible format (with the possibility of multiple topic-focussed working groups) could serve as a longer-term structure for dialogue.

8.5. What resources are required to successfully achieve the actions?

The resources available from ERA-Instruments (until 2011) plus funds from other interested partners (in particular the private sector in relation to the innovative value of building new frontier research infrastructures) could be combined with that of the ESF Member Organisation Forum on Research Infrastructure (up to 100 k€ pa) as

2. http://www.riportal.eu/public/index.cfm?fuseaction=ri.search
3. *ERA-Instruments* is a project funded by the European Commission focussing on the above-mentioned goals in the area of bioanalytical instrumentation. It consists of 16 partners from 12 countries and runs from April 2008 to March 2011. For more details: www.era-instruments.eu

a starting point. It is estimated that in the long term, and considering the large scope of the medium-sized research infrastructure issue, an annual budget of 500 k€ for organisation, personnel and workshop costs for the coordination measures will be required.

9. Implement a common policy on Open Access to research results and Permanent Access to research data

Addresses Vision point 8

9.1. What is the issue?

Scientific research and development represents a huge investment of the public as well as of the private sector. EUROHORCs and ESF want to go beyond recommending a minimal standard regarding Open Access to its Member Organisations (which was published in April 2008) with a clear formulation and backing by research funding organisations of the moral behind public funding of research and development, as well as the formulation of the rules and ethics involved in the commercial exploitation of research findings/results. The formulation and adoption of such a common policy would have an immediate, beneficial and unifying impact. The results of publicly funded research have to be made available quickly and publicly and copyright for the publication of results and fees to copyright owners should not be obstacles to the dissemination of knowledge generated or supported by public funds. The aim is a system of scientific publications in which free access to all (published) scientific information is guaranteed. This involves a move toward Full Open Access. Ultimately, this means replacing the present reader-paid publication system with an author- or institution-paid one. (The introduction of the appropriate notions of publication versus service charges shall also be considered.) Opportunities and developments in information science and technology allow rapid, efficient and equitable dissemination of findings generated.

The collection of research data is a huge investment. Permanent access to such data, if quality controlled and in interoperable formats, will allow better use to be made of this investment because it allows other researchers to (re)use them. Furthermore it allows re-analysis and could play a role in ensuring research integrity.

9.2. What are the actions?

EUROHORCs and ESF will develop a joint policy and statement on Open Access and put it into action.

Elements to be included are:

- Joining the “Berlin Declaration” on Open Access to Knowledge in the sciences and humanities;
- Incorporating mandatory Open Access (OA) requirements into the conditions for all grants, including banning the transfer of the copyright to third parties without retaining the right to disseminate via OA outlets;

- On an intermediate time scale, a policy on grant management should include provisions for obtaining copyright for OA. In the long run, the publication system has to undergo a transition from a reader-paid to an author- or institution-paid system;
- Gradual introduction of verifying whether researchers and institutions comply with funder's recommendations;
- Formulating standards and good practice guidelines.

EUROHORCs and ESF will support the necessary infrastructure for Open Access.

- Allow institutions to incorporate in their financial plans the legitimate costs of the infrastructure, i.e., creation and maintenance of repositories;
- Allow the legitimate costs of OA as part of the dissemination costs of research findings;
- Consider establishing a European Repository (an initiative of the Max Planck Society) for institutions and/or disciplines without a repository.

EUROHORCs and ESF Member Organisations will promote the awareness of the importance of Open Access amongst researchers and administrators.

EUROHORCs and ESF Member Organisations, together with other national or European associations and possibly with other non-EU research funding organisations, will work with publishers to redefine the responsibility and cost distribution of the publishing system.

Permanent preservation and open access, such as promoted by the Alliance for Permanent Access, will be the rule for repositories. EUROHORCs and ESF Member Organisations will address how to best promote and ensure such permanent access to data generated with their funding.

9.3. What is the envisaged effect of the actions?

- Faster dissemination of research findings from publicly funded research;
- Wider and more efficient dissemination (subscription fees selected amongst readers and impeded access to a substantial number of potential readers);
- Improved efficiency of public funds assigned to support scientific research;
- Indirect generation of (better) commercial services in research information retrieval. Commercial actors will adapt to changing publication environment and will develop cost-efficient information tools for retrieving and handling OA research information.

9.4. Who are the actors?

All actors in the scientific endeavour (funding organisations, research performing organisations, universities, academies and learned societies, holders of public research grants, libraries and librarians) as well as publishers.

9.5. What resources are required to successfully achieve the actions?

Resources involved in publication of scientific findings are a small part of the research expenditure. Some redirection and reorganisation of the research budget will easily pay for OA costs. All contributors to the full economic cost of the research findings have to share the costs of OA dissemination. In this context, funders should be prepared to include the cost of dissemination into their grants. Institutions, universities contribute to the human resources, administration, and overhead costs. For the Permanent Access data repositories a shared funding mechanism will be developed involving all actors. Discussions about this will involve the National Science Foundation (NSF, USA) (see chapter 10).

10. Connect European research to the world

Addresses Vision point 10

10.1. What is the issue?

As research is by its nature a global endeavour, it is essential that European strengths are embedded in global cooperative and competitive frames. Different approaches are needed for industrialised regions (such as Australia, Japan and the USA), emerging regions (such as China, India, South Korea, Singapore, South Africa and Brazil) and developing regions (such as Africa). With full respect for the autonomy of national research organisations, there are possibilities for streamlining the collaboration with counterpart organisations in other parts of the world and thus facilitating research cooperation and global benchmarking.

10.2. What are the actions?

Achieve international standards for data assembling and sharing

Scientific progress proceeds via extensive international collaboration and widespread access to common research instruments and facilities. This must go together with data sharing and data and software integration. The action would be to explore with the NSF issues relating to international cooperation in e-science, with special emphasis on data sharing and interoperability. The long-term goal would be to achieve a data sharing agreement with NSF, which, if feasible, at a later stage could include partners in other regions of the world, for example, in Asia.

Streamline collaboration

Open up joint programmes to research groups from countries outside Europe. This possibility is already offered, for example, by the ESF which includes non-European groups in its EUROCORES programmes. EUROHORCs will look into establishing common guidelines which will allow non-European groups to take part in national or supranational European programmes of different kinds. Experiences in ERA-NETs such as CoREACH (with China) and New INDIGO (with India) will be taken into account. Extension of the EUROHORCs-initiated Money Follows Researcher and the Lead Agency schemes will be considered in this context.

Simplify contacts between research organisations in Europe and those outside Europe

Simplification of contacts between research organisations in Europe and those outside Europe could be achieved through sharing offices in non-European countries. EUROHORCs will make an inventory in order to establish the interest in sharing offices and what benefits this sharing could offer. Shared European "Houses of Science" could display the wide range of possibilities offered by Europe and facilitate European research cooperation. A sharing would thus promote the image of Europe as an important centre of high-quality research. EUROHORCs will also make an effort to standardise and coordinate Memoranda of Understandings (MoU) with non-European countries.

Joint meetings with heads of non-European research organisations

EUROHORCs and ESF will arrange Exploratory Round Table meetings for Heads of European and non-European research organisations every second year. Each meeting will focus on one or two issues of common interest. In order to be successful, these meetings will be well prepared, preferably with concrete proposals. An aim will be to initiate joint actions whenever this is considered to be useful. A first example of such a common topic could be data sharing. A menu of topics could include Intellectual Property Rights (IPR), opening up of programmes, needs for global infrastructure, Open Access and collaboration with developing countries. In order to launch this action, a preparatory meeting is envisaged where it can be established who to invite, agenda, venue, etc. These actions will, when appropriate, be coordinated with those of the OECD Global Science Forum and G-8 HORCs.

Another form of joint meetings would be the organisation of meetings for representatives of non-European organisations wishing to cooperate with several national or European organisations. Considerable efficiency could be gained by combining such meetings in a central location.

Contributions to building a Global Research Area, GLOREA

EUROHORCs and ESF will initiate discussions with similar international structures and larger national research organisations outside Europe (e.g. NSF) to develop, in a long-term perspective, a Global Research Area, where the European organisations will build on the experience gained in the ERA. Different approaches will be needed for industrialised regions (such as Australia, Japan and the USA), emerging regions (such as China, India, South Korea, Singapore, South Africa and Brazil) and developing regions (such as Africa). A Global Research Area of this kind could have a profound impact on the promotion of knowledge sharing and, if properly designed, could engage developing countries more fully in the global research effort.

10.3. What is the envisaged effect of the actions?

The ultimate aim of the actions is to create conditions for research and researchers which allow optimal use to be made of the potential of global cooperation and competition in the interest of the advancement of science. Large parts of the vision on the ERA can – and ultimately should – be translated to the global level. A special challenge is the relationship with developing countries for those organisations which have no specific mandate in this area.

The envisaged effect of achieving international standards for data assembling and sharing is greater interoperability.

The envisaged effect of the action to open up joint programmes to research groups in countries outside Europe will be that national research organisations and ESF follow common guidelines which are recognisable for non-European organisations when setting up new programmes.

Sharing offices in non-European countries would increase the joint European visibility and the efficiency of the money spent. The envisaged effect of joint meetings with heads of non-European research organisations would be to have a regular dialogue (aimed at joint actions) with counterparts outside Europe.

10.4. Who are the actors?

The actors are EUROHORCs and ESF members, the European Commission and research organisations outside Europe.

10.5. What resources are required to successfully achieve the actions?

The resources needed are initially relatively modest, involving financing of and participating in a variety of meetings.

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EUROHORCs

EUROHORCs is the informal association of the heads of European research funding and research performing organisations. The acronym originates from “European Heads of Research Councils”. Since its establishment in 1992, EUROHORCs has become a key player in the field of European research policy by promoting and enhancing inter-council cooperation and by contributing actively to the development of the European Research Area. By creating an informal platform for discussion, producing policy statements and initiating joint activities, EUROHORCs seeks to strengthen European research policy.

ESF

The European Science Foundation (ESF) was established in 1974 to provide a common platform for its Member Organisations to advance European research collaboration and explore new directions for research. It is an independent organisation, owned by 80 Member Organisations, which are research funding organisations and research performing organisations, academies and learned societies from 30 countries. ESF promotes collaboration in research itself, in funding of research and in science policy activities at the European level.

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