EIROforum

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Towards the Next Framework Programme for Research, Technology and Innovation – EIROforum Position Paper on FP8

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Europe's Intergovernmental Research Organisations

CERN | EFDA | EMBL | ESA | ESO | ESRF | XFEL | ILL

The EIROforum

EIROforum is a partnership of European Intergovernmental Research Organisations (EIROs). The EIROforum partners design, construct, operate and exploit large Research Infrastructures on behalf of the user communities of their Member States and beyond. EIROforum is growing. The European XFEL has recently joined and several other major new organisations have shown interest in joining the partnership, which currently comprises:

CERN	European Organisation for Nuclear Research
EFDA-JET	European Fusion Development Agreement-Joint European Torus
EMBL	European Molecular Biology Laboratory
ESA	European Space Agency
ESO	European Organisation for Astronomical Research in the Southern Hemisphere (European Southern Observatory)
ESRF	European Synchrotron Radiation Facility
XFEL	European X-Ray Free-Electron Laser Facility
ILL	Institut Laue-Langevin

All EIROs operate in a competitive global environment, attracting users from all over the world to the very best scientific and technological resources. As centres of excellence for the development of some of the world's most advanced technologies, they interact with European industry and thus play a crucial role in the innovation process, whilst enabling Europe's researchers to maintain scientific leadership in their fields.

The EIROs have an ongoing commitment with, and through, their user communities to a range of activities contributing to the stimulation of growth through innovation, the promotion of technology transfer and knowledge exchange, the support of training and high-quality capacity building, the execution of research that contributes to addressing the societal grand challenges; and the support of education and public understanding of science.

EXECUTIVE SUMMARY

The 8th Framework Programme (FP8) will provide the base for the Europe 2020 Flagship Initiative Innovation Union and help meet major societal challenges (The Grand Challenges). With this paper, the EIROforum partners (EIROs), using their considerable experience of constructing and exploiting world-class Research Infrastructures (RIs), provide their input to the early-stage discussion on the formulation on FP8. In this context, specific issues of importance to the continued success of European research are addressed in the document:

- The creation of new scientific knowledge for the benefit of society as a whole requires both basic and applied research activities and is crucial for Europe to meet the goal of smart, sustainable and inclusive growth. (Section 2 – Knowledge Creation)

- European RIs produce vast amounts of data that need to be managed, processed, harmonised, catalogued/archived, stored, preserved, and ultimately made accessible for users if their potential is to be fully realised and exploited. These data hold the potential for multi-disciplinary, innovative research across different scientific domains and the creation of new knowledge for the use by, and benefit of, the knowledge-based society. (Section 3 – Access to Research Results)

- Open Access to the results of publicly-funded scientific research, i.e. the immediate, on-line, free availability of research results, increases their visibility and potential for exploitation and innovation by making them available to a broader community. Europe must continue to be at the forefront of developments in order to maximise the impact of its investment in research. (Section 3 – Access to Research Results)

- Knowledge is created in industry, universities, national research centres and, at the European level, in facilities such as those operated by the EIROforum partners. The exploitation of knowledge needs strong interfaces between all involved. The Framework Programme should foster and support such interfaces. This means strengthening the structural aspects of European research and its links to innovation. (Section 4 – Exchange of Knowledge in support of Innovation)

- Scientific discoveries in today's RIs require top-class instruments that utilise component technologies that continually advance the 'state-of-the-art' in different fields. Universities, industry and RIs may work independently on the same or similar component R&D projects, resulting in high-gain but also high-cost developments. Closer links between these will result in both cost savings and increased potential for application in other fields. (Section 5 – Scientific Instrumentation)

- It is essential to encourage new generations to enter research as scientists, engineers and technicians. This is even more important in view of the demographic changes that will occur in Europe over the coming years as well as the increased demand for highly trained S&T personnel to support the growth of the knowledge-based economy.

- Increased Researcher-mobility requires a set of actions, even extending beyond FP8. These include the development of a European career path system and the introduction of a common pension scheme. (Section 6 – Human Resources)

- Enlarging trans-national access to RIs at European-level (a) increases competition for the resources and opportunities that the facilities provide, offering the potential for improved quality, increased scientific return and added-vale for innovation in Europe, (b) has a positive impact on mobility and (c) promotes EU-wide integration of scientific communities, in particular those in convergence regions that have few RIs. (Section 7 – Access to Research Infrastructures)

- Investments in R&D should not be reduced, since this would have an adverse effect on an innovation-driven recovery and long-term economic well-being. This applies to both Member State and EU funding; and they should be perceived as a complementary. (Section 8 – Funding)

- Member State funding of the European intergovernmental organisations constitutes a focussed investment in very particular areas, whereas EU funding has a much wider scope. Thus, the Member States fund the core tasks of European-level RIs, whereas the design and delivery of ancillary activities, such as specific education and outreach programmes, together with the expansion and enhancement of certain research projects, often depend on additional funding. Support from the Framework Programme may significantly enhance the value of ancillary activities of European RIs for society as a whole, generating important synergies between the Member State and EU funding streams. (Section 8 – Funding)

- Simplification of the implementation and financial management requirements, leading to streamlined administrative practices and procedures, together with good practice in governance, project management, cost containment and reporting, would greatly increase leverage and maximise scientific return on the investment made. (Section 9 – Simplification)

- Previous FPs have advanced a wealth of innovative ideas, providing strong evidence for the quality, enthusiasm and inventiveness of Europe's researchers. Sometimes highly successful activities have not been able to develop to their full potential and/or secure a continued exploitation beyond the duration of the initial contracts. Improved coordination between the European Commission and the Member States could help to secure longer-term funding for these activities. Furthermore, to ensure improved coordination and exploitation of synergies, new initiatives within FP8 should take full recognition of European-level activities by the Member States. (Section 10 – Continuity and Coordination with Member State Programmes)

- International competition strengthens the scientific effort, but cooperation brings clear and significant benefits, creating a broader user base, opening opportunities for sharing ideas, developing joint initiatives and reducing duplication. (Section 11 – International Cooperation)

1 INTRODUCTION

The next Framework Programme (FP8) will have a significant impact on European research activities during the time foreseen for Europe to meet the goals set out in the 2020 Agenda. Both the ambitious goals and the current challenges underline the importance of formulating FP8 in such a way that it will contribute effectively and efficiently to strengthening the knowledge-based economy and thus to maintaining Europe's competiveness in the world.

This paper draws on the EIROs' history of involvement in past and present Framework Programmes and their experience, stretching over more than fifty years, of operating and exploiting major international research facilities. It is against this background of engagement and experience that the EIROs make this contribution to the discussions that will shape FP8.

The underlying themes include the need to maintain a continued high level of support for R&D in Europe in the face of increasingly strong global competition, the need for both basic and applied science for tackling the Grand Challenges and spurring innovation, the role of the Framework Programme in supporting structural links and interfaces between the various elements of European research, the need for coordination and alignment of the Framework Programme with major national or intergovernmental activities so as to ensure the highest efficiency and exploitation of synergies and, finally, simplification and continuity.

2 KNOWLEDGE CREATION

The creation of new scientific knowledge for the benefit of society as a whole requires both basic and applied research. It is a key element of the knowledge-based economy and is crucial for Europe to meet the goal of smart, sustainable and inclusive growth by 2020[1] and to address some of the major societal challenges, such as climate change, energy security, protection of the natural environment and human health. Many of these challenges require an orchestrated, multi-facetted effort with a strong contribution from basic, investigator-driven research. EU support for scientific research is crucial.

FP8 Action Point

FP8 should enable the strengthening and expansion of activities that provide targeted support for high-risk/high-gain research projects across the different thematic areas, together with opportunities for novel, researcher-driven projects of the European Research Council.

3 ACCESS TO RESEARCH RESULTS

3.1 e-infrastructures

European Research Infrastructures (RIs) produce vast amounts of data that need to be managed, processed, harmonised, catalogued/archived, stored, preserved, and ultimately made accessible for users if their potential is to be fully realised and exploited. These data hold the potential for multi-disciplinary, innovative research across different scientific domains and the creation of new knowledge for use by, and benefit of, the knowledge-based society[2].

The development of e-infrastructures (distributed computing infrastructures), connecting information that was previously isolated or used only by individual scientific communities, demands the design and implementation of sophisticated hardware and software systems.

FP8 Action Point

FP8 should provide increased support for the development of (a) e-infrastructures (distributed computing infrastructures, such as grid and clouds, and supercomputing centres), (b) ICT tools for storage, processing, archiving, curation and usage of very large data sets, and (c) infrastructures that can be used by scientific communities to interface archived research data with scientific publications.

3.2 Open Access to research results

Europe has taken a strong stance in favour of Open Access to the results of scientific research[3] and must continue to be at the forefront of developments in order to maximise the impact of its investment in research. Open Access to the results of publicly-funded scientific research, i.e. the immediate, on-line, free availability of research results, increases their visibility and potential for exploitation and innovation by making them available to a broader community. Long-term preservation of data should be linked to its use in specific scientific publications.

1. Europe 2020 Flagship Initiative Innovation Union; European Commission COM(2010) 546 FINAL, Brussels 6.10.2010
2. See "Riding the wave - How Europe can gain from the rising tide of scientific data", Final report of the High level Expert Group on Scientific Data; European Commission October 2010
3. See e.g. "Research: OpenAIRE opens access to EU scientific results"; 2.10.2010

FP8 Action Point

FP support for Open Access publishing of publicly-funded research results should be strengthened.

4 EXCHANGE OF KNOWLEDGE IN SUPPORT OF INNOVATION

Knowledge is created in industry, universities, national research centres and, at the European level, in facilities such as those operated by the EIROforum partners. The exploitation of knowledge, especially for the wider benefit of society, needs strong interfaces between all involved in its creation. The Framework Programme should foster and support such interfaces, including specific technology transfer initiatives. This means strengthening the structural aspects of European research and its links to innovation.

The early involvement of industry, especially SMEs, in basic and applied research facilitates the exploitation of developments with commercial potential, including those which might be tangential to the specific scientific research programme.

FP8 Action Points

1. *FP8 should enable industry to secure proprietary access to RIs (within normal peer review and IP considerations) in order to impact on industrial output, processes and services.*
2. *FP8 funding rules should be adapted to encourage a stronger engagement of industry, especially SMEs, in the early phases of R&D collaborations and in developments up to proof of concept.*
3. *FP8 should support national and European RIs in technology transfer initiatives designed to encourage industry to fully exploit research results (including scientific discoveries and technical know-how).*

5 SCIENTIFIC INSTRUMENTATION

Scientific discoveries in today's RIs require top-class instruments that utilise component technologies that continually advance the 'state-of-the-art' in different fields (e.g. high performance radiation detectors, cryo- and nano-mechanics, very large databases and their utilisation). Universities, industry and RIs may work independently on the same or similar component R&D projects, resulting in high-gain but also high-cost developments. Closer links between these will result in both cost savings and increased potential for application in other fields. A good example is in the development of advanced imaging technology that has revolutionised fields such as medicine and astronomy.

FP8 Action Point

FP8 should include a large-scale action to catalyse a broader integration of European efforts in instrumentation development (roadmaps and technology platforms), combining expertise and pooling resources.

6 HUMAN RESOURCES

A major strength of the EIROs, which needs to be mirrored in the new RIs now being created, is their wealth of scientific and technical expertise. This is achieved by attracting highly competent scientists, engineers, technicians and administrators; by continuous development of staff, providing training and career opportunities; and by adopting policies that promote staff mobility, including fellowship and student schemes.

To achieve mobility on a wider scale requires a more comprehensive set of actions, that extend beyond FP8. These include the development of a European career path system and the introduction of a common pension scheme (or a transfer scheme between national and international pension schemes). In addition, and specifically for FP8, existing actions should be strengthened and augmented by a scheme to allow short-term staff secondments without penalising the sending RI financially[4] or the long-term career prospects of the secondee. Short-term secondments can fulfil specific needs that arise in an RI or in industry for a limited period of time. These actions should be well-coordinated with other mobility schemes to exploit synergies.

It is essential to encourage new generations to enter research as scientists, engineers and technicians. This is even more important in view of the demographic changes that will occur in Europe over the coming years (the 'ageing society' and the shrinking of the labour force), as well as the increased demand for highly trained S&T personnel to support the growth of the knowledge-based economy.

FP8 Action Points

1. *Within FP8, the Marie Curie scheme should be strengthened and expanded, including the host-driven actions, the actions to foster exchange between industry and publicly-funded RIs and the FP7 COFUND scheme.*
2. *FP8 should contain a secondment scheme that will enable short-term secondments to facilitate exchange of know-how.*
3. *FP8 should support the development of a concerted effort to design and implement a sustained, coherent and comprehensive scheme, with a clear European dimension, to attract and support entrants to scientific, technical and engineering careers. Both outreach and education initiatives should be included.*

7 ACCESS TO RESEARCH INFRASTRUCTURES

The development of a European roadmap for RIs by ESFRI has helped to identify new RIs of Pan-European interest, to which access by the European scientific community should be ensured. Already today one third of the existing RIs in the EU have more than 50% foreign users[5]. Enlarging trans-national access to RIs at European-level (a) increases competition for the resources and opportunities that the facilities provide, offering the potential for improved quality, increased scientific return and added-vale for innovation in Europe, (b) has a positive impact on mobility and (c) promotes EU-wide integration of scientific communities in convergence regions that have few RIs.

FP8 Action Point

FP8 should further strengthen trans-national access to RIs, through for example the Integrated Infrastructure Initiative scheme.

4. The secondment scheme applied within the European Fusion Programme may serve as a model.
5. A more research-intensive and integrated European Research Area, Science, Technology and Competitiveness key figures report 2008/2009, European commission, DG Research EUR 230608 EN

8 FUNDING

The goal for 1 % of the GDP to be spent on publicly-funded research has been reached by only a small number of EU Member States. While this remains a declared goal for all, the current economical climate poses a significant risk to its attainment. Investments in R&D should not be reduced, since this would have an adverse effect on an innovation-driven recovery and long-term economic well-being. This applies to both Member State and EU funding; and they should be perceived as a complementary.

Funding for European-level scientific research is provided mainly by Member States and the EU Framework Programme. Member State funding of the European intergovernmental organisations constitutes a focussed investment in specific areas, whereas EU funding has a much wider scope. Thus, the Member States fund the core tasks of European-level RIs, whereas the design and delivery of ancillary activities, such as specific education and outreach programmes, together with the expansion and enhancement of certain research projects, often depend on additional funding. Support from the Framework Programme may significantly enhance the value of ancillary activities for society as a whole, generating important synergies between the Member State and EU funding streams.

In some cases, actions to attract additional investment from alternative sources are vital to complement the public investments made in research. To leverage such alternative funding requires actions that extend beyond FP8, such as the introduction of new regulatory provisions, e.g. tax breaks for industry support of public research initiatives. A careful cross-analysis of environments in which external funding thrives, would give a better understanding of the key characteristics that contribute to successful public-private funding and thus inform the drafting of provisions within FP8.

FP8 Action Points

1. *FP8 funding should be at or above current levels of investment in order to foster innovation, attain the 2020 goals and create additional jobs.*
2. *FP8 should include provision for exploiting synergies with activities of the European Intergovernmental Organisations to use resources efficiently and effectively and facilitate the application of results and technologies beyond their original purpose.*
3. *FP8 should encourage supplementary funding from alternative sources and promote a regulatory environment that recognises their significance.*

9 SIMPLIFICATION

Procedures to ensure clear and rigorous accountability in the use of FP funds are mandatory. However, cumbersome bureaucracy (actual and/or perceived) can be a barrier to many organisations and individuals (especially in the private sector). Procedures may inadvertently divert resources and mask underlying fundamental issues in the conduct of projects. Good science may even be lost or under-exploited as a result. The guiding principle should be to enable researchers to concentrate on their research, not on administration; the approach to administration should be trust-based which would resonate better with the ethos of the world of science.

Entry to programmes should be facilitated by adopting a less resource-demanding application procedure. The complexity and administrative burden on beneficiaries should be reduced. Best practice from Member State funding schemes should be considered. Simplification of the implementation and financial management requirements, leading

to streamlined administrative practices and procedures, together with good practice in governance, project management, cost containment and reporting, would greatly increase leverage and maximise scientific return on the investment made.

FP8 Action Points

1. *In FP8, the application process should be further simplified by extending the use of a two-step procedure to all areas. The possibility for oral hearings should be applied more extensively.*
2. *In FP8, the administrative framework should be simplified and processes and procedures streamlined, while retaining a sufficient level of detail to ensure accountability against clear and recognisable objectives.*
3. *For FP8, a single, universally recognised and authoritative point of reference for all FP8 beneficiaries, project officers and auditors, should be established to provide consistent understanding and application of financial rules.*

10 CONTINUITY AND COORDINATION WITH MEMBER STATE PROGRAMMES

The next Framework Programme should provide continuity, in terms of both instruments and programmes, for example in the case of the Integrating Activities. Previous FPs have advanced a wealth of innovative ideas, providing strong evidence for the quality, enthusiasm and inventiveness of Europe's researchers. Sometimes highly successful activities have not been able to develop to their full potential and/or secure a continued exploitation beyond the duration of the initial contracts. Improved coordination between the European Commission and the Member States could help to secure longer-term funding for these activities. Furthermore, to ensure improved coordination and exploitation of synergies, new initiatives within FP8 should take full recognition of European-level activities by the Member States.

FP8 Action Points

1. *FP8 should retain the necessary instruments and programmes that would secure, where appropriate, continuity of projects and allow the opening of second phase contracts.*
2. *FP activities should be coordinated with European-level activities of the Member States.*

11 INTERNATIONAL COOPERATION

The European Research Area (ERA) was created as Europe's response to the challenges emerging from globalisation and the increasing competition among world regions. Promoting the ERA as a place to conduct successful, world-class research remains a task for all involved.

International competition strengthens the scientific effort, but cooperation brings clear and significant benefits, creating a broader user base, opening opportunities for sharing ideas, developing joint initiatives and reducing duplication.

This applies not only to cooperation with highly developed regions, but also to the development of capacities in emerging scientific and economic powers and developing countries.

For the benefit of scientific progress, the EU should promote political actions to facilitate increased access to technologies developed worldwide, e.g. the ITA regulations.

FP8 Action Points

1. *FP8 should enable the European Commission in close collaboration with stakeholders to actively promote the ERA beyond Europe as a place to conduct successful, world-class research.*
2. *FP8 should not only comprise Coordination and Support actions but also extend the instruments under the INCO calls to research and capacity building projects, including training activities, for developing countries.*

12 CONCLUSIONS

The creation of new scientific knowledge for the benefit of society as a whole requires both basic and applied research and is key to the knowledge-based economy.

Knowledge is created in industry, universities, national research centres and, at the European level, in facilities such as those operated by the EIROforum partners. Research Infrastructures are pivotal not only for knowledge creation but also for knowledge exchange and exploitation. Research Infrastructures allow scientists to conduct scientific research and make technological breakthroughs at the level of international excellence. They structure research fields in their respective areas, integrating resources to achieve critical mass and prevent fragmentation while interacting with national facilities, industry, educational institutes and international partners. Research infrastructures, with their state-of-the-art analytical tools, are essential to the innovation process.

The exploitation of knowledge, especially for the wider benefit of society, needs strong interfaces between many parties. The Framework Programme should foster and support such interfaces. In particular, it should strengthen the structural aspects of European research and its links to innovation and should promote European-level actions in (a) basic and applied research, (b) technology development and transfer, (c) mobility, training and attracting the next generation of S&T personnel, (d) access to research facilities and results, and (e) international cooperation.

Funding for European-level scientific research is provided mainly by Member States and the EU Framework Programme. Member State funding of the European intergovernmental organisations constitutes a focussed investment in very particular areas, whereas the EU funding has a much wider scope. The goal for 1 % of the GDP to be spent on publicly-funded research has been reached by only a small number of EU Member States. While this remains a declared goal for all, the current economic climate poses a significant risk to its attainment. Investments in R&D should not be reduced, since this would have an adverse effect on both an innovation-driven recovery and long-term economic well-being. This applies to both Member State and EU funding, which should be perceived as complementary.

To exploit synergies and avoid unintended duplication new initiatives within FP8 should be aligned, where possible, with major national or intergovernmental activities. This calls for an enhanced consultation and dialogue when formulating the Framework Programme, the Specific Programmes and the Work Programmes.

Whilst the FP is central to stimulating R&D in Europe, additional legislative and political actions are also needed to enable the ERA to develop to its full potential.

With this paper, the EIROforum partners provide their input to the early-stage discussion on the formulation of FP8, sharing their collective experience of enabling world-class research with Europe's decision makers.