EMBL

European Molecular Biology Laboratory

Response to EC Public Consultation on the European Research Area Framework: Areas of untapped potential for the development of the European Research Area

November 2011

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Response to European Commission Public Consultation on European Research Area (ERA)

I. Introduction and general comments on the ERA

EMBL is Europe's flagship laboratory for molecular biology research. It is funded by 20 European member states and one associate member state, Australia. EMBL's mission is to perform basic research in molecular biology, provide services and infrastructure, provide advanced (post-graduate) training, develop new instrumentation and methods, engage in technology transfer and promote integration of the European life science community.

EMBL's annual income in 2010 was €183.4 million, €33.9 million of which came from external competitive funding and €12.4 million of that from the EU Framework Programme (FP). To date EMBL researchers have coordinated forty and participated in more than two hundred projects funded by FP6 and FP7.

The goal to establish the ERA by 2014 is ambitious and achieving it will require the continuous involvement of all relevant actors to address the challenges at hand. EMBL considers itself a key player in the development of European Research Area (ERA) and the most important[1] gaps to be filled in order to achieve ERA are as follows: research infrastructures (5), knowledge circulation and open access (5), researchers' careers and mobility (4), cross border cooperation (4), knowledge transfer (3), cross-cutting governing issues (3), international dimension (2).

II. Researchers

A highly skilled work force is one of the preconditions for establishing the ERA and producing, attracting and retaining the best researchers are essential for its success. Training is one of EMBL's core missions and it was set up as a centre of excellence to attract and train researchers for the benefit of its member states. Most researchers spend only a limited time at EMBL and over 80% return to one of its member states, helping to transfer knowledge and to build capacities across Europe. Most advanced training activities at EMBL are internally funded, however the EU schemes for training and trans-national mobility have made invaluable contributions, providing added value at the European level. They have allowed the opening up of EMBL's training programmes to scientists from non-member states including less developed regions.

In general, EMBL considers the Marie Curie host-driven and fellowship programmes extremely valuable in training excellent researchers and promoting strong independent research careers for skilled scientists in Europe. EMBL believes that they are the right policy approach from the EU and should as such be kept and strengthened as an important driver of ERA.

Scientific careers could become more attractive if proper career paths and career development opportunities were available especially in the public sector. Closing the gap

[1] 5 – most important, 1- least important

between the postdoctoral level and permanent positions for principal investigators and allowing young scientists to grow, develop and progress, also taking gender and diversity issues into consideration, will be essential for generating sufficient well-trained researchers. The European Charter for Researchers & Code of Conduct provides guidelines to develop more favorable employment conditions for researchers at the European level and we strongly endorse their broad implementation in the context of the "Human Resources Strategy for Researchers". EMBL is working towards obtaining the label "HR Excellence in Research".

The portability of social rights is a cross-cutting issue concerning the EU labour market, but it provides particular concerns to researchers as they represent a profession with relatively high mobility. As this issue is closely connected to the labour law of EU member states, a comprehensive approach with a strong lead from the European Commission (EC) is needed. EMBL can be viewed as an example of good practice at the institutional level as it provides its researchers with a pension fund as well as an effective health insurance scheme with world-wide coverage during the time of employment. However, upon leaving EMBL researchers face some difficulties when trying to transfer their pension rights and other social benefits such as health insurance to a national scheme.

III. Cross-border cooperation of research actors

Major societal challenges, such as for example, the ageing population, the loss of biodiversity, viral pandemics and food security, can only be tackled by combining efforts and resources. Pan-European approaches are needed to allow better coordination and pooling of resources within the ERA Framework. A number of EC instruments, such as the ERA-NET schemes and Joint Programming Initiatives (JPI) as well as existing intergovernmental research organisations like EMBL are already contributing to the establishment of the ERA. The EC has assumed the role of facilitator to bring together relevant JPIs and emerging European Strategy Forum on Research Infrastructures (ESFRI) projects in the field of bio-medical sciences. EMBL warmly welcomes this initiative and calls upon the EC to further facilitate contacts and explore possible synergies between research infrastructures, including ESFRI projects, and JPIs. This will improve scientific and technical co-operation and permit the new initiatives to benefit from the experience of the intergovernmental research organisations.

EMBL was established in 1974 based on an international agreement initially signed by ten European countries; today it is supported by twenty member states. It was founded because the scientific community was able to show to member states that such an organisation was needed in Europe and that it had to be established with long term perspective and with the agreement to pool resources to carry out a scientific programme that is revised every five years. EMBL was not established as a project-based organisation with short term objectives but with the understanding that it would continue to change and adapt its strategy according to its members' needs.

EMBL and ELIXIR[2] would be obvious partners for JPIs in the life sciences and closer interactions could be achieved by supporting scientific collaborations and technical development as well as mobility and training.

Research alliances such as the institutional partnerships that EMBL has formed with research performing organisations in its member states should also be cited as examples of close cooperative affiliations that are based on shared institutional goals and scientific synergy or complementarity. Their aim is to leverage the successful EMBL model and competences, together with the strengths of the partners, to create an interlinked system of leading institutions and thus help to enhance the development of the molecular life sciences in Europe and the world.

IV. Research Infrastructures

European research infrastructures are a key pillar of ERA and are making an essential contribution to overcoming national fragmentation in specific scientific fields. EMBL is a working model for sustainable, distributed life science research infrastructures, integrating European research communities and fostering synergies and collaborations.

Nevertheless, due to scientific developments and financial constraints, life sciences research infrastructures, including EMBL, face many challenges. The scientific community relies on access to complex equipment, specialised services or large collections of patient samples, mutant animals or biomedical data resources and this demand often exceeds the capacity of existing facilities or requires the development of new research infrastructures such as ELIXIR.

The biomolecular data resources of EMBL's Outstation, the European Bioinformatics Institute (EMBL-EBI) in Hinxton, UK, for example, are now used by more than 1.3 million users per year downloading over 75 terabytes of data. The ever-increasing rate and complexity of data generated in the life sciences are leading to more and more demands on compute power, data storage, network bandwidth, and staff to handle, curate, integrate and serve these huge data volumes. Comprehensive and carefully curated databanks are a long-term investment and can be of invaluable use in future when the information entered in the past might help to find answers to scientific questions that we cannot even conceive today. Unfortunately, support for biomedical databases and other life science-infrastructure in Europe remains woefully limited.

The next generation of European research infrastructures is under development and EMBL coordinates two out of thirteen (ESFRI) biomedical projects: ELIXIR and Euro-BioImaging[3]. It also participates in five other projects: Infrafrontier[4], BBMRI[5], INSTRUCT[6], EMBRC[7] and EU-OPENSCREEN[8].

[2] http://www.elixir-europe.org/
[3] http://www.eurobioimaging.eu/
[4] http://www.infrafrontier.eu/

ELIXIR will become one of the main pillars of the ERA with the lead in bioinformatics. EU support will be required for integration at the European level to ensure connectivity, not only between the different ELIXIR sites, but also with other biomedical research infrastructures, all of which will be handling data that will have to be linked and integrated with the core biomolecular data resources.

Euro-BioImaging is the European research infrastructure for biomedical imaging technologies, integrating basic biological imaging and medical imaging. It will provide access to and service and training in state-of-the-art imaging technologies. This will foster the cooperation and networking between all stakeholders at the national and European level including multidisciplinary scientists, industry, and regional, national and European authorities. Euro-BioImaging will deploy the distributed imaging infrastructure in Europe in a coordinated and harmonised manner and again this will require support from the EU and its member states.

As regards the ESFRI process, which at present connects 48 projects over 33 countries, it is necessary that the ESFRI member states and the EC agree on a mechanism of coordinated action on these research infrastructures. The simple solution would be a European-level coordination or decision-taking body that could grow out of the current ESFRI and implement agreed member state policy on prioritization, funding, site selection and construction of the ESFRI projects. Such a body would consist of member state representatives who ensure that legitimate national interests are taken into account, but at the same time render the process faster, cheaper, more efficient and more consistent across projects.

Drawing on existing expertise would further help to avoid reinventing the wheel for every new research infrastructure. Europe already has world-class infrastructures such as those operated by the members of EIROforum (CERN, EFDA JET, EMBL, ESA, ESO, ESRF, ILL and XFEL). They serve both as models and sources of expert advice. Their governance structures are designed for international membership and operation and have sustainable, performance-based funding systems.

Trans-national user access to research infrastructures in Europe is another key aspect in building the ERA, and support for access to existing and new types of research infrastructures in the life sciences, for example, for access to electron and light microscopy facilities, will have to be increased to meet demand. Coordination of user access through research infrastructures is in principle a good idea but should not increase administrative overheads and bureaucracy by duplicating selection and reporting procedures at the level of the coordinator and the individual organisations that are providing the facilities.

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[5] http://www.bbmri.eu/
[6] http://www.structuralbiology.eu/
[7] http://www.embrc.eu/
[8] http://www.eu-openscreen.eu/

Another aspect to address in achieving ERA is to better integrate Central and Eastern EU member states in existing and emerging pan-European research infrastructures. In particular, these countries should be supported in their efforts to create new research infrastructures or to bring existing infrastructures up to a competitive level. EMBL is open to the participation of all EU member states not only in the existing research infrastructures but also in new distributed infrastructure projects such as ELIXIR and Euro-BioImaging. One way to support the Central and Eastern EU member states would be to make a clear and coherent link between the ERA policy and the EU regional policy.

V. Knowledge circulation: knowledge transfer and open access

Knowledge Transfer

Technology transfer is one of EMBL's missions and one in three EMBL scientists has been involved in knowledge transfer to facilitate the translation of basic research discoveries into practical applications that benefit European society and the economy. EMBL interacts with industry at various levels and actively engages in technology transfer through its commercial subsidiary EMBL Enterprise Management Technology Transfer GmbH (EMBLEM). In the past 10 years, EMBL has filed close to 300 patent applications and created 12 spin-out companies.

In order for society and its economy to benefit from scientific discoveries and inventions, efficient technology transfer mechanisms are needed, including simpler patent and tax laws that encourage these activities. In Europe patenting is subject to national legislation. As the laws differ from country to country the patenting process is often complex, time consuming and expensive. In addition, an invention has to be protected many times over. A uniform European patent law would be one way to solve this problem. The European tax laws associated with venture capital are another limiting factor. Tax exemptions comparable to those granted to backers of start-up companies in the USA would be an incentive for European entrepreneurs to take more risks.

Moreover, knowledge transfer in Europe could be substantially increased by creating an EU-wide funding mechanism for Proof of Concept/Translational funding to enable the further development of promising Intellectual Property (IP). The latter currently forms a major bottleneck in the innovation cycle and is where EU support could have a significant impact in helping towards the application of basic research results in both industry and medicine.

Furthermore, there should be focus on training of knowledge transfer officers. At present, the knowledge and experience level of knowledge transfer officers varies strongly within the EU. For successful knowledge transfer activities staff needs to have experience both in the academic and in the industrial world. The definition of minimum knowledge transfer training standards as well as the support of professional knowledge transfer accreditation (i.e. ATTP; www.attp.info) associations and the establishment of knowledge transfer bachelor/master courses is essential not only to raise the standards but also raise the

visibility of this profession and therefore attract better qualified personnel. Existing national and pan-European knowledge transfer associations (such as ASTP[9] or PraxisUnico[10]) should be supported.

In addition, mobility of scientists/researchers between industry and academia should be strengthened to allow for a "reverse" cross-fertilisation.

As regards the numerous national and EU initiatives addressing strategic public-private partnerships, EMBL suggests changes that would stimulate participation of SMEs. In particular, within the current FP7 funding schemes, the level of paperwork/bureaucracy associated with the calls often hinders the participation of SMEs since they have neither the time nor the required resources for the initial detailed application procedure. In our opinion the future ERA policy should aim at a more simplified and shorter initial application process, which should be followed by a detailed R&D plan once the application receives a positive evaluation. This two-step procedure is already used in the FP7 NMP theme and in some parts of the FP7 Health theme and the results show that it does encourage SME participation.

Open access

EMBL strongly supports the principles of open access to data and publications as the basis for future scientific discoveries and innovations, and to ensure maximum benefit from the investments made into science.

EMBL is involved in the open access data policy through its outstation, the EMBL-EBI in the UK. As the leading institute in the field in Europe one of the core missions of EMBL-EBI is to provide freely available data and bioinformatics services to all facets of the scientific community in ways that promote scientific progress. This policy is also going to be endorsed by ELIXIR.

Open access provided through free online access can significantly enhance the circulation of knowledge within ERA. Data stored by EMBL-EBI are available as open access material wherever possible. The EMBL-EBI web portal, for example, receives one billion hits per year from a user community of hundreds of thousands individual scientists from all over the world, accessing data and other resources. Ensuring open access through on-line access will be of increasing importance to ensure knowledge circulation within the ERA.

In relation to this, it has to be underlined that the main barrier to the open access of data is funding. Large investments in research are made at regional, national and European level, but investments for infrastructures to preserve and grant access to these data has been much more difficult to secure. Given the volume of data that is now being generated in the life sciences, this issue is critical. It could be addressed in part by ensuring that future EU

[9] www.astp.net
[10] www.praxisunico.org.uk

funding programmes provide adequate support to the operating costs of such data infrastructures.

As regard open access to publications, the main barrier is that most publications of research results are still made available via subscription based models. Member states, national funding bodies and the EC could change this by the formulation of clear policies on open access for articles published as a result of publically funded research. In parallel, the interoperability of repositories is desirable. The setting of standards for technical formats of research articles will be integral to fully capitalising on research investments, and, alongside Open Access, this will allow for reuse of published data and new developments that arise from this.

EMBL is participating in one of the open access pilot initiative in FP7 and is supporting of the recommendations of 'Vision 2030', which is set out in the publication entitled 'Riding the wave: How Europe can gain from the rising tide of scientific data'.

VI. International dimension

EMBL agrees with the three principles identified in the EC Communication on international science and technology cooperation: 1. Define research topics; 2. Guarantee of critical mass of resources; and 3. Distinguish between scientifically advanced and less advanced partners, although cooperation with both is important. These principles could be a starting point for future better coordination of science policies between member states and the EU.

Research in biomedical sciences delivers benefits to citizens around the world. The EU and member states have international development responsibilities and goals, particularly in the world's developing regions. Future EU international science policy should acknowledge the improvements that biomedical sciences can bring to developing countries, especially in the fields of health and food production.

EMBL maintains collaborations with both highly developed and developing countries. The most prominent collaboration with a highly developed country is Australia's associate membership in EMBL. In addition EMBL recently signed Memoranda of Understanding with several Russian research institutions to promote scientific co-operations.

International cooperation will become more important in the future and ERA policy should reflect that by the opening up of EU research programmes to non-EU countries. This can bring real added value to EU countries and inter-governmental organisations. In particular, ERA should address the possibility of supporting non-EU countries that may form part of some of the large European research infrastructures.

Further instruments – e.g. within bilateral Science and Technology Agreements that the EC has concluded with different countries– would bring benefits to all parties involved. It is important that any future bilateral S&T agreements signed by the EU are strategic and bring real value to participants. S&T Agreements could be made more effective, in general, by ensuring they are more strategic and that EU programmes are used as an

instrument to facilitate the actual collaboration of research teams between the two regions concerned. Collaboration with the US could be improved within the EU-US Dialogue in Research and Education. The co-operation agreement between the EU and NIH in the field of Health research, which guarantees the reciprocity of funding, is an example of an international agreement that can bring value to researchers. Such agreements could usefully be extended to other research fields.

There is also considerable potential for increasing research-based interactions with developing countries, particularly the BRIC countries. This includes intensified collaboration in the biomedical sciences in close cooperation with countries such as Russia (within the Common Space for Research and Education) and India (within its Scientific and Technology Agreement).

Another instrument to support international cooperation with developed and developing countries would be mobility schemes for scientists from non-EU countries to take part in EMBL programmes.

Facilitating employment conditions in general and easing the visa requirements for non-EU scientists would be also an important policy step towards increasing international S&T cooperation.

VII. Managing and monitoring the ERA partnership: cross-cutting governance issues and next steps

Reducing the current research and innovation gap in Europe will need a multilayer approach. Dedicating more EU funding to research is only one approach, yet a very important one. EU research and innovation funding should remain complementary to regional and national funding in order to have the highest impact, i.e. European value-added. It should focus on activities that require pan-European funding. A larger proportion of EU Structural Funds should be dedicated to research and development activities. In terms of policy, a coherent link between EU regional policy and future ERA policy should therefore be made.

On a general level, structures and processes needed to achieve ERA should aim at facilitating the heavy administrative environment encountered by those research actors that are engaging across national borders. Minimizing the red tape when addressing researcher's careers, trans-border cooperation, pan-European research infrastructures or cross-cutting governance issues should be a high priority.

The European Council embraced 2014 as the goal for completing ERA, which shows that the consensus on EU level is strong. Completing ERA is in the interest of pan-European research infrastructures, including EMBL. It is important that this political commitment is also fully embraced on the national level in the near future.

The construction of ERA should go beyond the involvement of EU institutions - stakeholders (i.e. research actors) should be involved throughout the process – ultimately they are the heart of the ERA. In this respect, EMBL and the EC signed a Memorandum of Understanding in March 2011 and we believe that this is the right framework for EMBL and the EC to exchange views on building ERA.

As regards the principles that should underpin the ERA framework, EMBL agrees that non-discrimination, equal opportunity, transparency, subsidiarity and proportionality are important. However, we believe that the key principle is scientific excellence. Only with scientific excellence will the EU be able to reach its Europe 2020 objectives and out-perform the world players that at present lead in S&T.

As to gender policy, it is clear that women are still under-represented in science. Despite the efforts made, there has been no dramatic increase in the number of women in higher positions in industry and in decision-making positions in academic science, and the gender gap, in terms of both position and salary, remains a challenge. EMBL is helping to tackle this challenge by providing excellent working conditions for women scientists, creating and driving initiatives that raise public awareness of the inequality issues faced by women scientists and finally by encouraging society to rethink and review the situation of women in science and in professional life in general. As a result 44 per-cent of EMBL employees are women. Overall, an ERA instrument to initiate a top-down reform for institutional change in this crucial area would be helpful

VIII. Concluding remarks

EMBL welcomes the initiative of the EC to engage in a broad public consultation to identify the areas of untapped potential within ERA.

In view of the preparation of Horizon 2020 and its definition of the main challenges for completion of ERA, it is important that the future policy actions that emerge from this consultation process, receive the appropriate level of financial support. For EMBL, research infrastructures, in particular the pan-European aspects of distributed emerging infrastructures, knowledge circulation and Open Access, as well as researcher's careers and mobility represent the most important aspects that need to be addressed in order to achieve the ERA.

Given its intergovernmental status, the quality of the research it carries out and the research infrastructures it provides, the Open Access policies it pursues, the training it delivers and its' standing in the international scientific community, EMBL already acts as a key driver in helping to achieve a true European Research Area, where knowledge circulates freely irrespective of national boundaries. As such, EMBL wishes to continue to lend its support, advice and experience, in dialogue with the EC, in order to continue the process of achieving ERA