



Statement by the ERC Scientific Council to the Consultation on the European Research Area Framework

The ERC Scientific Council (ScC) welcomes this opportunity to contribute to the debate on areas of untapped potential for the development of the European Research Area (ERA) as outlined in the document accompanying the on-line public consultation questionnaire on the ERA framework¹.

We fully support the objective of creating "*a European research area in which researchers, scientific knowledge and technology circulate freely*". We agree with many of the key issues identified such as the fact that in many European countries the public sector still does not offer sufficiently attractive career prospects for researchers, the need to develop and maintain pan-European research infrastructures and the desirability of more open access. Our views on these issues and others were set out in our response to the 2007 Green Paper on ERA².

It is not our intention therefore to comment on all of the detailed areas covered by the present consultation. We would like instead to argue strongly for the eventual ERA Framework to strike a balance between the effectiveness of both coordination and competition in achieving its aims.

Coordination and competition: two complementary approaches to developing the ERA

The current European research and innovation system is often characterised as "fragmented" and the solution is seen as more cross-border coordination, often looking to build critical mass around a mission-orientated approach, either to address societal challenges or establish industrial leadership in key technologies. We would wish to emphasise in addition the benefits from the complementary approach of increasing pan-European competition in a bottom-up mode. Science

¹ http://ec.europa.eu/research/consultations/era/consultation_era.pdf

² http://erc.europa.eu/sites/default/files/document/file/erc_scc_relaunching_the_european_research_area.pdf

has always moved forward through a creative tension between competition and collaboration.

Large-scale coordination with a mission-orientated approach is in our view best suited to well-defined challenges that need the synchronised deployment of established technologies and to the development and maintenance of research infrastructures (including large scale databases). But there are also constraints to any top-down policy:

- Coordination can be sub-optimal at a stage when a field is still emerging and researchers are still exploring different approaches as it can encourage premature lock-in of technologies or standards, therefore hindering innovation. Independent groups working on similar problems, can spur each other on and any mistakes in experimentation or interpretation (or plain falsification) can be rapidly identified and corrected. At earlier stages, competitive funding in a decentralised and bottom-up manner is therefore likely to be more effective;
- Coordinated approaches to challenges can also lead to structures built on "juste-retour" principles and the pre-defined division of labour to existing teams. Such structures might be suited to some industrial ventures but they carry high costs and in our view are less likely to be able efficiently to explore all the possible solutions to a less well defined challenge or converge on the optimal solutions to such a challenge. In these cases a common "competitive challenge fund" or prize allowing the best researchers to respond creatively with new approaches is likely to be more effective. Frontier research can in this way create new platforms for subsequent coordinated, mission-orientated initiatives.

The ERC: a new interpretation of EU added value

As we said in 2007, *"Competition on the sole criterion of excellence, independent of political considerations, is the surest way to release human creativity and thus to promote fundamental advances at the frontier of knowledge."* The ERC is built around this well established idea, and extends it to create a new interpretation of EU-added value. By setting up a truly pan-European competition the ERC is able to draw on a wider pool of talents and ideas than would be possible for any national scheme. In this way the best researchers with the best ideas receive funding irrespective of local bottlenecks or the availability of national funding.

This approach not only allows us to fund excellent frontier research, but is already having a significant structural impact:

- The ERC's competitions act as a benchmark allowing national systems and individual institutions to assess their relative strengths and weaknesses and reform their policies and practices accordingly;
- ERC funded projects and researchers set a clear and inspirational target for frontier research in Europe, raise its profile and make it more attractive for the best researchers at global level;
- The prestige of hosting ERC grant-holders and the accompanying 'stamp of excellence' are intensifying competition between Europe's universities and other research organisations to offer the most attractive conditions for top researchers; and
- We are already seeing Member States explicitly reforming their policies and practices in line with ERC practices.

We consider therefore that the ERC is already playing and can play a decisive role in creating an ERA based on excellence. And this is a key point for us. The EU has nearly three times as many public sector researchers as the USA, spends more on its public sector research base than the USA, and continues to produce more scientific output than any other region in the world³. But it has fallen behind in producing the very best cutting-edge science in new and rapidly emerging fields which are closely associated with world-leading innovation. For example, the USA produces 52% of the most influential scientific articles⁴ while the EU produces only 30%⁵ despite producing more scientific articles overall. In newer, more dynamic fields the distance is even more dramatic, for instance for computer sciences, the figures are 59% and 21%. Similarly, international rankings of universities and other research organisations show that US based organisations dominate the top places. And 70% of the world's Nobel Prize winners are based in the USA.

Competition needs to be encouraged at all levels

National policymakers will naturally look at their national research and innovation systems. But science is collective, public and international and has been since the earliest days of modern science when rumours of Copernicus' heliocentric theory reached educated people all over Europe. As of 2011 only 7% of the world's population live in the EU and the scientific production of the 93% is increasing rapidly. The Chinese Academy of Sciences now produces more scientific articles

³ Innovation Union Competitiveness Report 2011.

⁴ Defined as the top 1% by citation count.

⁵ NSF Science and Engineering Indicators 2010 based on 2004 – 2006 articles cited in 2008 in Thomson Reuters SCI and SSCI.

than any other institution in the world⁶. Already in 2008, 29% of articles with an EU author had a co-author or co-authors from outside the EU (mainly in the USA)⁷. Discoveries made anywhere are available almost instantly to the whole global scientific community.

National policymakers therefore need to maximise the ability of their scientific communities to take part in and contribute to this overall endeavour. Increasing the small fraction of research funding currently allocated through ERA-wide competition could thus significantly raise Europe's performance. The lack of such competition can result in:

- sheltered funding of research teams which would not be competitive at EU level;
- similar research priorities (nano, bio, ICT) being funded in each country or region which prevents greater specialisation and the exploration of new ideas and methods; and
- insufficient concentration of funding on the best performing teams.

Competition needs to be encouraged at all levels, individual, institutional and structural. It is not possible for institutions to compete, or create the conditions in which their researchers can compete if they are constrained by a lack of resources or autonomy. And conversely the benefits of increased resources and autonomy can be limited without competition as there is no incentive to use the autonomy in a positive way.

Efforts to further develop the ERA must therefore not lose their focus on the need for the reform of national research structures and institutions. The top research institutions are players on a global field. Allowing Europe's research institutions to achieve world class standards would by itself go a long way towards addressing many of the issues described in the ERA consultation paper. Increased competition can therefore be a tool to achieve common reform goals as elaborated through the ERA initiatives. The fact that the responsibility for universities, which are key players in many European research systems, is shared between different DGs in the Commission and often by different ministries at national level should not be allowed to distract policymakers from the urgent need for their modernisation and reform.

Conclusion

Economic history reveals the central role of science and innovation in the productivity growth of industrialised nations⁸ increasing competitiveness, wealth

⁶ Scimago World Report 2011 based on the period 2005 – 2009 using the Scopus database.

⁷ NSF Science and Engineering Indicators 2010.

⁸ Landes D (1969). *The Unbound Prometheus: Technological Changes and Industrial Development in Western Europe, 1750 to the Present*. Cambridge University Press: Cambridge, UK; Lipsey R, Carlaw K & Bekar C (2006). *Economic Transformations:*

and social progress. Frontier research offers tremendous economic rewards. Many important innovations, in industries ranging from pharmaceuticals to information technology, have their origins in publicly funded research conducted at universities and research institutions. Many of the commercially successful inventions we now take for granted and which have driven economic growth are the result of research that had no apparent immediate commercial purpose.

The innovation process, with its many linkages and feedback mechanisms, needs to be understood at a systemic level and is increasingly global. Innovation does not follow a neat linear model in which "an innovation" follows directly and rapidly from "a research project", with the benefits captured in the same geographical location as the research takes place. Global innovation leads to national growth, and national innovation leads to global growth.

Europe has a tradition of excellence and the brains and resources to be the world's leading research area with all the benefits that would bring. By introducing a more open, competitive spirit across European research institutions and among all stakeholders of ERA, and by making Europe a more attractive place to carry out research, a decisive step could be taken towards achieving the objectives of the 2020 Innovation Union.

General Purpose Technologies and Long-Term Economic Growth. Oxford University Press: Oxford, UK; Mokyr J (2009). *The Enlightened Economy: An Economic History of Britain 1700-1850.* Yale University Press: New Haven.