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Frontier Research: The European Challenge

High-Level Expert Group Report
Executive Summary

REPORT

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'Frontier Research: The European Challenge' presents the conclusions of a high-level expert group (HLEG) convened by the European Commission to examine the benefits of creating a new European-level funding mechanism to support the very best research carried out at the frontiers of knowledge.

The report takes as its starting point the concept of a European Research Council (ERC), which would govern and administer funds for such research as part of the overall budget of the Seventh Framework Programme. The arguments presented in the report are supported by extensive references to published studies and data.

Up to now, the case for establishing an ERC has been couched in terms of the need to create a pan-European competition to support the best 'basic research'. However, classical distinctions between 'basic' and 'applied' research have lost much of their relevance at a time when emerging areas of science and technology often embrace substantial elements of both. The report therefore adopts the term *frontier research*, rather than basic research, to reflect this new reality. Frontier research, because it is at the forefront of creating new knowledge, is an intrinsically risky endeavour that involves the pursuit of questions without regard for established disciplinary boundaries or national borders.

A unique historic opportunity

Limited progress to date in moving towards the Lisbon and Barcelona targets points to the need for substantial improvements in the way Europe manages its research base. Frontier research of the highest quality has a critical role to play, but research funding in this area has until now been largely the province of initiatives at the national level.

An ERC would provide the pan-European mechanism necessary to selectively encourage and support the truly creative thinkers – scientists, engineers and other researchers – who, driven by curiosity and a thirst for knowledge, are most likely to make the unpredictable and spectacular discoveries that can change the course of human understanding, as well as perhaps helping to solve some of mankind's most enduring problems.

The accelerating pace of technological advance, the recent enlargement of the EU, the implementation of the European Research Area and the imminent definition of the Seventh EU Research Framework Programme (FP7) together create a unique opportunity for decisive action with regard to fostering excellent frontier research in Europe.

Meeting the challenges

A number of challenges now facing Europe make the proposal to create an ERC both timely and necessary.

- **Reinforcing excellence, especially in new, fast-growing research areas.** Europe does not perform particularly well in terms of truly outstanding research, nor is it mastering sufficiently quickly the new fast growing fields in which science and technology are often closely interlinked. It needs a new funding mechanism such as the ERC that encourages, facilitates and selects more adventurous research, drawing upon the full continental pool of creative researchers.
- **Staying ahead in a world of growing scientific and technological competition.** While Europe wrestles with the task of catching up with its traditional competitors, it may face the danger of being overtaken by fast-developing Asian

countries. Special attention must therefore be given in European policy to areas such as frontier research and mechanisms such as the ERC where Europe can exploit some of its potential comparative advantages.

- **Linking science to technological innovation.** Europe's relative slowness in entering and exploiting new fields of technology closely linked to scientific knowledge has adverse consequences for its ability to generate innovations. A new organisation like the ERC is needed to fund the best frontier research in emerging, fast-growing areas, and thereby to help strengthen European competitiveness in relation to technological innovation.
- **Competing for talent.** Success in frontier research as well as in exploiting new scientific knowledge depends increasingly on the efforts of a relatively small number of truly outstanding research leaders. Europe needs a new institutional mechanism to make it more attractive to such individuals (irrespective of their country of origin), providing them with the resources needed to develop their full research potential, and helping to retain them within Europe.
- **Encouraging greater investment.** Europe lags well behind the USA in funding research. To reach the R&D investment targets set by the Barcelona European Council meeting in 2002, national governments and European institutions must both make additional efforts. A pan-European approach for investing in high-quality frontier research through a new ERC is one response to this need and, with other complementary measures, can make Europe more attractive to companies deciding where, and how much, to invest in R&D.

The European added value of an ERC

The ERC, by funding research through a European-wide competition on the basis of scientific excellence, will provide added value above and beyond what can be achieved at the national level, either individually or in combination. It offers arguably the single most important means to remedy Europe's current weakness in high-quality research and in new, fast-developing areas. The main benefits of the ERC include the following:

- **Encouraging and supporting the finest talent:** Open and direct competition and better selection at the pan-European level will heighten the aspirations and achievements of European researchers across the full range of research areas, enabling the best talents and ideas to be reliably recognised from a larger pool, and thus raising the overall level of excellence in frontier research across Europe.
- **Selectivity, agility and focus:** An appropriately designed ERC will be able to support the best ideas in frontier research, and focus resources selectively on excellent research. Its highly competitive funding will channel funds into new and highly promising research areas, and will capitalise on the diversity of European research talent with a speed, agility and focus not always possible within some national funding systems.
- **Status and visibility for research leaders:** The ERC can confer status and visibility on European frontier research and specifically on the best researchers and their teams, attracting talent and creativity to Europe. Through their links with higher education and their role in training other researchers working at the frontier of knowledge, they will have a

strong multiplier effect across the research system.

- **Dynamic structural effects on the European research system:** The ERC can catalyse the adaptation of national research structures to the evolving European Research Area, thereby creating a more coherent and effective European research system capable of matching the best in the world. Higher quality peer review, the establishment of international benchmarks of success, and the provision of reliable, up-to-date information on who is succeeding and why, will help individual countries to maximise their research performance, and enable universities and other research institutions to develop better strategies and to establish themselves as more effective global players.
- **Economic benefits:** The availability of new knowledge and the expanded, higher-quality and more visible pool of talented researchers funded by the ERC can help to nurture science-based industry, to attract and retain more R&D-intensive firms in Europe, and to create a greater impetus for the establishment of research-based spin-offs.
- **Societal benefits:** Excellent frontier research in all disciplines is a necessity to address the complex societal challenges faced by Europe. The ERC can provide the opportunity to invest quickly in the knowledge base necessary to tackle the new and emerging issues confronting society.

ERC must be positioned within the European Research Area so that it is both a powerful instrument in itself but also acts as a part of a cohesive well-functioning system. This should then ensure that the ERC and the national research-funding instruments add value to one another. In particular, the national agencies, in their role of supporting the development of national research capabilities, will need to work with their respective research communities to help them in developing high-quality research proposals for submission to the ERC.

The success of the ERC will depend on a clear definition of its strategic mission and on firm political commitment to ensure its autonomy and adequate resources to attain its goals. Member States also need to recognise the complementary nature of European and national research funding, and to reject any short-sighted temptation to regard ERC funding as a reason for cutting back on national research funding. This would deny them the opportunity to develop up-and-coming researchers to the level where they can compete successfully at the European level for ERC funds.

With visible and substantial support at both European and national levels for sustaining its operation over the longer term, the ERC will thus provide Europe with the world-leading capabilities in frontier research that it needs to confront the challenges of the 21st century.

Maximising the benefits

The decision to establish the ERC represents a bold initiative, but it needs to be clearly differentiated from existing national activities. The

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For further information on frontier research in the EU, please refer to the following website:
http://europa.eu.int/comm/research/future/basic_research/index_en.html

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