

European Research Policy: 25 Years Development

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Early Stages

The first initiatives to support scientific research at the European level go back to the 1950s, the early days of the "European Community," when the European Coal and Steel Community (ECSC) and EURATOM treaties were signed by the six countries that had created the newly formed European Common Market (Belgium, France, Germany, Italy, Luxembourg, and The Netherlands). The situation for the scientific community in Europe in the aftermath of the Second World War was very difficult. Much of the industrial infrastructure had been destroyed in the six years of conflict and university departments were suffering from the loss of academic staff and a shortage of resources. A major concern for the governments of Western Europe was the need to establish structures that would avoid future wars in Europe and to meet the challenges posed by the Soviet domination of Central and Eastern Europe. In the early years of the Common Market, support for research was not considered as a top priority because the major objective was to minimize the threat of another war in Europe.

In the early 1950s, initiatives were taken to launch a closer economical collaboration in Europe as well as several European research organizations in order to stimulate closer scientific collaboration in Europe. One of the initiatives was the establishment of the Conseil Européen de Recherche Nucléaire (CERN), which resulted from an intergovernmental agreement between 12 European countries (1954), the Council of Europe (1949), the European Space Agency (1975), and others.

In the early 1980s, the European Commission initiated several research programs of importance. One of these was the first Framework Program (FWP) for research within the "Common Market," to no longer be based on annual decisions by the European Commission, but on five years of funded programs. Commissioner Etienne Davignon played a key role in

getting the concept approved, particularly by getting the Framework Program accepted by the larger countries, like France and Germany. Although the budget was rather modest, the intention was to stimulate collaborative research and development (R&D) between European universities and the private sector without regard to national boundaries.

Previously, in the 1970s, Commissioner Ralf Dahrendorf had promoted the creation of a truly European Space Research program. However, it took nearly 20 years before this idea was taken up again and pushed forward in real earnest by Antonio Ruberti in the 1990s and Philippe Busquin in 2000.

Framework Programs

Since the 1980s, European Framework Programs have been well established and trans-national collaboration in research has become a common feature in Europe. Currently, the 7th Framework Program is in operation running from 2007 to 2013. The total budget of the program is approximately €50 billion, which is still only about 5% of the combined R&D budget of the 27 states that are now members of the enlarged European Union (EU). Nevertheless, the Framework Programs in combination with other European programs and initiatives have stimulated scientists in Europe, who have been focused on research performed in the United States, to take collaboration with European colleagues much more seriously. The Framework Programs have also contributed to the fact that scientifically less advanced European countries have been raised to a more competitive level of research and the creation of a European scientific community, which

involves both PhD students and postdoctoral young researchers. However, there is still much to be done to further strengthen the capacities of higher education, research, and innovation in Europe, and the links between them.

During the last decade, both the European Commission and several national governments in Europe have frequently expressed their concerns about the increasing gap in science between Europe and the United States. This is particularly true in materials science considering its breadth, importance, and multidisciplinary nature. The Commission has identified a number of reasons why the gap is continuing to increase by pointing out that "European universities are not at present globally competitive with those of our major partners"* and that Europe lacks sufficient capacity to transform knowledge into products and services because the European infrastructure does not always meet the requirements of industry. Collaboration between academia and industry is further complicated by the fact that intellectual properties are presently not treated equally in the 27 member states of the European Union.†

It is also of significant interest and concern that some 50% of Europeans, who obtained their post graduate qualifications in the United States, have remained there for several years, and many became permanent residents. Furthermore, during the last 30 years, a majority of the Nobel Prizes in physics, chemistry, and medicine have been awarded to scientists working in the United States. However, a closer study reveals that a considerable number of these laureates are Europeans. Scientists in Europe therefore start to wonder why research performed in the United States is more worthy of the Nobel Prize than that conducted in Europe.

Similar unfavorable comparisons can be recognized from other assessments, such as the ranking of universities. Regardless of the ranking methodologies used, only a

*Commission of the European Communities, "Communication from the Commission: The Role of the Universities in the Europe of Knowledge," COM(2003) 58 final; Brussels, 05.02.2003.

†For example, see D. Archibugi and B.-A. Lundval, eds. *The Globalising Learning Economy* (Oxford University Press, 2001); and "Assessment of the Feasibility and Possible Impact of the Establishment of a European Institute of Technology," European Institute of Technology IP/A/ITRE/IC/2006-157, PE 382.188 (European Parliament Study, Policy Department, Economic and Scientific Policy); www.europarl.europa.eu/comparl/itre/pe382188_en.pdf (accessed September 2008).

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few European universities, in the latest rankings, are found among the world's top 40 universities. The top European universities are located in the United Kingdom, France, and in Switzerland, but there are none in Germany, Scandinavia, or southern Europe. A further European concern is the fact that more European students than non-Europeans tend to drop out of their university courses and that in several European countries only 50% of the students who start courses in certain fields of study actually leave with a university degree. Is this an efficient use of university funding?

Though many more examples could be given, these should be sufficient to alert all Europeans to consider why this situation exists. However, there is an emerging consensus among the scientific community in Europe that it is not a matter of creativity, intelligence, or money, as confirmed by the European Commission, but it is due to the difference in the fundamental structure of research.

With regard to the structural organization of research, Europe can be considered to still be on a learning curve and, worldwide, there has never been such an approach and support for internationalization of research as there is in the European Union.

Currently, the research activities being undertaken in the 27 European nations are more or less the same, but on varying levels. Basic research in most areas is fragmented because of the very large increase in the number of universities in the last two decades. Although the expansion in higher education provision is, in principle, a positive development, it has resulted in a significant increase in the number of institutions carrying out research on similar subjects—however, with subcritical funding and resources, both in terms of infrastructure and human resources. In addition, many of the new universities were originally mainly teaching institutions and, hence, are low-budget universities.

The European Commission has frequently indicated that there is a limited margin of maneuver for increasing public funding in the future.[‡] It has therefore been suggested that European universities should raise more money for research from private sources by selling services and prototypes. However, the excellence and ranking of universities is based on medium- and long-term research and is certainly not favored by carrying out short-term research at the behest of industry.

[‡]See, for example, the European Commission Web site on Education and Training, http://ec.europa.eu/education/index_en.htm (accessed September 2008).

There is an emerging consensus that Europe is not always using the research capabilities and strengths of Europe as a whole in an efficient manner. Research in Europe is performed at three levels, on the regional, national, and European planes. Because of the different cultures in European countries, the regional and national levels should be overseen by the national research councils. The European Commission should focus on the European level, not only by supporting the best researchers in Europe, but by linking the most recognized research laboratories at European universities with the best equipped European research institutes having well-documented cooperation with the private sector. However, it has to be achieved *without* jeopardizing the excellence and the possibility of European universities performing curiosity-driven research.

Very few of the leading scientists in Europe are really satisfied with the recent evolution of the framework programs. In the United States the general opinion of the European Framework Programs can be summarized as “billions spent and nothing to show.” Networks inside Europe created with European Union support, such as integrated projects (IP), have in many cases no well-defined objectives or roadmaps but only rather loose structures. The creation of large consortia has revealed major difficulties in management, low flexibility, and little or no reduction of administration and bureaucracy.

For the establishment of Networks of Excellence (NoEs), there were no specified criteria for the definition of “excellence” and often huge and uncontrollable consortia applied, however, very often without any involvement by industrial partners. Because of the limited budgets, the scientists involved were of the opinion that no real research objectives were given and the only goal of the NoEs was to cover the travel expenses for participation in informal meetings.

Recent Initiatives

The European Research Council

The creation of the European Research Council (ERC), proposed during the EU Presidency of the Scandinavian countries, Denmark and Sweden, and under strong pressure by the scientific community, has engendered great hopes for the future. The ERC has been launched as an independent autonomous structure governed by a scientific council with an annual budget of approximately €1 billion. In bottom-up processes, two important modes of support are available: “starting grants” and “advanced grants.” Starting grants

are awarded to up-and-coming research leaders who are about to establish, or consolidate, an independent research team to conduct independent research in Europe. The scheme targets young researchers who have the potential to become world-recognized independent research leaders and it can provide up to €2 million over a period of up to five years. The first call for the early stage grants was a great success by the number of proposals received, and on May 15, 2008 the ERC announced that the first ERC Starting Grants were being issued with a budget of about €335 million. The sum will enable at least 297 proposals to be funded. However, this scheme is not significantly different from the one practiced by national research councils and, hence, is not combining research capabilities on a European level.

European Institute of Technology

Early in 2005, the president of the European Commission, José Manuel Barroso, launched the proposal to establish a European Institute of Technology (EIT) in order to enhance innovation in Europe through the “knowledge triangle” of industry, education, and research. This new concept has generated considerable interest and concerns in the European scientific community with the outcome that the concept has undergone drastic modifications over the last two years.

During the summer of 2007, the EU Commission launched a call inviting proposals for the identification of the best practices of multifaceted and multilevel governance models to be implemented in the EIT concept, based on the “KIC” (Knowledge Innovation Communities) model.

The overall goals of the four selected pilot projects are to propose the structure, organization, and management model for the EIT by addressing the challenge of complexity, to test and evaluate this model through a first concrete case, the development of strong interregional collaboration, and to disseminate the results among all players involved in the wider European innovation community. The EIT will require coordinated, multifaceted public-private stakeholder engagements and actions. The scientific community in Europe debates intensively this initiative. If the EITs are established with the right governance and their own legal personality and independence from national regulations, it will finally provide the framework for a première that has been eagerly awaited as it will undoubtedly strengthen the European research as a whole.

Future Options

As stated, the ERC is strongly supported

by the scientific community throughout Europe because it is considered as a most effective structure for supporting European basic research. If, in the near future, the activities of the ERC can be focused on European objectives apart from the national issues, but are better coordinated with those being taken at the national level, Europe should again quickly become globally competitive.

Today, Europe is still a long way from reaching such a situation: The ERC recognizes and supports small teams, whereas several countries are promoting and supporting large parts of university structures, for example Germany with their program "Elite-Universitäten." Furthermore, in the field of fundamental research, national structures are often very effective for small-scale projects. However, many of these research groups are rather small and, hence, not currently globally competitive. It may transpire that a large number of research groups in Europe will not fit into the goals of the ERC. Another open question is the relationship between ERC and EIT.

It is generally agreed that there are several possibilities which may overcome these limitations. Some can be summarized as follows:

- A limited number of world-class research institutions should be established in the framework of the KICs, which bring together the most distinguished researchers in well-defined fields, apply new forms of governance, and pay particular attention to educational entrepreneurship and dedicated innovation programs.
- Bringing research results closer to the market by linking the most recognized research laboratories at European universities within well-defined areas with the best-equipped research institutes having well-documented cooperations with the private sector. Established as virtual centers, they will ensure the independence of European universities as well as allowing them to undertake curiosity-driven research. The centers should be used as the nuclei for supranational research structures where the scientific and administrative responsibility is in the hands of an experienced CEO assisted by a scientific committee.
- Institutions and organizations not directly involved in the two structures described should be actively engaged in local or regional education, training, and


R&D programs in closer collaboration with the local industries.

Conclusion

During the last 25 years, Europe has established the first truly large-scale international research-development-technology structure. Although Europe is still on the learning curve because of the diverse scientific cultures in the different countries, at least one important objective has been achieved: Because of the European research programs, researchers from the various European countries are more focused on Europe than previously. Due to its involvement in the different programs, the scientific community in Europe is currently much better informed about who is performing what kind of research in the different European countries. This has resulted in an increased number of personal and corporate contacts, which at the beginning is an essential step toward the realization of a pan-European research community.

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