More Basic Research Needed

Herwig Schopper, the EPS President, discusses an Opinion on Basic Research in the Next Framework Programme that was sent recently by the EPS Executive Committee to Edith Cresson, the Member of the European Commission responsible for science, research and development.

The discovery and exploitation of physical, chemical and biological phenomena have given Europe and other industrialized countries advanced welfare systems combined with a high life expectancy and the ready availability of energy, food, mobility, and leisure time. Owing to today's problems such as unemployment, state deficits and criminality, politicians and the population as a whole often forget that this standard of living was achieved solely by vigorous effort – an effort which was ultimately based on fundamental research, where physics played a major role. Future technological development to maintain our advantages and to cover, in addition, the needs of the developing countries calls for an even greater effort; in view of the long-term aspects, basic research has also to be supported.

The present tendency, however, is to concentrate on near-term economic competitiveness so the view is often put forward that research and development should be guided by market needs. Immediate competition might justify such an attitude, but relying on the evolution of existing technologies will not guarantee long-term competitiveness. Indeed, the Japanese government has decided to double in the coming five years the funding of research at universities since the country anticipates that new ideas and visions will emerge from basic research.

EPS Opinion on Basic Research in the Next Framework Programme

In the past European Union (EU) Framework programmes have focused on the development of generic technologies. These programmes have recently been supplemented by task forces which can be seen as driven by urgent social concerns. It is to be expected that EU research policy will remain application-oriented in the future.

However, we want to emphasize the widely recognized role that basic research plays for the long-term development of technology, industry and the economy. To guarantee European competitiveness in the long run, this aspect should be taken into account when the next Framework Programme is set up. In particular, knowledge-based industries such as information and communication technology do not fit easily into the main EU programmes, as is well expressed in the European Commission's Green Paper on Innovation. For this reason the research policy needs to be established in a wider context that takes into account basic and applied research.

We do not expect that physics should enjoy privileged treatment, but it should obtain an adequate support if account is taken of its benefits to society in the general understanding of Nature, in applications in technology and medicine, and as the methodological basis for other sciences, e.g. chemistry, biosciences, geosciences. It has also pioneered the introduction of communication networks, new methods of teaching and the use of large facilities. Research networks in physics have been spearheading international cooperation in an outstanding way.

In parallel with other scientific bodies, such as European Science and Technology

Summary

The difficult question is, of course, a quantitative one: how much of our resources should be used to support basic research? There is no objective answer to this question, although history has shown that industrialized countries should spend about 10% of their overall R&D budget on basic science. A recent report by the Israel Academy of Sciences and Humanities has argued that if a country spends more than 20% than it has insufficient industry to benefit from what is being accomplished in basic science. Conversely, spending less than 7% of the total national R&D budget on basic research means that one has done next to nothing.

The science policy of the European Union (EU) is governed by the subsidiarity principle which implies that the Union's actions should be complementary to national programmes. Indeed, the EU's total spending on R&D amounts to only a few percent of the combined national efforts of its member states. The major part of the EU Framework Programme...
concentrates on developing generic technologies at a pre-competitive level, with the topics mainly determined by industrial needs. The programme has recently been complemented by Task Forces which are even more strongly determined by today's needs, namely technology for automobiles, aeroplanes, railways, multimedia, etc.

It was hoped that the Maastricht agreement would make it easier for the Union to extend its activities in a broader way to basic research. Meanwhile, several European scientific bodies (e.g., European Science Foundation, European Union advisory committees, European Science and Technology Assembly) have made recommendations which also imply a strengthening of basic research. However, the preparations for the next Framework Programme do not indicate such a trend. EU policy will of course remain application oriented, but it would be useful if, for instance, each specific programme contained a small component for research relevant to the programme, but not directly related to an objective.

Based on the reactions and worries of some of our members, and on discussions in the Divisions and Interdivisional Groups, the Executive Committee decided to address the appropriate European Commissioner, E. Cresson, and to supplement the recommendations by other organizations with a statement covering a few specific issues. A memorandum (see insert) was formulated and sent in June to research ministers and to the European Parliament.

Secondly, on 1 July an EPS delegation comprising the President, Vice-President, Secretary, and Secretary General met J. Routti who took over as the Director-General of the European Commission's Directorate-General for Science, Research and Development (DG-XII) at the beginning of 1996. The aim was to discuss future policy and possible areas of cooperation with him and his colleagues, notably P. Kind who is responsible for cooperation networks and access to large facilities, and B. Schmitz who is responsible for indicators and accompanying measures. Dr. Routti, a physicist by training, has a full understanding and appreciation of basic research, and an impressive record as the Director of SITRA, the Finnish agency for research and innovation under the direct responsibility of the Finnish Parliament, where he made considerable contributions to the rapid development of Finland's high-tech enterprises. He favours strong basic research but feels, however, that it should also contribute to economic success through an efficient mechanism for transferring technology.

Four of the memorandum's topics were discussed in some detail, together with several general aspects of collaboration. The President pointed out that the ERASMUS, TEMPUS and TMR mobility programmes are very successful and have made considerable contributions to a closer cooperation in Europe. They should be strengthened since at present the success rate for applications to some TMR activities is a mere 6%, implying that the effort of the majority of the applicants is in vain. Various ways to improve the success rate were considered. The introduction of qualification criteria could improve the situation so rules for qualified applicants will probably be implemented. However, it was agreed that the formulation of suitable criteria is very difficult and insofar as physics is concerned, it was ruled out that certain fields of physics should be exempted. EPS was invited to suggest qualification criteria and it was indicated that physics could possibly be a testing ground for a qualification procedure.

The delegation argued that specific programmes were not appreciated because applicants felt frustrated when applications were unsuccessful. Providing more information and making selection procedures more transparent would probably help improve acceptance by scientists.

We expressed our willingness to continue to help manage certain parts of the mobility programmes, notably student mobility within ERASMUS and TEMPUS, and it was established that DG-XII support of conferences will continue as at present (i.e., for general conferences with a broad impact on science and society; TMR Euro-conferences; European Research Conferences; dissemination of information).

We underlined the importance of further support for using and accessing large facilities, which include relatively small installations and not only the very large facilities. Research at these installations provides excellent opportunities, even for small groups, to participate in international and interdisciplinary work and to train scientists and engineers. The Director-General indicated that support for this activity will continue in the new Framework Programme.

Regarding relations between academia and industry, the importance of support for smaller enterprises was discussed, together with other more general issues.

We were assured that the good relations between the Commission and the EPS will continue under the new Director-General, while those responsible for the various specific programmes will redouble their efforts to help develop European science, and among it physics, in the most efficient and flexible way possible. However, we received the impression that increases in funding for basic research will be very limited, and even unlikely. It seems, moreover, that legal aspects and restrictions are becoming more important.