

# The Royal Society of Edinburgh

## A European Institute of Technology?

The Royal Society of Edinburgh (RSE) is pleased to comment on the EU Commission consultation on a European Institute of Technology (EIT). The RSE is Scotland's premier Learned Society, comprising Fellows elected on the basis of their distinction, from the full range of academic disciplines, and from industry, commerce and the professions. These comments have been compiled by the General Secretary, Professor Gavin McCrone and the Policy Officer, Dr Marc Rands, with the assistance of a number of Fellows with considerable experience in this area.

The consultation paper rightly highlights the threat of the decline in Europe's share of knowledge creation, in the face of competition from the US and Asia, but attributes a large part of this to being less effective than our competitors in terms of patent awards. If, however, you look at "spin-out" companies, for example, from Scottish universities per Euro of research income invested, then they compare very favourably with the US<sup>1 2</sup>. More important is investment in research and development (R&D) that stimulates innovation and the competitiveness of economies. In 1982, the European Union (EU) and the United States of America (USA) each invested 2.4% of their Gross Domestic Product (GDP) on R&D but, by 2002 a large gap had opened up with the USA having increased its investment to 2.8% of GDP while the EU investment had declined to 1.9% of GDP. Translated into actual spend, this means that every year the USA is now spending over \$90 billion more in R&D than the EU and, unless the quality of their investment is significantly inferior, will aggregate to an enormous advantage in innovation, productivity and growth.

We have deep concern, therefore, about the significant reduction in the science and research budget being proposed by the Council of Ministers. If the budget is cut, then there will be a need to focus even more clearly on the goal for the EU's 7th research Framework Programme (FP7) should be. The budget will be insufficient to meet all desirable objectives (e.g. support for excellence, support for the regions, support for the new member states, or support for small to medium sized enterprises) and we believe that it will be important to focus, above all, on projects of true excellence at the expense, if necessary, of other objectives. In this context, we have concern that the development of an EIT could detract funding away from other areas of EU research, including FP7 and the European Research Council, and on the premise that it is needed in the first place.

The different questions in the consultation paper are now addressed below:

### **What should be the main objective of the EIT**

We welcome the policy of trying to establish a more tolerant atmosphere for public-private research partnerships throughout the EU, and in order to bring out more of the commercial value in the research currently done within the EU, there needs to be an integrated approach to research and technology transfer, but we are cautious as to whether the designation of being an EIT would add benefit to existing university structures.

### **How can the EIT best contribute above and beyond current provision in this area?**

Engaging with industry is, inevitably, an interactive process: the simple linear models of innovation have long been discredited. Instead, universities have been active, with research councils, regional development agencies and other funders in developing forums in which not only two partnerships between HE and industry are forged, but three-way partnerships in which regional government is also active as a player. This model is more common in countries such as Germany, where the Länder have seen this as a key weapon in regional competitiveness, and is becoming the norm in countries such as Scotland, where Scottish Enterprise is becoming increasingly active in promoting such partnerships, most recently through its Intermediary Technology Institute initiative. There are also a great variety of institutions, besides the universities that are able contribute to the transfer of knowledge. Places like Government research institutes and botanical gardens already work closely with universities, and therefore, mechanisms to support the strengthening of ties between universities and other academic institutions similarly need to be developed at a regional level.

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<sup>1</sup> Exploitation Efficiency: US vs Scottish Universities, Smailes, R., University of Edinburgh, 2002, ([www.research-innovation.ed.ac.uk/information/exploitation2005.pdf](http://www.research-innovation.ed.ac.uk/information/exploitation2005.pdf))

<sup>2</sup> Knowledge Transfer: Science to Scottish Businesses, Scottish Science Advisory Committee Position Paper, October 2004 ([http://www.scottishscience.org.uk/main\\_files/publications.htm](http://www.scottishscience.org.uk/main_files/publications.htm))

An important requirement is to develop a shared understanding of the way in which "centres of knowledge" can contribute to economic development. There are numerous research studies which demonstrate the efficiency of commercialising universities research in areas where there is R&D intensive business able to utilize the research. But increasingly, there is awareness of the way in which areas that lack such R&D intensive industries (and Scotland is one), that the development of research and knowledge from universities can be important in promoting development. It is vital, however, that this is done sustainably. A wholesale shift from basic to strategic/applied research could be damaging (e.g. as was tried in Norway) to the maintenance of innovative capacity. A creative balance between them is vital. Once a shared understanding of the process has been developed, politicians, development agencies and consortia of universities can be readily persuaded that such initiatives are in their mutual interest.

What ever the role identified, it will be important from the outset that appropriate audit measures are built in, in order to be able to assess the initiative's success.

### **Which type of institutional format would best allow the EIT to achieve these goals?**

A healthy system must be dynamic and flexible. Depending upon the regional distribution of concentrated specialist institutions, the expectations for regional economic growth could be limited in areas where there are absent, and cause further imbalance in demographics between regions. Too much concentration also runs the risk of an overly great focus of people and resources into a narrow range of topic areas. This may be good for the research output but will have detrimental effects on the range of available knowledge and skills to the economy. In the UK, increasing research selectivity may also have developed a pattern of research that owes more to very high levels of scholarship and 'safe' research than to highly innovative and imaginative, but risky research, with its longer term benefits. Evidence for this can be found in a recent report commissioned by Engineering and Physical Sciences Research Council and the Royal Society of Chemistry in the UK<sup>3</sup>, with increasing evidence that high-risk areas of interdisciplinary research, such as chemical biology and materials chemistry, are being neglected.

Nevertheless, there should be continuing examples of the kind provided by CERN, the European Synchrotron Radiation Facility and the Institute Laue-Langevin where a major facility can only be funded by a truly co-operative effort. However, even there it is the case that data produced in large facilities can be exploited by small groups of researchers distributed around Europe, i.e. there is a combination of a very large facility with substantial sized groups able to exploit it on site, and small groups or even individuals who are able to apply their own skills to data collected in such a facility. Wherever it is the case that individuals do not need access to large pieces of sophisticated equipment, it should be possible for critical mass to be achieved in a distributed fashion so long as adequate opportunities exist for bringing together researchers to debate and discuss their work at regular intervals.

### **How should the EIT organise its teaching/research/transfer activities?**

Technology is always mission oriented and determined by context. However, despite the considerable emphasis placed on encouraging commercialisation of research-generated ideas, one of the major weaknesses of many economies, as mentioned above, is the absence of locally-based businesses capable of developing such ideas. In some cases world class researchers cannot find any local businesses to work with and need to collaborate with industry outside their region or indeed outside the UK or EU. It is not easy to see how this can be addressed beyond encouraging such local collaboration as can take place, promoting academic "spin-out" companies and attracting appropriate inward investment. In this context, the Royal Society of Edinburgh in partnership with Scottish Enterprise has run a successful series of Enterprise Fellowships since 1997. These one-year Enterprise Fellowships have equipped post-doctoral researchers, or younger lecturers, with the "hands-on" business knowledge to enhance the commercialisation potential of their own research. They encourage the establishment of new "start-up" companies and allow young researchers to devote time to develop their research from a commercial perspective.

However, "spin-outs" may not be practical in all cases. In some cases the international quality and complexity of the research in our institutions means that it can only be exploited by international companies. Collaborative research with such companies can bring real benefits to the institutions, and to the UK and EU, and improve our standing as a centre of excellence at an international level. A key objective must, therefore, be to increase the number of companies performing effective R&D in these regions.

### **Additional Information**

In responding to this consultation the Society would like to draw attention to the following Royal Society of Edinburgh responses which are of relevance to this subject: *The Role of the Universities in the Europe of knowledge* (May 2003) and *Science and innovation: working towards a ten-year investment framework* (April 2004).

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<sup>3</sup> "Chemistry at the Centre" Engineering and Physical Sciences Research Council and the Royal Society of Chemistry ([http://www.rsc.org/pdf/lap/chemistryatthecentre\\_full.pdf](http://www.rsc.org/pdf/lap/chemistryatthecentre_full.pdf))

Copies of this response and of the above publications are available from the Policy Officer, Dr Marc Rands (email: [mrand@royalsoced.org.uk](mailto:mrand@royalsoced.org.uk)) and from the RSE web site ([www.royalsoced.org.uk](http://www.royalsoced.org.uk)).

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