

## **The EIT/ETI Proposal: Some Reflections from the Scientific Council / ERC<sup>1</sup>** **Rev.26-05-06**

### **1. Introduction**

The Commission's EIT proposal has the worthy aim to strengthen innovation in Europe. It is evidently complementary to the ERC (as detailed below), and the ERC Scientific Council would welcome the opportunity to comment in further detail on a fully articulated EIT proposal. As always, the EIT's success or failure would very much rest on the details. The present note is chiefly about guaranteeing sustainability and excellence in a potential EIT. Innovation presupposes top quality inputs in terms of trained personnel, research infrastructure and fundamental research. It also presupposes the right kind of incentives for strengthening the links between European universities, industry and business. In Europe, support for these prerequisites is provided largely at the national level, but substantial needs persist at EU level. Action to address them at European level is foreseen through FP7 (with the ERC as a particularly innovative intervention), and through the just released Commission Communication "Delivering on the Modernisation Agenda for Universities: Education, Research and Innovation". The EIT is meant to actively strengthen the knowledge triangle between research (new discoveries), education and innovation. The key statement has been made that it is not intended to fund the EIT from FP7.

### **2. Existing Models for an EIT**

EIT has been conceived as a new institution that would serve as a visible example of coupling the essential inputs of personnel, infrastructure and advanced fundamental research with strategic research oriented towards problem-solving that is pertinent to industry and business and consequently supported extensively by the private sector. The EIT would operate largely through "knowledge communities" consisting of top-quality personnel seconded from existing institutions. The proposed name is a conscious reference to MIT, a 140 year-old institution, and by extension to the elite research universities of the USA. It is worth recalling that these institutions are funded largely by government grants and contracts from Federal agencies including for example the Departments of Defense and Energy, the National Institutes of Health and smaller but significant entities such as the Small Business Administration. The research universities in the USA usually have substantial endowments (the largest one being Harvard's, some 26 billion US \$), resulting from a tradition of contributions from alumni and private philanthropy (individuals or institutions), underpinned by tax exemptions. Major capital projects or other initiatives are often funded by tax-privileged municipal or state bonds (e.g. the \$300 million stem cell initiative in California).

<sup>1</sup> The EIT concept has been discussed by the Scientific Council of the ERC at its April 2006 meeting in Vienna, and this paper is informed by that discussion. The paper was written by three members of the Council (Jens R. Rostrup-Nielsen, Helga Nowotny and Fotis Kafatos) at the invitation of President Barroso following a meeting that he initiated. The ERC Scientific Council has endorsed the thrust of this paper; they consider it as an interim ERC contribution, consistent with the invitation of the European Council for the ERC to provide guidance on this issue.

While American industry supports its own research efforts, it also benefits from public sector grants and contracts and (massively so) from public procurement. In addition, it benefits from a culture and institutional policies that favour interaction between university researchers and industry (e.g. 20% release time for university staff) and a well-developed technology transfer system. Importantly, many industrial research centres are located adjacent to leading universities, facilitating interactions in both ways (e.g. Scripps Institute near the University of California San Diego, Novartis Institute next to Harvard Medical School and many other examples).

It must be emphasised that Europe also has some successful experiences in similar directions that are worth emulating. This includes some very strong technological universities. The Wellcome Trust is one of the world's largest private philanthropies and operates both through individual and programme grants and through the setting-up of excellence Centres. Links with industry are established at several institutions; for example, proactive technology transfer affiliates, spin-offs or other collaborations with industry are found at Institut Pasteur, Karolinska Institute, Max Planck Society, EMBL, CERN, ESA and other intergovernmental laboratories etc. An exceptionally innovative example is VIB (Flanders Inter-university Institute for Biotechnology) where the regional government provides substantial renewable funding that is conditional on a combination of performance targets in research excellence, advanced training, technology transfer and promotion of biotechnology in the community.

### **3. Enhancing existing strengths.**

Potential problems of the EIT concept, as initially communicated, have been noted by others. The European Council has recognized that an EIT “based on top-class networks open to all Member States – will be an important step” and also called for a guiding role of the ERC in this context. Here we will comment on some issues, which, if properly addressed, would facilitate greater support and chances of success for the EIT concept.

- **Staffing**

A strong feature of the Commission's proposal is pooling available strengths of European research universities by the formation of goal-oriented “knowledge communities” (see also the next section 4). The term “secondment” has been used in this context and has raised serious concerns about denuding these universities of their best talent. We note that the European University Association (and others) have expressed serious reservations on this point, which we share. The appropriate solution would be “dual affiliation”, which would maintain the links of such staff with their home institutions for the duration of their parallel appointment to the EIT (probably with reduced teaching and administrative obligations). In a highly successful example, dual affiliation of top USA biomedical scientists with their university and the Howard Hughes Medical Institute (a private charity) has permitted the emergence of powerful excellence at the institutional level. Possibilities of recruiting additional top quality staff in the areas of EIT focus into Europe should also be encouraged. These might be recruited directly by the EIT or jointly with an institution engaged in a KC.

- Name

The name EIT, directly recalling MIT, is problematical. A potential alternative that is consistent with the previous bullet point and the statement of the European Council would be ETI or *European Technological Institutes*, reflecting the pluralistic and necessarily networked nature of the new institution.

#### **4. Reflections on a Potential *Modus Operandi* of a Competitive ETI**

- ETI as a technological university

What are the expectations of industry and business from European universities? Overwhelmingly, what is valued most is the training of graduates at the highest level, in this case training engineers and others in related disciplines close to the frontier of what is known today. This can only be achieved by universities that, over time, have built up strong research groups, attracting top talent and carrying out advanced research in fields of great potential and relevance to industry and business.

If ETI is agreed to be not strictly an Institute but a University (i.e. engaged in education as well as research), the question arises what the level of education should be. The above considerations, together with the very high complexity and immense costs of starting a new, full-blown university that grants degrees at all levels (both undergraduate and postgraduate diplomas, masters, doctorates) argue that in the first phase (probably a decade or more), the ETI should focus its educational activities only on postgraduate education and training, especially at the doctoral and postdoctoral levels (which are also most pertinent to innovation). Joint award of doctoral degrees together with the universities of dually affiliated staff would have an additional advantage, reinforcing institutional links and spreading institutional excellence.

- Performance focus

Advanced training and research have been and continue to be the strength of the US. The best US research universities have succeeded in involving industry and business in strategic research as required by industry, while at the same time emphasising postgraduate training and the ambitions of fundamental research within the various research fields. This strategy favours problem-solving, which is a strong feature of the US system.

Future-oriented focus

The Joint Technology Initiatives (JTIs) in FP7 offer the opportunity of a strong performance focus, in the same mode that prevails in the US. However, their main emphasis is more on demonstrating the 'state-of-the-art'. What is still needed in Europe is to nurture the capability to conduct advanced research that paves the way for the 2<sup>nd</sup> S-curve of the technology of the future. We suggest that this could be the central mission of the ETI.

- Moving ahead

The maturing of ideas put forward by the Commission, through debates with stakeholders, is a welcome development. There is probably no need to establish new buildings or separate institutions. Well-functioning networks already exist, and the ETI could capitalise on them in building its ‘knowledge communities’ (KC). These would be configured among the best already existing research groups within European universities (or research and technological centres – henceforth centres), at whatever location, whose research is highly attractive for industry and students alike. One possible way forward would be to let universities (represented as appropriate by a department/institute/research group) compete at EU level. Each applicant would need to team up with at least one other appropriate university or centre, preferably from one or more different EU members or associated states. Universities would be able to submit only one application together with its partner(s) in a KC. Each KC would operate under a strongly coordinated joint management structure. Opportunities in building technological strength coupled with industrial development in suitable regions (across as well as within national boundaries) would be a sensible strategy; investments from the EIB and structural funds would be extremely helpful.

- Choice of focus

A mixture of bottom-up and top-down strategies could be adopted for identifying relevant research topics with a high potential for future technological yields, and would constitute the major programme of activities of the ETI, to be pursued by the KCs. A limited number of these research topics, probably no more than ten, could be pre-selected among the topics dealt with in the JTIs and the remaining ones could be proposed bottom-up. We foresee that, after open consultation with EIT staff, KCs suitable for addressing each topic would be put together by relevant investigators, institutions and industries, in a manner that does not compromise the independence of the subsequent evaluation and selection processes for actual incorporation of KCs in the ETI. In order to maintain the competitive element at the European level, two KCs would be selected for each of the research topics. This would lead to a total of twenty KCs, financed for up to five years. Considerable thought needs to be addressed to the possibility of subsequent renewals, as it would seem appropriate that industry frequently would take on the most successful programmes for subsequent funding, releasing ETI funds for programme rotation to newly emerging areas and to newly constituted KCs.

- Institutional governance

It is premature to address the question of governance in detail, before other points that have been raised are addressed. Moreover, operational flexibility and evolution should be encouraged. In brief, we suggest that the ETI would be managed by a small Governing Board invested with the authority to select the KCs on the basis of an open competition at EU level. While each KC would set up its own joint management structure, the Governing Board would oversee and monitor the entire range of ETI activities. Its tasks would also include to close and replace KCs after five years as appropriate, consistent with the preceding paragraph. The Governing Board would be assisted by an Advisory Council consisting of representatives from academia, industry and other stakeholders.

The ETI would therefore retain its character as a performing institution, with its Governing Board responsible for the distribution of institutional funds. A tentative budget for such a scheme could foresee 20 mio €KC/yr. In that case, 20 KC would amount to €400 mio/yr. It would be helpful to provide €100 mio/yr for flexible distribution through the Governing Board based on developments. The overall ETI cost therefore would be approximately €0.5 bio/yr plus administrative costs.

In establishing and setting up such structures, an ETI could benefit from the corresponding experience of the ERC. In particular, the procedure adopted for the selection of the ERC Scientific Council members through an independent Identification Committee, has given high credibility to the ERC in the scientific community. By choosing a similar procedure for selecting the members of the Governing Board and by involving suitable members of the Technology Platforms in ETI expert panels, high legitimacy would be gained among the respective industrial, business and scientific/technological communities.

### **5. Complementarity and Potential Synergies between ERC and EIT/ETI**

Several aspects of these reflections point towards a clear complementarity between the ETI and the ERC, as well as the research universities (or centres) of Europe. They include the following:

5.1. The ERC is clearly a funding institution at EU-level. It has been set up with the objective to support frontier research at the individual investigator level. Frontier research consists in letting individuals choose their research theme in a strictly bottom-up way without consideration of short-term relevance. Nevertheless, experience shows that bottom-up selection for individual excellence can catalyze the emergence of excellence at the institutional level.

5.2. An ETI would incorporate KCs (through dual affiliation and complementary recruitment), at the institutional level. Its objective would be to support advanced research with a strong focus on strategic needs (Pasteur's Quadrant) and on research topics of high technological as well as problem-solving relevance. The ETI would be a performing institution operating on an EU-wide scale, since it would be the KC that actually perform research and education (initially at least at doctoral and post-doctoral level), closely linked to innovation.

5.3. The ERC is an innovative component of FP7, in which individual teams will compete for the first time at EU level with the aim of fostering truly European excellence in 'frontier research', i.e. new discoveries. They will add to the foci of excellence within existing institutions.

5.4. An ETI would enable groups of European universities (rather than individual investigators) to compete for the first time at EU level through the KC they put forward for incorporation into ETI through affiliation. Universities would thus demonstrate their excellence in how to combine advanced training with a strong research component of interest to European industry and business, thus leading towards spreading institutional excellence and innovation.

5.5. At present, European universities are not competing with each other, as can be seen from the fact that rankings of European universities come from outside Europe (e.g. Shanghai ranking). Recently, inter-university competition has been favoured in some member states, but only at national

level (e.g. the RAE in the UK, the 'Exzellenzinitiative' in Germany and others). An ETI would be an important step forward to set up inter-university competition at EU level.

5.6. By following similar procedures in selecting the members of the ERC Scientific Council and members of an ETI Governing Board, the independence of these governing bodies would be underlined, therefore enhancing their credibility and authority in setting up the competition.

5.7. The ERC is mindful of the importance of innovation, whilst insisting on its core principles of excellence and bottom-up operation; its synergy with ETI in terms of innovation is clearly foreseeable.

5.8. An ETI would thus gain European visibility and credibility, which is indispensable if it is to attract the most talented students for advanced training, the strong involvement of industry and business and the additional funds that will be required. By providing a highly visible example in how advanced research oriented towards problem-solving can be set up and managed in Europe, such an ETI would amount to a major step towards strengthening the innovative capacity of Europe based on research and education.