



The Royal Academy
of Engineering

Technology and Innovation Centres

Response to the Technology Strategy Board
On Behalf of Engineering the Future

February 2011

Engineering the Future response to the Technology Strategy Board on the Technology and Innovation Centres Prospectus

This response has been prepared by the Royal Academy of Engineering under the banner of Engineering the Future in partnership with:

- The Institution of Mechanical Engineers
- The Institution of Civil Engineers
- The Institution of Chemical Engineers
- The Institute of Physics
- The Institution of Engineering and Technology
- Engineering Council
- Engineering UK

Introduction

Engineering the Future partners understand that there is a lot of interest in both where Technology and Innovation Centres (TICs) should be set up and what subject areas they should concentrate on. As a broad coalition representing the professional engineering community, we know that a large number of views on these issues will be reflected among our memberships. We therefore feel as a partnership we can add most value to the discussion by concentrating on higher level issues such as funding mechanisms, operation and objectives.

This response aims to provide a view from the professional engineering community on the high level issues surrounding TICs without preventing individual Engineering the Future partners from championing the specialist interests of their own communities. Whatever the choices of sector or location, at a strategic level, it is important that the choice of TICs' areas of interest should align with UK national priorities and needs, and the key themes of the Technology Strategy Board. While choice of location for the establishment of TICs may become important, TICs in particular fields need to be viewed as centres of national excellence rather than simply regional centres.

Engineering the Future welcomes the proposed establishment of TICs and member organisations had previously welcomed the proposals in both the reports by Dr Herman Hauser FREng and James Dyson FREng last year.

Even though it is now well understood that the innovation process is not linear in nature, ideas of the 'Valley of Death' in the product development cycle between applied scientific research and commercial exploitation are useful in discussing the purpose and operation of TICs.

Funding

We welcome the funding package of £200M to establish the TICs and the commitment to provide core funding over a minimum of five years for each centre. However, within this £200m, it should be noted that:

- £50m per annum spread over six TICs is modest funding and will not go very far. It is therefore important to build on existing strengths and foundations that have already been laid in several areas of strategic importance.
- There is likely to be a tendency to compromise by forming large consortia so that more organisations get a slice of the cake but the effectiveness of a

consortium is often in inverse proportion to the number of members. There is a balance to be struck between involving all relevant parties and creating consortia small enough to be effective, but no one university or company should be a dominant player within any one of the consortia.

While recognising that some policy mechanisms are withdrawn as others are put in place, the funding of TICs should be examined in the light of the winding up of Regional Development Agencies and the likelihood that Local Enterprise Partnerships will be unlikely to have sufficient funds to replace the support previously available to help local companies innovate. It is important that the funding provided to TICs enables them to at least partially fill this gap (we will address the operational issues of this later). Recognising that the bulk of TIC funding will eventually come from major industrial partners, the ability of TICs to help and engage with local SMEs should not be drowned out by the demands of more powerful partners.

Experience in Germany with the Fraunhofer Institutes has shown that long term funding and stability will be required before demonstrable results can be seen. The aspiration that TICs should generate a significant proportion of their funding through commercial R&D contracts is an important aspect to the funding package as the successful commercialisation of the outputs of TICs requires both industrial direction and ownership of the results to create the necessary commercial pull. Industrial ownership of the results also assumes industrial ownership of any IP directly generated and this should be the general presumption.

Operation

Recognising that innovation is not a typically linear process from lab to commercial product, the drivers and direction for TIC's work need to come from both universities and industry. We would expect a significant amount of TIC effort to be directed towards engineering practice and processes as distinct from the development of scientific ideas. By this, we mean that much of the valuable innovation to come from TICs will be associated with scaling up processes to commercial volumes and engineering cost out of innovations so that more value can be captured by the sponsoring companies. A more tangible example of this might be in the field of regenerative medicine, where processes that can be accomplished on the lab bench (and proved effective at this scale) need to be adapted for factory scale production.

The involvement of commercial companies in collaborative and business funded R&D is critical, but care should be taken that this does not become an exclusive club for a few major companies, in fact, TICs should have a duty to work with SMEs even if that activity has to be disproportionately subsidised compared to work for larger companies. The abolition of the RDA structure and the probable inability (due to funding constraints) of the Local Enterprise Partnerships to help local SMEs to innovate and invest in new products and processes could leave a vacuum of effective innovation stimulus for small and locally focused businesses. Local universities and the research voucher scheme can address some of this gap, but the value that TICs could add to the economy by providing access to (partly) publically funded R&D at this level should not be overlooked.

Much of the form and function of TICs has already been settled. It is likely that broad topic areas will be shaped by industrial needs broken down by major sector and location will likely follow the existing distribution of academic expertise. There are likely to be areas of the economy that will benefit from innovations that cross these boundaries and TICs will need to be able to coordinate and work together where such opportunities present themselves.

Objectives

The key objective of TICs will be to carry out R&D at technology readiness levels ranging from three to eight. The purpose of this R&D is to accelerate the translation of promising academic research into wealth creating or value enhancing products and services. As such, the direct customers of the TICs' outputs are the industrial partners and it is therefore likely that the work of the TICs will be predominantly driven by industrial partners.

Over time, the bulk of TICs' funding is likely to come from the industrial sponsors. The types of company able to fund substantial pieces of R&D work with the TICs are likely to be multinational, major companies, probably the major manufacturers. Under present conditions, it seems unlikely that SMEs could be expected to contribute to finance and yet it is expected that innovative SMEs will be among the drivers of new employment and recovery from recession. There must be mechanisms in place that encourage the involvement of SMEs, part of which should emphasise the development of skills within SMEs as well as technology development.

The fundamental purpose of the TICs will be the commercialisation of research in partnership with industry and academic partners. In order to support this activity, each TIC should have a market/economic research activity whose support would be available to SMEs.