

## National Enabling Technologies Strategy.

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### Key Issues and Challenges

I think that the 'lessons' of the past ICT and biotech policies need to be carefully set out and their implications specified. I would include in this 'review' an assessment of the successes and limitations of the IT biotech research initiatives via the CRC program (quite limited in the case of CRCs in IT, I think), ARC Centres and the CSIRO. While this would not be easy, I think that we need to have an informed assessment of the past history of investments to build capability through these types of initiative – in order to guide future initiatives. This strategic review should also look at international experience in enabling technologies. This will help to communicate to all stakeholders the foundations on which the strategy is built.

I think that there are several lessons from that experience, and these identify some of the key challenges for the NETS:

- ❖ The key priority is the application of the enabling technologies - the uptake in user firms. Such uptake is usually an innovation process in itself and as such involves risk, financing, a range of capabilities (often in both the enabling technology and the domains of application) and a confidence on the part of the innovator that they can capture benefits from the effort.
- ❖ From that perspective the barriers to innovation (ie application in the market) are primarily on the user side and include: technological and managerial capabilities, conservative markets, regulatory problems etc. [see prior work on absorptive capacity]
- ❖ Those barriers vary from sector to sector and the average, across all sector, information on barriers is often highly misleading. What is often needed is a sector based study and approach.
- ❖ *Lead users* often play a particularly important role in exploring new paths of application and signalling the scope for profitable investment in capabilities, technologies, products, processes and services.

This experience and the perspective it leads to has two key conclusions for strategy:

- ❖ The key role of research in the public sector is to develop capabilities rather than technologies. Those capabilities then provide the basis for the development of technologists who diffuse out into industry and for collaborative innovation/problem solving with firms.
- ❖ The locus of innovation is in firms in the private sector. Public sector research is an enabler, not a solution.
- ❖ Knowledge spillovers arise just as strongly, if not more so, from business experiments as from laboratory experiments. Business experiments include efforts to develop products, processes and services based on enabling

technologies, the formation of new business lines or ventures based on such innovations and the development of new markets based on those innovations. In the Australian context, where the majority of knowledge about new technologies is imported (arising from laboratory experiments in other countries better able to appropriate the benefits of major technological innovation) support of business experiments is particularly vital.

### **How should those issues be addressed.**

- ❖ An overall program/strategy will be most effective where it is integrated, from research/knowledge acquisition through to uptake/application, including support for new ventures.
- ❖ The overall focus should be capability development, not technology development – the latter is a focusing device for the former.
- ❖ Sectoral roadmaps, not only of the supply side but of the paths of uptake in key user sectors should be developed. These would identify the barriers in each sector and work to address them.
- ❖ Support programs should be firm based.
- ❖ In developing strategies at the sectoral level roadmapping should be supplemented with sound frameworks for assessing the evolution of sectors – particularly of new sectors. There are some valuable approaches that inform policy in these areas. By and large, neither biotech nor nano tech are sectors and would not be productive to force the approach into a supply side sectoral perspective. As you recognise the sustainability agenda is likely to be a key area of application. A strong focus on applications in this area would leverage off other priorities and may assist early adoption.
- ❖ A set of performance indicators should be developed at the outset and these should provide the basis for evaluation – this will be challenging and it may be useful to look at international experience here.
- ❖ Public awareness, while important (and I recognise the talent you have in that area) should not overshadow the need to focus on information to potential users. I think that authoritative web-based information, along with some major media events, can go a long way in providing public information.
- ❖ Both of these technologies are key technologies in almost every country. I note that the strategy includes a concern to keep in touch with what is happening in those countries. I would add that our strategies in these areas should also shape our approach to bilateral and multilateral research cooperation.
- ❖ The section in DIISR should also ask itself what in-house knowledge base it requires work effectively. In this regard it would also be valuable to take an explicit approach to policy learning, regularly reviewing what has been learnt and so ensuring a more systematic foundation for policy in these vital but complex and challenging areas, with many forceful interest groups and often timid senior bureaucrats. The section needs to have the confidence to take a broad policy advocacy role.

## **What is my our organisation doing to address those issues**

My work, through the Centre for Innovation, University of Sydney, and proposed Centre for Innovation Research, UTS, focuses on research, consulting and teaching in innovation.

At the Centre for Innovation, University of Sydney, a particular focus is foresight and roadmapping.

One current project, supported by the Australian Business Foundation, involves analysing how firms change their business models. Business model innovation is being driven in large part by the diffusion of new ICT technologies, which enable much higher levels of interaction (with suppliers and customers) and hence greater specialisation and responsiveness. An associated issue that will be a component of this study is the issue of how firms manage major shifts in their competencies.

## **Main outcomes of the Strategy**

- ❖ The capability in the senior levels of firms to make decisions about exploring and exploiting enabling technologies in the development of products, processes and products.
- ❖ The capability within firms to explore and exploit exploiting enabling technologies in the development of products, processes and products.
- ❖ The availability of competent professionals as a resource for firms.
- ❖ The development of broad research capabilities in firms and the public sector able to assess, acquire and adapt new knowledge about enabling technologies in order to support implementation for the development of products, processes and products in Australia.
- ❖ A capacity within DIISR to
  - develop and maintain an informed strategic perspective on the opportunity for developing products, processes and products in Australia, based on enabling technologies,
  - assess the barriers to realising those opportunities,
  - maintain a sound assessment of progress throughout the economy in exploring and exploiting the potential of these technologies,
  - develop a credible networking and advocacy capability, that contributes substantially to shared views of priorities and hence to soft coordination of investments.

## **How could our organisation work with the Enabling Technologies Policy and Public Awareness Sections.**

The Centre for Innovation works in the areas of innovation system and sectoral analysis, and in foresight and roadmapping. These are competencies that could contribute to the development of the NETS.