9th August 2006.

Science and Innovation Study
Productivity Commission
PO Box 80
Belconnen ACT 2616.

Economic, Social and Environmental Returns on Public Support for Science and Innovation in Australia

The Study Team,

We wish to draw your attention to three aspects of the study that are of particular relevance to our current research in innovation in gene technology, nanotechnology and open source software:

1. the identification of impediments to the effective functioning of Australia's innovation system;
2. examination of the decision making principles and program design elements that influence the effectiveness and efficiency of Australia's innovation system and guide the allocation of funding together with the scope for improvements and the implications from changing the level and balance of current support; and
3. the broader social and environmental impacts of public support for science and innovation.

From our research and the literature on innovation policy, we are developing a model that can be used to characterise Australia's style of innovation policy and determine the appropriateness of the policy. The model identifies two essentially different types of innovation policy – economic and social – based on the following characteristics:

- the primary objective of innovative technology;
- the prime mover of innovation;
- the impetus for innovation;
- the rationale for the regulatory framework that has been implemented or proposed;
- the type of license used to secure intellectual property generated by that research; and
- the role that the community is permitted or expected to play in formulating policy.

The economic type of innovation policy is characterised by a preoccupation with economic growth and the belief that research drives innovation. The private sector is considered responsible for providing the impetus for innovation and much of the physical infrastructure (buildings and equipment) and human infrastructure (education, university research) to support R&D. The state is responsible for securing the intellectual property generated by research, establishing a regulatory framework that facilitates research and the progression of the product from the laboratory to the market place, and promoting the benefits of new technologies. Policymakers are not required consider seriously the concerns voiced in public consultations (surveys, public hearings and public submissions) nor justify their decisions.

The economic type of innovation has enjoyed mixed success. Certainly, there have been significant developments in the area of gene technology and been a dramatic increase in the number of

patents issued for nanotechnologies. Yet, countries in the EU and Australia have experienced considerable opposition to gene technologies that has delayed efforts to maximise their applications. This has been due to the ethical questions raised against xenotransplantation and the growth of human embryos for tissue transplants, the long-term uncertainty surrounding GM products and the lack of trust felt towards governments and scientists.

In view of these problems, however, a social type of innovation policy has begun to emerge in which sustainability is the primary objective and users drive innovation. The role of the state is to support investment in innovation, share the intellectual property generated by that research, establish a regulatory framework that complies with community sentiment, and engage in a mutual dialogue with the public to consider the social, ethical and environmental dimensions of innovation in an effort to ensure its sustainability. Finally, the social type is characterised by *public participation* (such as citizen panels and consensus conferences) at all stages of decision-making and makes explicit the bases for accepting or rejecting inputs from experts and members of the community. In this way, the community comes to understand the bases for decision-making and share responsible for policies.

The social type is not without its detractors. Some policy-makers find the idea of engaging the public a costly and pointless exercise, which is fraught with political risks. Certainly, public forums are time consuming and do not necessarily lead to consensus. Moreover, there is no guarantee that public participation will generate significant interest in the community. Nevertheless, the social type offers policymakers an alternative path in cases where the private sector does not or cannot invest heavily in the requisite infrastructure, provides a means to insure the sustainability of innovative technologies against social attack, and engender trust in policymakers.

Although our model comprises two ideal types that may or may not be fully evident in a policy sector, the application of the model can help to identify policies that are either internally inconsistent or incompatible with the policy environment. For example, our preliminary analysis reveals that Australia's innovation policy is predominantly of the economic type; however, the private sector is not investing heavily into the R&D of emerging innovative technologies. This suggests that if this situation is not soon rectified, then the state would be well advised not to persist with the economic type and consider supplementing this deficiency. Furthermore, policymakers would be amiss not to permit the community to participate in deliberations over how and to what extent the state's resources should be directed into this area.

We urge you to take this opportunity to consider carefully the need for greater public support of science and innovation in Australia. Without greater public support of R&D, Australia will slip further behind other OECD countries. Without greater support of public participation in innovation policy, public trust in scientists and governments is likely to decline further, stifle the emergence of new technologies and undermine the long-term sustainability of existing technologies. Finally, the Productivity Commission would do well to look beyond the ideological assumptions that underpin faith in the private sector as the driver of Australian science and innovation.

Yours faithfully,

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