

Executive Summary

Innovation—The Only Way Forward

Science, engineering and technology underpins our future as a thriving, cultured and responsible community.

The return to the community from investing in Australia's SET base will be:

- An economically strong and prosperous nation
- Acceptance at the highest scientific levels internationally
- A responsible, informed and responsive society

Innovation—the only way forward

Innovation is the driver of every modern economy – it is the key to competitiveness, employment growth and social well being.

The cycle of innovation must be fed by new ideas and basic knowledge which are capable of being transferred and accepted by end-users.

Our international partners and competitors are investing heavily in their SET bases. Clearly the pace of development is quickening. For Australia to participate and thrive, we must, first, be part of this international process and, second, be committed to developing an innovation process for pursuing scientific advances and implementing them successfully. It is not sufficient for Australia to be a fast user of other nations' technology. We must have leading edge capabilities so that we can develop pioneering technologies that will ensure the competitiveness of our industry in the global marketplace of the future. Global customers are both discerning and demanding.

What Must Change

Without additional strategically driven investment, it is likely that the SET capability will lack the critical mass needed for the future. Simply increasing funding based on the *status quo*, however, will not ensure a more seamless and active innovation process. We need a SET capability that is an integral part of the national innovation capability and has the best chance of supporting economic and social goals in the 21st Century. We need to be able to measure more clearly our investment, to test whether we are getting value for money. The objective of new funding should be new business and wealth creation.

Our competitors in other countries are showing the way. Their governments are viewing the systems that generate and translate knowledge into wealth as the primary focus for sustainable economic development. The themes of investment which are emerging are:

- *People and Culture*
- *Ideas*
- *Commercialisation*

¹*Excellence and Opportunity - a science and innovation policy for the 21st century*, UK Science and Innovation White Paper, July 2000.

**"OUR LIVES WOULD BE
UNIMAGINABLE
WITHOUT SCIENCE" ¹**

This report outlines an integrated investment strategy based on these themes. All the government-funded elements of the SET system have been subject to funding pressures, especially the university research sector. The proposed investment targets the areas of greatest need and opportunity. Many of the recommendations are complementary or indeed overlapping with those of the ISIG report, *Innovation-Unlocking the Future*.

People and Culture

People matter. Without people, Australia has no vision, no ideas and no SET base to create and anchor ideas and turn them into products and processes that enhance the quality of our lives. The SET base is reliant upon people who have progressed through a supportive educational system, from primary school through to tertiary, and beyond. As well, people in SET need to have the skills to communicate with the business world and with the rest of the community.

The culture needs to change. We need more support for those who inspire our children to study science and maths. We need to encourage more of our young people to consider studying science in tertiary institutions and we need those students to have a broader range of skills than they currently have, to prepare them for exciting projects in the business world. We should be able to inspire our researchers to enter the teaching world with much greater ease, to transfer crucial knowledge and help excite our children about careers in SET.

Science and innovation need a transparent framework of public support within which they can flourish. Public awareness and involvement in the SET base are vital.

Ideas

Ideas have the potential to dramatically change the way we live. Ideas, when translated, can improve our health, sustain our environment, and help us communicate better and quicker. Australia needs to create environments in which the best ideas are identified quickly and easily, to promote our contribution to the global knowledge pool and to respond to business and community needs. A much larger commitment to the ideas generation process needs to be made, both in terms of financial support for the SET base in universities and CRCs and the broad research infrastructure.

Excellence must be combined with relevance in a successful modern public sector research environment. Contestability of funding is needed to ensure excellent research, wherever it is conducted, is supported – this is less likely to happen in a system that is clearly partitioned.

We need to create:

- new and innovative mechanisms by which ideas are translated into achieving societal goals and economic growth
- new ways of linking infrastructure strengths and pooling scarce resources, and
- new ways of ensuring that excellent research raises the profile of Australia internationally

Commercialisation

The ultimate measure of success in innovation is the value placed on it by consumers and the community. Integrating the innovation system across all points can increase the chance of generating more products and processes that enhance our lifestyle. The innovation system is dependent on strong links between all players, government, industry and research performers. Government has a special role to play in aiding the linkage process. We need to think about new ways to develop alliances, connections and partnerships between the SET base and other players.

Government plays the central role in building the environment for change. Successful government initiatives should be expanded, and the recipients of government research funding encouraged to play a greater role in making connections with the business community in line with the changing needs of society and national priorities. In particular, the government - funded research agencies must play a stronger role in the creation of new businesses by a much improved effort at business incubation. Such a commitment is consistent with their essential mission of conducting research for the benefit of the Australian community.

In conjunction with this, we need to introduce incentives for researchers in universities and government research agencies to make the most of the knowledge they create, and build upon this to elevate their role in the economy. The challenge for them is to stimulate and facilitate the increased transfer of knowledge to business and society, across all sectors of the economy

Recommendations

The major recommendations for enhancement of the SET base to emerge from the Review are:

People and Culture

- Provide 200 HECS scholarships for students undertaking combined science/education qualifications and 300 for students of the enabling sciences - maths/physics/chemistry.
- Increase the number of Australian postdoctoral fellowships – doubling would be appropriate. These would be tenable at universities, government - funded research agencies and internationally recognised institutes.
- The Commonwealth Government fund the establishment of Federation Industry Chairs in universities or a research entity affiliated with a university on a competitive basis for five years.
- Redesign and expand R&D *Start Graduate* to place SET graduates in SMEs.
- The Commonwealth Government show leadership and initiative to raise the importance and profile of science awareness. Activities with a high public profile, such as National Science Week, be expanded.

Ideas

- Implement a priority review process R&D for funding across the Commonwealth Government.
- Over five years, double funding for the Australian Research Council's competitive grants and related infrastructure activities, consistent with the commitments already made for increased funding of health and medical research.
- CSIRO, ANSTO and AIMS be given access to competitive R&D funding mechanisms, including commercial loans; be assessed against outputs; and reform incentives for researchers to encourage new business creation.
- Consideration of intellectual property be prominent in assessing ARC grant applications, similar to the NHMRC process.
- Expand the funding for university research infrastructure (RIBG) and provide a commensurate increase in support for research infrastructure at non-university institutions eligible to receive ARC and NHMRC research grants.
- Develop a pilot scheme to test a national site license concept between higher education institutions, government-funded research agencies and publishers in an attempt to keep the price of journals down.
- Commonwealth Government fund fifty per cent of the cost of creating new major research facilities on a competitive basis in conjunction with the States/Territories, publicly-funded research institutions and commercial interests.
- Government-funded research agencies, CRCs, and RDCs have access to the initiatives outlined in this report, including Major Research Facilities, pre-seed funds and Innovation Centres.

Commercialisation

- Create a cash-out option under the R&D tax concession for R&D expenditure by SMEs and provide suitable incentives to attract significant R&D projects to Australia.
- ARC and the NHMRC develop stronger guidelines on commercialisation of research.
- Expand the CRC program to encourage greater SME access and to facilitate stronger networks between the SET base and industry, nationally and internationally.
- Establish Innovation Centres to provide universities and government-funded research agencies with support in commercialising research.
- Establish a pre-seed capital fund for universities, Innovation Centres and government-funded research agencies, such as CSIRO, RDCs and CRCs.
- Universities and government-funded research agencies review opportunities

for researchers to better share in the benefits of commercialisation with particular encouragement for formation of start-up and spin-off companies.

- Universities and government-funded research agencies adopt a more strategic approach to the management of intellectual property.

General

- Any additional funding for the SET base should be closely linked to measurable performance indicators.
- A Science Capability Implementation Group be established to implement the recommendations endorsed by Government.

I am also proposing a number of other strategies that deserve consideration, as well as some thoughts on what should be driving government policy, the research community and industry in the future. These can be found throughout the report and in the appendices.

Priorities

The SET base would provide greater returns to the community if a priority review process was clearly articulated across government as a whole. It is possible to prioritise R&D in a publicly defensible way based on excellence of the R&D and its impact on the community. I propose that PMSEIC have a greater role in advising government of priorities for research and initiatives across different elements of the SET base.

Implementation

Investment is, by nature, a risky business. To justify the investment proposed in this discussion paper, close scrutiny and sound measures of accountability are required to maintain public confidence in the SET system. As well, monitoring the SET system will enable government to respond more quickly to priority needs. The community needs to know that the return on its investment will lead to improvements in quality of life.

To implement the plan for increasing Australia's return on investment in the SET base, an implementation committee should be formed, possibly chaired by the Chief Scientist, to ensure that the recommendations of the Review accord with government and community objectives. The Science Capability Implementation Group would, report to the Prime Minister's Science, Engineering and Innovation Council on progress with implementation.



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