

**Joint Standing Committee on Foreign Affairs, Defence and Trade (Trade Sub-Committee)
Inquiry into *Enterprising Australia – planning, preparing and profiting from
trade and investment***

Background

The role of the Australian Research Council (ARC) is to advise the Government on research funding and policy, and to promote the conduct of research and research training that is of the highest quality for the benefit of the Australian community. The Council has a special responsibility for research in the higher education sector, basic research and research training.

Over the past year, the ARC has been in transition implementing a range of changes announced in *Knowledge and Innovation*¹, a policy statement on research and research training released by the Government in December 1999. In this statement, the government announced that the ARC would be established as an independent body with its own legislation – that legislation is currently being considered by parliament. Other changes to the Council's administrative and programme structure were also announced.

Subsequently, in January 2001, the Government released *Backing Australia's Ability*², an action plan outlining the next steps in the Government's strategy to encourage and support innovation in Australia. In that plan, the Government announced that it would double funding over the next five years for the national competitive research grants administered by the ARC. The extra funding will provide for a range of new initiatives as well as increasing the level of support provided under the Council's current programmes.

The ARC's submission to this inquiry is focused on the terms of reference as they apply in the context of Australia's research and development activities. The Council's comments are restricted to three of the terms of reference which are considered to be most directly relevant to the Council's activities:

- research and development initiatives which act as incentives or impediments to foreign investment in Australia;
- the adequacy of the skilled workforce in Australia particularly in new growth areas; and
- opportunities for encouraging inward investment.

Research and development initiatives which act as incentives or impediments to foreign investment in Australia

The quality of Australia's science, engineering and technology (SET) base will affect the level of foreign investment in research. In recent years Australia's SET base has been under close scrutiny³ in face of increasing concern that it is falling behind the rest of the world. These studies have highlighted the characteristics of Australia's current SET base, some of which may impact on Australia's attractiveness to foreign investment in research.

An important factor in attracting investment (both local and foreign) is the critical mass of research activities in areas of international significance. Currently, there are few major international research facilities located in Australia but there has been increasing recognition at both Federal and State levels of the necessity to support research activities at an appropriate scale.

A good example of the progress which has been made is the newly formed Institute for Molecular Bioscience which is a national research and development initiative of The University of Queensland and the Queensland and Commonwealth Governments, based at the University's St Lucia Campus in Brisbane. When completed in 2002, the Institute is expected to be one of the largest, most innovative and integrated biological and biotechnology research environment in Australia, establishing Brisbane as a centre of excellence in molecular biosciences and a major hub for bioindustries in the Asia-Pacific region.

Similarly Bio21 in Victoria, is expected to draw together that state's leading universities, research institutes, hospitals and industry to capitalise on the State's world-class research and development capabilities. The first significant investment under the Bio21 umbrella is a major \$A400 million development at Parkville which will begin in October 2001.

The recently released Innovation Action Plan builds on this concept, announcing that the Government will provide \$176 million over the next five years to establish Centres of Excellence in information and communications technology (ICT) and biotechnology. With strong industry participation, it is intended that these centres will undertake world-class R&D, focussing on commercialisation and encouraging spin-off companies. Continuation of this level of commitment from the Government through establishment of similar centres in the future will be vital to the continued growth of Australia's research capability.

Traditionally Australia has not had a strong research capability in many of the areas which are dominated by transnationals and which attract foreign investment. A report released last year by the ARC and CSIRO⁴ indicated, for example, that Australia places a relatively weak emphasis on patenting in computers and peripherals, telecommunications and semiconductors and electronics when compared with the rest of the world. It places a relatively strong emphasis however on other high technology areas such as pharmaceuticals, agriculture and biotechnology.

The adequacy of the skilled workforce in Australia particularly in new growth areas

Investing in the people who conduct research is as important as investing in the infrastructure that supports it. Support for research training that "is of the highest quality, response to national needs and globally oriented" is one of the objectives of the ARC. Support for research training is provided under a number of elements of the ARC's current suite of programmes:

- Under the ARC's Discovery programme, the ARC provides support for three levels of fellowship - Australian Postdoctoral Fellowships, Australian Research Fellowships and Professorial Fellowships - to meet the needs of researchers at different stages of their careers.
- Under the ARC's Linkage programme, Australian Postgraduate Awards Industry (APAI) and Australian Postdoctoral Awards Industry (APDI) expose researchers to commercial and industrial objectives. The APAIs have been shown to be extremely popular with industry partners (and in particular with SMEs) and there is currently unmet demand for these awards. In the 2000 application round (for funding to commence in 2001) there were 723 applications for APAIs of which 300 (41%) were successful.

In late 1997, as part of the package of measures in the *Investing in Growth* Industry Statement, the Government announced that it would fund additional 50 APAIs each year

for five years in the fields of information, computer and communications technology. This initiative was aimed at improving links with industry to help universities direct more students into the IT profession.

- The ARC's Centres programme, which includes Special Research Centres and Key Centres of Research and Training, also provides support for research training through establishment of excellent research environments.

In recent years Australia has experienced significant problems in attracting its best scientists to a research career because research funding and salaries are low and career paths are uncertain. In addition, the phenomenon of the so-called 'brain drain' has come to national prominence as working conditions and opportunities unavailable within Australia have attracted researchers overseas.

In the recently released Innovation Action Plan, the Government announced a range of measures that will make Australia more attractive as a place where young researchers can pursue their careers. Additional funding for the ARC will provide for the following initiatives:

- twenty-five new Federation Fellowships, each worth \$225,000 a year for five years;
- doubling the number of ARC postdoctoral fellowships, from the current 55 to 110; and
- improving the competitiveness of researchers' salaries, to get better parity between the salary payable to research-only and research-and-teaching academics.

The Innovation Action Plan also announced the establishment of two new Centres of Excellence. These new Centres are expected to nurture excellent local researchers and attract world class researchers from overseas, facilitating the global knowledge exchange process.

Opportunities for encouraging inward investment

Establishing Linkages

It is acknowledged that international science and technology collaboration activities may encourage increased inward investment in Australia⁵. Strengthening links within Australia's innovation system and with innovation systems internationally is one of the ARC's six key objectives⁶. A number of the mechanisms currently in place have the potential to encourage greater foreign investment in Australia.

The ARC's Linkage programme supports collaborative research projects between higher education and industry with industry required to provide a contribution in cash and/or in kind. Industry partners may be non-government overseas organisations, provided that the application addresses (i) the economic and social benefit of the research to Australia, and (ii) intended use of the research outcomes in Australia.

One of the aims of the ARC's Centres programme is to connect Australian researchers with the world's leading edge knowledge and expertise in overseas businesses and research centres. The ARC Special Research Centre for Quantum Computer Technology, for example, has been recognised internationally as one of the leading quantum computer centres in the world. It currently has project partners from United States (Los Alamos National Laboratory and

University of Maryland) as well as Australia (University of NSW, University of Melbourne and University of Queensland). The US Department of Energy is also collaborating with the Centre and it has held talks with a number of major players in the US semiconductor industry, including Hewlett-Packard Laboratories and Intel.

Another example is the ARC Special Research Centre for Advanced Mineral and Materials Processing at the University of Western Australia. Research carried out in this centre led to the development of a new mechanochemical processing technology for the production of nanopowders. The University of Western Australia has now signed a \$A12 million dollar joint venture agreement between Advanced Powder Technology (a company established by the University) and Samsung Corning, the Korean based world-leader in electronic materials. The joint venture will design, construct and commission a pilot plant in Western Australia to scale-up the University's patented mechanochemical processing technology.

Commercialisation

While Australia has a strong research capability its record is much weaker in the area of commercialisation. Development of a stronger commercialisation record will help Australia attract an increased level of foreign investment. As input to that development we will need to consider carefully the appropriateness of Australia's physical infrastructure as well as its skills-base.

The ARC has a particular interest in the commercialisation of university research. In July 2000, it released a report *Research in the National Interest: Commercialising University Research in Australia* which provided advice to the Minister on Australia's performance against a range of incentive and cultural factors associated with effective university-industry research commercialisation practices in other countries, in particular the United States and the United Kingdom. The report identified some of the barriers to efficient and effective research commercialisation and provided a number of suggestions to improve the level of commercialisation of university research in Australia.

The ARC is also currently commissioning a study aimed at investigating the feasibility of instituting measures to stimulate private capital investment in the commercialisation of research funded by the ARC. The project is expected to establish, for example: the information held by the ARC which may be of value to private capital investors as a basis for their decision making in relation to investment in research commercialisation, the level of interest by the investors in accessing that information, barriers or impediments to the release of the information and the potential risks to all parties in providing the information.

¹ *Knowledge and Innovation: A Policy Statement on Research and Research Training*, the Hon Dr Kemp MP, Minister for Education, Training and Youth Affairs, December 1999

² *Backing Australia's Ability: An Innovation Action Plan for the Future*, Commonwealth of Australia, 2001

³ See for example, *The Chance to Change: Final Report* by the Chief Scientist, November 2000; *Innovation: Unlocking the Future*, Final Report of the Innovation Summit Implementation Group (ISIG), August 2000 and *Inventing our Future: the link between Australian patenting and basic science*, ARC and CSIRO, June 2000

⁴ *Inventing our Future: the link between Australian patenting and basic science*, ARC and CSIRO, June 2000

⁵ *The Chance to Change: Final Report* by the Chief Scientist, November 2000

⁶ *Investing in Our Future: ARC Strategic Plan 2000-2002*, May 2000