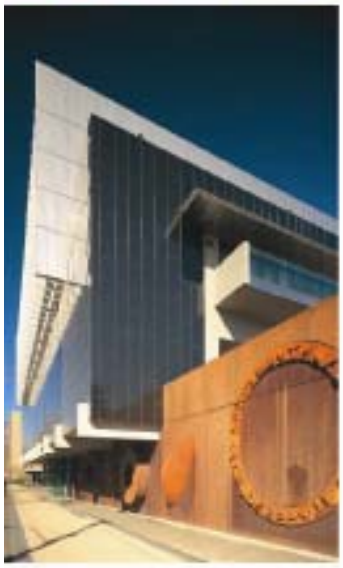

# AVCC Response to the Productivity Commission Draft Research Report:

## *Public Support for Science & Innovation*

December 2006


Australian Vice-Chancellors' Committee

*the council of Australia's university presidents*

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# Contents

## 1. Introduction

The Productivity Commission Draft Research Report, *Public Support for Science and Innovation* (November 2006) provides a detailed analysis of the current contribution of university research to Australia's economic, social and environmental wealth. The AVCC commends the Commissioners for their fine work.

In particular, the AVCC welcomes the Draft Report for its support for continued investment in research, citing as it does "strong rationales for the provision of public funding for science and innovation" (Draft Finding 3.1) and "significant positive economic, social and environmental impacts from publicly supported science and innovation" (Draft Finding 4.1). The AVCC concurs with the Draft Report's cautions regarding basic and strategic science and innovation (Draft Finding 8.1); while applied research should be supported, shifting the focus too far away from basic research will be detrimental to innovation.

The Draft Report indicates that, while difficult to measure, the outcomes of research are beneficial to Australia and should continue to be supported. Draft finding 7.1 presents a national approach to evaluation and reporting of research which we believe is supportable. While the AVCC would like to see a national innovation strategy, we agree with the Draft Report's suggestion that greater specification of the National Research Strategies would be counterproductive.

The contribution of Australia's universities to innovation is acknowledged in the Draft Report. The role of universities as generators of intellectual and human capital is well-reported. In particular, we note the Commission's observations regarding the lack of evidence for deficiencies in research quality under the present funding system.

## 2. Research Training and Human Capital

Training of researchers and innovators is a central role of universities. The importance of this human capital cannot be overstated, and should be considered in addressing shortcomings in the innovation system. The Research Quality Framework (RQF), in particular, runs the risk of focussing on past research success rather than supporting development of researchers and new research. The AVCC is of the view that the Draft Report, which discusses human capital in section 5.2, passes over universities' role in this aspect of science and innovation.

Support for research training is at present via the Research Training Scheme (RTS) which provides funding for the training of doctorate (PhD) and Masters higher degree students, and via the Australian Postgraduate Awards. Funding for research training is also drawn from the Institutional Grant Scheme (IGS), as is support for higher degree students and post-doctoral fellows. Project grants from the Australian Research Council (ARC) and the National Health and Medical Research Council (NHMRC) also fund post-doctoral positions.

This source of human capital is perhaps the most important aspect of the university's contribution to the innovation system. Universities are conscious that neglect in this area has long-term negative repercussions. It is imperative that this aspect of universities' activities receives not just adequate

support, but generous support. Table 1 shows the static rate of increase in academic and non-academic staff in Australian universities. Research training – development of human capital – depends directly upon the number and quality of academic staff and importantly the ratio of those staff to the number of students enrolled in university. Table 1 shows that over the past ten years academic staffing levels in teaching and research have remained reasonably static in-toto and that increased research staffing has predominantly been achieved at the expense of teaching-only staff.

**Table 1. Academic Staff FTE by Function 1995 to 2005**

| Year | Function | | | TOTAL FTE |
|---|---|---|---|---|
| | Teaching Only | Research Only | Teaching and Research | |
| 1995 | 1,804 | 7,610 | 24,261 | 33,675 |
| 1996 | 1,398 | 7,757 | 24,904 | 34,059 |
| 1997 | 1,162 | 7,849 | 24,006 | 33,017 |
| 1998 | 781 | 7,619 | 23,757 | 32,157 |
| 1999 | 751 | 7,757 | 23,365 | 31,873 |
| 2000 | 844 | 7,866 | 23,138 | 31,848 |
| 2001 | 814 | 8,116 | 23,413 | 32,343 |
| 2002 | 842 | 8,654 | 23,457 | 32,953 |
| 2003 | 860 | 9,306 | 23,685 | 33,851 |
| 2004 | 922 | 9,866 | 24,336 | 35,124 |
| 2005 | 755 | 10,358 | 25,204 | 36,317 |

Source: DEST Staff Statistics

Enrolment in research level courses has been very strong over the same period having more than doubled. The static trend in staffing coupled with the dramatic growth in post-graduate level enrolments has meant that the capacity to produce high quality research graduates is seriously undermined. In order to maximise the development of human capital, there is a need to increase government support for academic staff.

**Table 2: Students enrolled in research level degrees (EFTSL) 1995 to 2005**

| | Doctorate by Research | Doctorate by Coursework | Master's by Research | Master's by Coursework | Total |
|---|---|---|---|---|---|
| **1995** | 17,403 | 47 | 7,706 | 22,698 | 47,854 |
| **1996** | 18,441 | 114 | 7,316 | 25,357 | 51,228 |
| **1997** | 19,500 | 267 | 7,408 | 28,529 | 55,704 |
| **1998** | 20,214 | 302 | 7,106 | 30,632 | 58,254 |
| **1999** | 21,649 | 339 | 6,958 | 33,884 | 62,830 |
| **2000** | 22,580 | 568 | 6,613 | 38,640 | 68,401 |
| **2001** | 23,482 | 678 | 6,425 | 45,576 | 76,161 |
| **2002** | 24,315 | 1,253 | 6,126 | 54,352 | 86,046 |
| **2003** | 25,771 | 1,069 | 5,931 | 64,274 | 97,045 |
| **2004** | 27,294 | 1,192 | 5,780 | 71,602 | 105,868 |
| **2005** | 28,079 | 1,194 | 5,508 | 76,263 | 111,044 |

Source: DEST Student Statistics

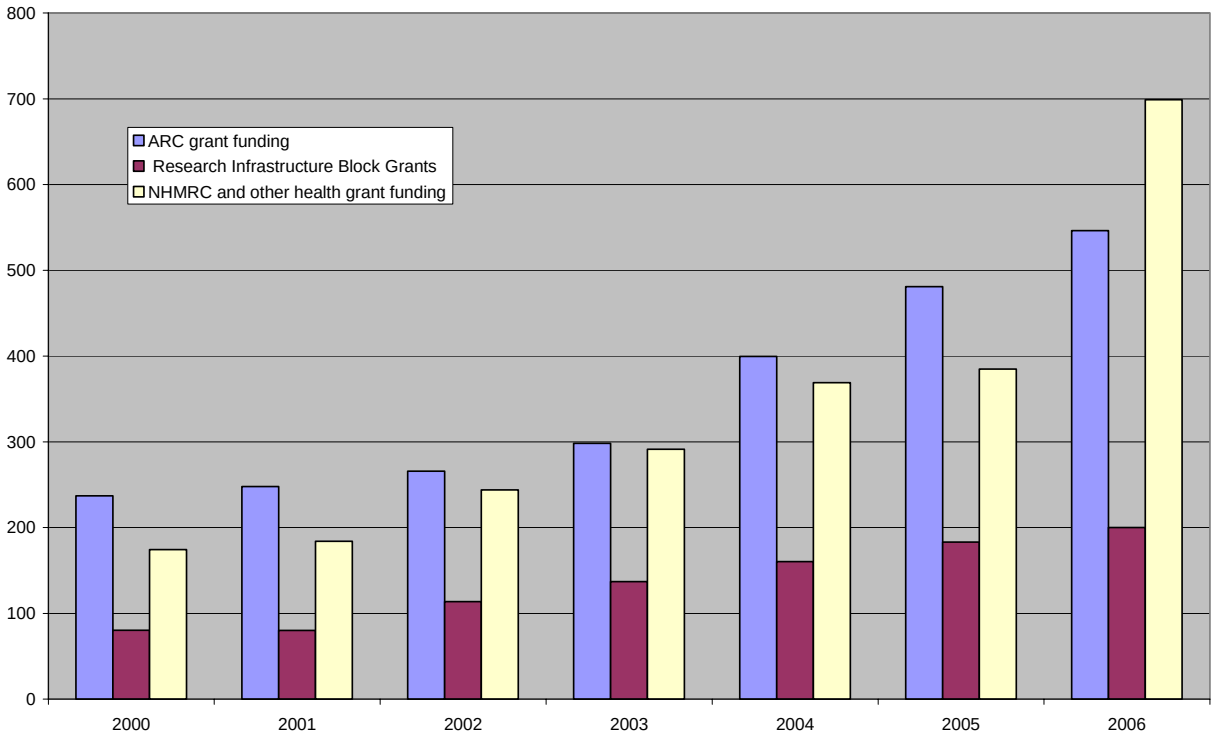
**Recommendation 1:**

**The development of human capital is a wise investment; the AVCC urges a strong commitment by government to continuing and increasing the funding and support available for research training in the interests of providing a science and technology literate workforce for Australia.**

## 3. Infrastructure

The Draft Report in section 5.4 identifies infrastructure to support the research base as an important input into Australia's innovation system. Research infrastructure is supported by the Research Infrastructure Block Grants (RIBG) Scheme. At present, infrastructure support is not keeping pace with project funding provided under the ARC and NHMRC grant schemes. As can been seen in Figure 2 below, ARC funding more than doubled from 2000-01 to 2005-06 (an increase of 120%). NHMRC funding has increased by 38% since 2003 over this period. Infrastructure funding has not kept pace with increases in project grant funding.

**Figure 1: Research Project Grant Funding and Research Infrastructure Grant Block funding, 2000-2006**




Note: Amounts in actual year values

**Data sources:** **(i) Unipay system statistics, 2000 to 2006 (ref. RIBG)**
**(ii) DEST Science & Innovation Budget Tables 2006 (ref. ARC & NHMRC Funding)**

The role of infrastructure in the innovation system cannot be overstated: without sufficient research infrastructure there cannot be an innovative research system. As infrastructure funding through the RIBG falls behind project grant funding, universities are forced to adapt to acquire sufficient project funding to maintain research projects. However, this necessarily results in the shift of funds away from support of research infrastructure, which will, in the long term, damage the capacity of universities for innovative research.

**Recommendation 2:**

**The AVCC recommends that infrastructure funding be increased in order to provide a suitable platform for innovation.**

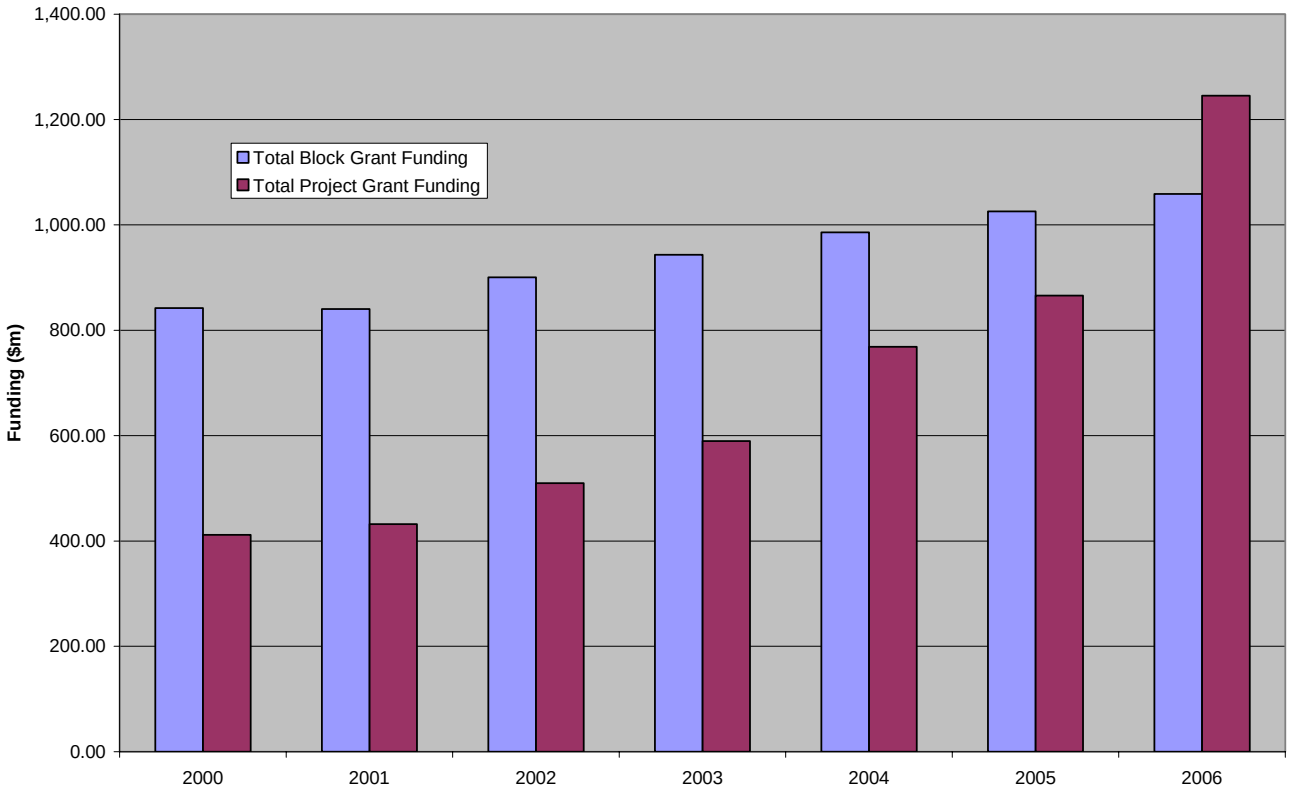
## 4. Block Grants and Support for Basic Research

The progression of research block funding (RIBG, RTS and IGS) against research project funding depicted in Figure 3 clearly indicates that project funding is increasing at a far greater rate than the block grants. While the support for research is extremely valuable, it is essential that research block grants remain abreast of increases in project funding.

The flexibility allowed under these grants enables universities to provide infrastructure according to their own needs and strategic plans, and allows universities to better leverage research project grant funding. Due to this increase in project grant funding over block grant funding, university strategy tends towards the use of funds to obtain project grants. Core funding is presently inadequate; unless the block grants keep pace with increases in project grants, universities will continue to lose essential flexibility. Universities would prefer to use block grant funding for research training, strategic research and research infrastructure as the schemes are intended.

Research rarely follows a directly linear development model. It is extremely difficult to predict which discoveries will lead to commercialised products or other benefits. A broad, active and adaptable base of “blue-sky” research must be in position in order to provide the optimal environment for later applied research. It is important that basic research not be seen as “dead end” or “high risk” compared to applied research, as the role of basic research in an innovation economy is distinct from that of applied research.

**Figure 2: Total Research Block Funding (RIBG, RTS, IGS) and Total Research Project Grant Funding (ARC and NHMRC), 2000-2006**




Note: Amounts in actual year values

**Data sources:** **(i) Unipay system statistics, 2000 to 2006 (ref. Research Block Funding)**
**(ii) DEST Science & Innovation Budget Tables 2006 (ref. ARC & NHMRC Funding)**

In its original submission to the Productivity Commission, the AVCC provided a number of case studies of projects which relied on basic research in order to produce benefits, in ways which could not have been predicted when the basic research was carried out. For example:

- The **colorectal cancer screening program** which has the potential to prevent more than 50 per cent of colorectal cancers, relied on basic research in the 1980s and early 1990s relating to the nature of bleeding from cancers and pre-cancer lesions (adenomas).

- **Hexima Ltd** was formed to exploit a novel gene conferring insect resistance as crop protection, based on the discovery of the gene in a fundamental research program based on understanding the molecular basis of pollen recognition in flowering plants.

- **The Telethon Institute for Child Health Research** provided public health information regarding the diet of pregnant women from basic research into a link between maternal folate consumption and neural tube defects, including spina bifida. The information provided the basis for a public

health campaign to inform women of childbearing age of the link between low folate consumption and birth defects.

- The **Australian Bionic Ear (cochlear implant)** formed the basis for Cochlear Limited, a highly successful company, based on initial fundamental research into electrical stimulation of the hearing nerve.

It is common for new discoveries to lead to new advances, new applications, even new areas of technology. This is reflected in the case studies cited. Basic research provides a platform of information that feeds technological development.

**Recommendation 3:**

**The AVCC recommends that funding through research block grants should be increased in order to better support basic research and research training.**

## 5. The Research Quality Framework

The Draft Report indicates in section 11.5 that there is no significant evidence of poor quality research under the present funding system. The AVCC concurs with this assessment. The concerns raised by the Draft Report therefore need to be addressed by the Department of Education, Science and Training (DEST).

The AVCC believes that it is imperative that, if implemented, the Research Quality Framework's (RQF) funding distribution models are rigorously tested: the incentive structure needs to be carefully considered, the assessment criteria finalised, and the methodology for distributing funding be decided. Under the Draft Report's advice this would have occurred with trialling of the assessment process independently from funding, however this will no longer be the case. Moreover, there needs to be a strong commitment to fund the implementation of the RQF, which has been estimated at some $25 million - $40 million.

**Recommendation 4:**

**The AVCC recommends that there be a rigorous process of development of the RQF, if implemented, with financial support provided by government, including the implementation phase, in such a way that it does not threaten or diminish Australia's research effort.**

**Recommendation 5:**

**The AVCC recommends that the amount of funding provided under the IGS and RTS Schemes should be increased.**

## 6. The Co-operative Research Centres Program

The Draft Report discusses the Cooperative Research Centres (CRC) Program in some detail. Draft finding 9.4 states that the Program would be more efficient if were closer to its original goals, namely the translation of research outputs into economic, social and environmental benefits. The AVCC concurs with this assessment. The returns from investment in research under the Program will be much more significant if the research is of a more wide-ranging approach and the principal focus on industrial research is unnecessarily limiting.

The AVCC believes the CRC Program has been extremely successful; however, in order to maximise the benefits of the Program, the outcomes should serve a broader social role. Collaborative projects such as those supported through CRCs are a valued part of the innovation economy. All CRC projects should be assessed on their impact on society and the environment.

**Recommendation 6:**

**The AVCC recommends that research projects under the CRC Program should extend to the full range of social, economic and environmental benefits.**

## 7. Knowledge Transfer

The Draft Report comments that knowledge transfer in universities is increasingly focussed on commercialisation goals, and considers that this focus is not optimal in terms of maximising a return on public investment in research.

The Draft Report in section 6.5 offers a number of requirements for a publicly-funded knowledge transfer scheme. While the Draft Report is equivocal regarding the need for such a scheme, the AVCC believes that a formal scheme for supporting knowledge transfer would allow for a documented, measurable demonstration of the positive effects of knowledge transfer.

The present situation, where universities support such activities through block grants which are explicitly intended for other purposes, leads to a situation where knowledge transfer takes place “around the edges”; and the bulk of funds is channelled towards activities which lead to gains in the categories covered by the metrics feeding the block grant formulae. A dedicated fund would maximise the outcome of the investment.

**Recommendation 7:**

The AVCC recommends government investment in knowledge transfer with a specific funding program rising to the value of 2% of total university revenue, or at least $260m.

## 8. Conclusion

For the most part, the AVCC endorses the Productivity Commission Draft Research Report, *Public Support for Science and Innovation*, which acknowledges there is benefit to the nation from the current public investment in science and innovation. The AVCC wishes to emphasise the role of Australia's universities in developing human capital, developing knowledge, and disseminating it for improvement of the nation and hence, sees value in each of these aspects receiving greater support if the knowledge economy is to prosper.