NTEU Response to the Productivity Commission's Draft Report on Public Support for Science and Innovation

Synopsis

The National Tertiary Education Union (NTEU) broadly supports the findings and recommendations contained in the Draft Report on ***Public Support for Science and Innovation***. However, in considering the Draft Report, NTEU would ask that the Commission give consideration to the following points before publishing its final report.

- The implications of the ageing of the academic workforce and its likely impact on the future capacity of Australian universities to be able to continue to provide high quality research and teaching. NTEU urges the Commission to consider recommending the establishment of a separate and additional fund to be expressly used by universities for the recruitment, training and professional development of teaching and research academic staff, to be allocated to universities based on current teaching and research staffing requirements.

- The need to establish a specific fund to allow universities to recruit and develop newly appointed academic staff goes beyond the need to address the ageing issue. It is also necessary to ensure that the unique mission of universities and the defining characteristic of academic freedom are protected.

- Given the high rates of return to investment in Research and Development, NTEU would urge the Commission to reconsider its original finding that the level of public investment in R&D is 'about right'. In particular NTEU would request that the Commission reconsider investing in R&D as an alternative to investing Budget surpluses in the Commonwealth's "Future Fund".

- In order to understand the financial pressure that universities are under to maintain high quality research, NTEU contends that it is necessary to consider the whole-of-institutional financial pressures and the extent to which universities need to leverage other institutional resources to successfully win competitive research grants.

- While NTEU understands the limitations of the Commission's terms of reference, we are strongly of the view that restricting the scope of the investigation to science, limits understanding about the benefits that derive from collaborative research with the humanities and social sciences.

Introduction

The National Tertiary Education Union (NTEU) welcomes the release of the Productivity Commission's Draft Report and the opportunity to provide further feedback. This submission outlines our response to the Draft Report and should be considered in addition to our more substantive initial submission.

The Union supports a number of the Commission's draft findings and conclusions in relation to universities, in particular:

- acknowledgement that *"competitive grants schemes effectively lock up a significant proportion of each university's block funds"* and that any attempts to increase the proportion of competitive research funding relative to discretionary research block funding is not warranted and would threaten universities' ability to undertake meaningful strategic research,
- that public funding for science and innovation should not be targeted solely at projects which have the potential to succeed commercially but also at those which emphasise the social, cultural and environmental dividends as well as purely economic returns to Australian society,
- that there may be a case to increase public funding to support universities' third stream activities, and
- that the Government should delay the implementation of the Research Quality Framework (RQF) and reconsider the nature and scope of the assessment framework to ensure that implementation and compliance costs do not outweigh the RQFs potential benefits.

NTEU also has some concerns about a number of the Commission's findings, which we believe are not compatible with the evidence presented in the Draft Report. In particular:

- the failure to provide a policy response in regard to the ageing of Australia's academic workforce so that Australian universities will be able to deliver high quality research and education,
- the finding that there is no case for increases in the level of public funding for science and innovation, which the Union believes is contrary to the evidence presented in the Draft Report on the significant economic, social, environmental and educational rates of return associated with these investments, and
- the finding that the high cost to universities in 'leveraging' competitive research grants is not a threat to the quality of educational services that universities are able to deliver, especially in an environment where there have been significant real cuts in university operating grants for government supported students.

The Union also has some general concerns about the scope of the Draft Report. While the Commission's terms of reference were limited to an examination of science and innovation, recent research suggests that linkages between the science and technology fields and those of the arts, humanities and social sciences is growing in importance, especially in addressing social, environmental and educational issues. As pointed out by the Council for the Humanities, Arts and Social Sciences (CHASS),

> *The world is turning to multi-disciplinary collaborations to deal with the big issues we face, critical problems such as water shortages, global climate change and threats to national security, human health and economic sustainability. No single discipline has all the answers: we need to provide the flexibility to ensure that the research and education community can*

pursue investigations across the whole landscape, regardless of discipline or approach[1].

Australian universities, by definition, are required to cover a broad range of teaching and research fields. It is the comprehensiveness and diversity of universities which makes them the ideal environment in which to foster and promote collaborative cross disciplinary research. Such linkages are critical to Australia's future innovation effort. The Draft Report's failure to investigate the role of the Arts, Humanities and Social Sciences in Australia's innovation effort seriously limits the Commission's findings, even as they relate to the terms of reference. The effectiveness and impact of public support for science and innovation cannot be adequately assessed without a consideration of the role of these critical fields of knowledge. NTEU recommends that the Commission acknowledge this exclusion as a limitation in regard to its findings and that it recommend that further investigation be undertaken into the role that the Arts, Humanities and Social Sciences play in Australia's publicly funded innovation effort, both individually and through linking with science and technology disciplines.

The following parts of the submission will explore the issues listed above in more detail.

Ageing of the Academic Workforce

As evidence documented in NTEU's original submission to the Productivity Commission demonstrated, the ageing of the academic workforce is a critical issue facing Australia's universities over the next decade, and one that could seriously impede Australia's overall innovation effort. Universities are likely to face substantial difficulties in replacing the large proportion of academics due to retire in the next decade. NTEU is concerned that inadequate career paths for early career researchers will mean a lack of experienced staff to succeed those retiring, which is likely to be exacerbated by an expected increase in international competition for academics[2]. This is not only an issue for the academic workforce, but also has potential flow on effects for Australia's overall research capacity, through a diminution in the basic research effort carried out in universities and an inability to produce high quality graduates to work in applied, experimental and strategic research endeavours.

While the retirement of a large proportion of Australia's academic workforce will present opportunities and openings within the university sector for early career academics, evidence presented by Hugo suggests that large scale replacements of retiring academics with inexperienced graduates is likely to present substantial succession and continuity problems, leading to significant difficulties for universities in meeting their teaching obligations[3]. This is particularly significant for teaching and research staff who are often already struggling to find time to undertake the research component of their work. Hugo warns that new staff taking on heavy teaching loads without the resources and experience of older staff are likely to feel this pressure even more[4]. This could lead to a decline not only in the quality and magnitude of research being undertaken by teaching and research staff at Australia's universities, but also to a decline in teaching standards as lecturers are increasingly forced to reduce even further the time they are able to spend on undertaking research to inform their teaching.

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1 CHASS, Collaborating Across the Sectors, CHASS Occasional Paper 3, November 2006.
2 Hugo, Graham, "Academia's Own Demographic Time-Bomb", Australian Universities Review, Vol 48, No.1, 2005, p21.
3 Ibid
4 *Ibid*

As drivers of a knowledge-based economy, universities provide training for skilled graduates and create wealth and employment across a range of industries. As pointed out at the UNESCO World Conference on Higher Education;

> *specialized professional knowledge is now becoming obsolete more quickly than in the past a growing number of professions and of positions within enterprises and public agencies (are) not clearly demarcated but rather based on knowledge deriving from different disciplines*.[5]

It is through the teaching and research nexus that universities are able to provide the type of education required by a knowledge economy and the type of research required to contribute to Australia's overall innovation effort. The separation of these roles, whether it be through the increased reliance on competitive research funding, the possible consequences of the Research Quality Framework or through inadequate government funding, will seriously impede Australia's wider innovation effort.

Currently, there is little incentive for individual universities to employ, educate and develop young researchers and academics to take the place of the ageing workforce as it begins to retire. Training of future academics has the economic characteristic of being a non-rival service because universities that invest in the education, training and professional development of early career academics are not guaranteed a return on this investment where other institutions, both in Australia and overseas, have the capacity to employ them. This disincentive is likely to be exacerbated with the introduction of the Government endorsed model of the RQF, due to the fact that the attribution date for research carried out during an assessment cycle provides universities with a major incentive to 'poach' established researchers after they have completed their research.

NTEU believes that it is critical the Commission consider what policy response might be needed to overcome this major supply constraint and its potential impacts on staffing levels and the quality of both teaching and research produced by Australia's universities. As outlined in our original submission, NTEU believes that like education more broadly, the recruitment, training and development of young researchers and university academics of the future should be the subject of public policy.

Specifically, in addition to our original proposal on this issue, NTEU urges the Commission to recommend the establishment of a separate and additional fund to be expressly used by universities for the recruitment, training and professional development of teaching and research academic staff which would be allocated to universities based on current teaching and research staffing requirements.

Academic Career Paths and Academic Freedom

The need for adequate career paths that provide some employment security for university staff goes well beyond the need to replace an ageing academic workforce. In addition to the need for succession and continuity planning outlined above, employment security is critical to the very nature of the enterprise of the university and its delivery of high quality, internationally competitive research and education.

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[5] *The Requirements of the World of Work Thematic Debate* at the UNESCO World Conference on Higher Education, Paris, 1998, pg.17

A report to UNESCO from the International Commission on Education for the Twenty-First Century describes the role of higher education as uniting all the functions associated with the advancement and transmission of knowledge - research, innovation, teaching and training, continuing education and international cooperation – with a view to the development of society as a whole. In order to fulfil this role, the report argued that universities must be autonomous centres for research and the creation of knowledge, where the freedom of academics to undertake teaching, scholarship and research without undue interference is protected and promoted.[6] In order to fulfil this role, teaching and research carried out at Australian universities needs to be independent and academically driven. This is not just in the interests of academics, but rather is part of a much broader national interest about the type of graduates that Australian universities produce, their ability to participate in and grow the Australian economy and to remain internationally competitive. It is also critical to the type of research universities produce. Freedom from commercial or market interference is vital to innovation and to the development and advancement of knowledge and ideas.

Academic freedom then, is not simply an intellectual ideal, but rather is part of what defines universities and the particular type of research and knowledge that they produce and disseminate. As Monotti and Ricketson conclude in a recent examination of university intellectual property policies in the UK, USA and Australia, universities

> *continue to share a continuity of meaning that makes them 'special' institutions and distinguishes them from other social and economic institutions. Above all, they remain at their core, institutions that foster free and open intellectual inquiry. Universities respect and promote a highly developed sense of 'academic freedom.' Independence, objectivity, systematic investigation and scientific rigour, are all aspects of this freedom, and have become firmly linked to each of their traditional functions of teaching, training, research and community service. In particular, this concept requires that academics remain free from external influence to do the following: (a) to determine what and how they teach and research; and (b) to publish their work in a manner and time they choose*[7]*.*

NTEU would contend that the only way to guarantee that these unique and defining characteristics of universities are maintained is to ensure that staff are free to undertake their teaching and research activities without external interference. This means that rather than relying predominantly on competitive research grants or winning funding for a particular project, academic staff need security in employment. The key to this is effective public funding through discretionary block research funding, to foster free and open inquiry.

As acknowledged in the Draft Report, *"The structure of funding for higher education research has increasingly eroded the share of block grants"*[8]. In addition, research funding has become subject to greater Ministerial intervention, with the previous Education Minister demonstrating on more than one occasion his preparedness to intervene in research funding, rejecting three grants recommended for funding by the

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6 *Learning: the Treasure Within*, Report to UNESCO of the International Commission on Education for the Twenty-First Century, 1995, p. 131.

7 Ann Monnotti and Sam Ricketson *Universities and Intellectual Property. Ownership and Exploitation,* Oxford University Press, 2003 (12.03 pp 545-55).

[8] Productivity Commission, Draft Research Report, Public Support for Science and Innovation, November 2006, p.XVIII

Australian Research Council Board in 2004 and a further seven grants in 2005. While the Education Minister plays a key role in the determination of research policy, in particular in relation to the funding of research, it is imperative that decisions about what research is funded are unequivocally independent and free from political interference. It is only through demonstrated impartiality that research is given integrity and value. Political influence over funding decisions has the potential to directly affect the type of research being carried out, as individual researchers as well as industry alter their projects to those areas that might attract funding.

Rates of Return and Level of Public Funding

NTEU wishes to raise a number of concerns about the Productivity Commission's overall findings in relation to the size and allocation of public funding for Australia's science and innovation system.

The Union is puzzled by the Commission's finding that "*while apparent measured rates of return to R&D are high, these results are too imprecise to provide a clear case for significant further funding".*[9] This is despite the Commission's finding that Australia's existing innovation system "*by and large, provides good returns for Australians and has, over time, adapted to meet new challenges".*[10]

The Commission's Draft Report has in fact acknowledged that in addition to pure economic returns, as measured by increased productivity and output, publicly funded R&D results in significant social, cultural, environmental and educational dividends and that the university sector is vital in meeting Australia's future education and labour market demands.

The difficulty in measuring social, environmental or education returns to government support for science and innovation should not mean that their importance is in anyway discounted. NTEU would urge the Productivity Commission to do further research and analysis into the social, cultural, environmental and educational benefits of science and innovation[11]. This will ensure that policy makers will have better information on which to base decisions in relation to both the optimal quantity and composition of future public support for research and development.

The Productivity Commission's conclusion that the overall quantum of public sector investment in R&D is 'about right' seems to be predicated on the fact that, when adjusted for structural differences between the Australian economy and other OECD economies, Australian rates of investment in R&D (as measured as a percentage of GDP) are about average for the OECD. Since the evidence indicates that the social rates of return in most, if not all OECD, countries are high, one conclusion that can be drawn is that the OECD as a whole is under investing in R&D and therefore current levels of investment in R&D for the OECD, including Australia are sub-optimal. NTEU believes the Commission should provide the Government with policy options that would promote Australia as a world leader in science and innovation, rather than supporting a position which effectively maintains the status quo at inadequate levels.

In addition the NTEU questions the Commission's assertion that any increase in public support for science and innovation would require either:

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[9] *Ibid*, p.XXX
[10] Ibid, XiX
[11] As a starting point the NTEU would suggest the looking at Louise Watson (September 2002) *Social transformation and economic growth. The critical role of universities.* National Institute of Sciences ANU

- additional taxation, or
- reduced expenditure in other program areas.

At a very minimum, NTEU believes that this argument needs to be balanced by considering the relative rates of return Australian society could expect to receive from additional public support for science and innovation relative to the rates of return it is likely to receive from investing Budget surpluses in the "Future Fund".

More fundamentally NTEU believes it is the role of the Federal Government to make political decisions about how much to spend, the appropriate allocation of that expenditure and how to finance it, and that the Commission should not be 'second guessing' the Government's fiscal policy stance.

NTEU therefore asks the Productivity Commission to reconsider its recommendation in relation to the overall level of public support for science and innovation, especially to Australian universities.

Public support for university R&D

NTEU agrees with the Commission's finding that positive rates of return are not in themselves sufficient to justify public support but that public support must 'add' to the quantum of R&D being undertaken. However, the Union notes that the Commission concedes that this 'additionality' is high in the university sector.

NTEU believes that the only rational conclusion that can be drawn from the evidence sited in the Draft Report is that additional expenditure on R&D at Australian universities would lead to additional investment in R&D and that this investment would yield high rates of return to the Australian economy and society. We find it curious that the Commission even questions whether the marginal benefits of increased expenditure on R&D at Australian universities would outweigh its marginal costs. NTEU believes that the Commission's findings not only indicate that any additional expenditure would be a good investment, but more importantly, from a public policy perspective, that current levels of investment in the university sector are sub-optimal.

Leveraging Competitive Research Grants

In our original submission the NTEU raised the issue about changes in universities' relative public funding mix between teaching responsibilities (in support of government supported students) and research funding. NTEU expressed concerns about the uncertainty created by an increasing proportion of research funding being allocated on competitive basis, especially in relation to the consequences this has on universities' ability to be able to employ and train young and upcoming researchers and therefore the ultimate consequences this has on building the future academic workforce.

The other relevant issue in relation to the funding mix relates to the proportion of university operating grants that are required to support competitive research grants. In its submission to the Productivity Commission, the Group of Eight universities estimated that universities spent $450 million of operating grants in leveraging these grants (as cited in Draft Report p11.23). It is worth comparing this figure to the Commission's estimated share of operating grants paid to universities for teaching related purposes of $587 million in 2004-05 (Draft Report Table 11.1). While it is unclear how the Commission estimated this imputed share, it seems to account for about 20% of Commonwealth Teaching and Learning related grants to universities.[12]

[12] DEST, *Selected Finance Statistics 2004*, Table 1, Adjusted Financial Performance

The NTEU questions whether universities or their teaching and research staff have the capacity to allocate 20% of their Commonwealth teaching and learning grants to teaching related research given the real cuts in government-supported students and the rapid increase in student-staff ratios over the last decade. This situation is made worse by the fact that universities now feel that it is necessary use their scarce resources to leverage competitive research grants.

Changes to the funding mix away from teaching and learning support and an increasing reliance on competitive research grants is forcing universities to allocate more of their general operating resources to support competitive research grants. Ad a consequence learning and teaching is coming under increasing pressure as fewer resources are made available to these functions and thus rising workloads for teaching and research staff. This is reducing Australian universities' capacity to continue the teaching-research nexus and ultimately threatens the quality of education they will be able to deliver in the future.

Transformative nature of R&D

As the Productivity Commission notes the relatively low levels of Business Expenditure on R&D (BERD) compared to other industrialised economies may well be a result of the industrial composition of the Australian economy which is dominated by sectors that have had historically low levels of investment in R&D. While the NTEU would argue that using public support for science and innovation as a driver to transform the structure of Australian industry has little economic merit, it would be wrong to conclude from this that the competitiveness of the Australian economy would not benefit from the adoption and application of publicly funded research and development.

As a recent Business Council of Australia report notes:

> *Innovation is much more than invention, specifically it requires that knowledge is used in a way that provides benefits through additional value-add. Through the application of knowledge and technology to create new products and services and improve production processes, innovation allows us to increase our competitiveness, create high quality jobs and achieve greater value for what we make and export.*[13]

In other words, to ensure that the macroeconomic benefits of publicly supported science and innovation flows through to the whole economy it is important that science and innovation be adopted and applied at the microeconomic level of the firm and individuals. The maximum economic benefits of R&D will not be fully realised unless all firms are in a position to adopt and apply innovation practices where they feel they can derive a competitive advantage from doing so, even if they are not directly involved in R&D. Likewise, if individuals are to be encouraged to undertake further education and training and invest in human capital, they need to do so with confidence that their skills and knowledge are capable of being fully utilised and rewarded.

NTEU supports in principle, the Productivity Commission's findings that the results of publicly funded research should be made freely available within the established conventions of intellectual property rights. This however, may not be sufficient if the intention is to encourage a greater up take of university research findings. Rather,

[13] Business Council of Australia, *New Pathways to Prosperity: A National Innovation Framework for Australia*, November 2006.

NTEU would advocate for public support to encourage individual firms to consider this strategy, especially in industries where such a culture or climate has traditionally not existed.

NTEU would envisage that the adoption and development of research undertaken at Australian universities by the broader community, including the business community, would constitute what is contemporarily referred to as 'third stream' activities and is strongly supportive of the Commission's recommendation for establishment of additional and separate funding to support further engagement between universities and their communities.

Research Quality Framework

In addition to sharing the Commission's concerns about the costs associated with implementing the RQF potentially outweighing the benefits of a research assessment exercise, NTEU has a number of specific concerns about the final model endorsed by the Government. In particular, the Union is concerned that this model could lead to further division between the teaching and research roles and could significantly impact on the broader community's ability to access high quality education and research.

One of NTEU's major concerns with the proposed model is the requirement that universities are to select research groups for assessment, as well as report on the total number of staff eligible for assessment. NTEU is aware that this has already led to some institutions arbitrarily classifying staff as *either* research active or inactive and using these "classifications" to reallocate teaching workloads away from so-called research-active staff and as a consequence, increasing the teaching loads of other academic staff. Many universities believe that they will best be able to achieve high RQF ratings and secure funding through separating the teaching and research responsibilities of academic staff, and as a consequence, universities' general research capacity and capability could be severely undermined.

Another potential consequence of the RQF is that it could lead to a substantial reshaping of the sector that could have significant impacts on the accessibility of publicly funded research to the broader community. The RQF could lead to a further concentration of public research funding, with universities who do not score highly in particular areas, being unable to, or choosing not to, offer particular discipline areas due to their inability to attract RQF funding in that area. In addition, the RQF might cause universities to alter the nature and type of research they are prepared to support, therefore impacting on intellectual freedom and free inquiry. This also has significant implications for student choice in relation to where they are able to study, as well as for the quality of education that individual universities are able to offer.

NTEU is also concerned that any further concentration of research funding could have detrimental consequences for the capacity of Australian universities to educate sufficient numbers of the next generation of researchers as well as limit the scope and diversity of that research training. Research education is one of the core activities of all Australian universities. Any diminution of an individual university's capacity to perform its research education role is likely to threaten the future viability of Australia's research community and the diversity of researchers.