Australian Research Council

Comment on the Higher Education Financing and Policy Review Committee discussion paper *Learning for Life*

Introduction

The Australian Research Council commends the Committee's recognition of the pivotal role of teaching and learning within higher education and the need for incentives for these activities. However, the Council is concerned at the Committee's failure to properly acknowledge the complementary importance of research. Research and research training activities are essential to the ongoing vigour of universities as institutions for learning. It is essential that research and research training be recognised as being of fundamental importance to the role of universities within the national innovation system.

Universities create new knowledge through research, they transmit knowledge through teaching and training and they transfer knowledge so that it can be developed and utilised. The Council believes that the Committee has failed to acknowledge properly the role of research and research training in invigorating teaching within higher education. The Council also believes that the Committee has missed an opportunity to address the need to develop a national vision for research.

In Appendix 7 of its discussion paper, the Committee identifies what it sees as the strengths and weaknesses in the present framework for research policy and funding. Options for funding mechanisms for research and research training are discussed in Appendix 10 of the discussion paper. The Council's comments on these specific issues are set out below.

Priority setting

The Committee advocates the establishment of national priority setting mechanisms to guide the allocation of research funding (p.37). It also states that the Council has yet to implement significant priority setting procedures or to initiate collaboration in R&D priority setting with other advisory and research performing agencies. In responding to this, consideration must be given first to the role of the Council, the types of priorities that may be set and the level at which they should be set, and the mechanisms that would be appropriate for priority setting at that level.

The role of the Australian Research Council

The Committee notes that the *Employment, Education and Training Act 1988* gives the Australian Research Council responsibility for providing advice on national research priorities. Recognising the role of other research advisory bodies that work within specific thematic areas (for example, the National Health and Medical Research Council),

the Australian Research Council has interpreted its mandate to relate to the higher education sector, emphasising the importance of placing the higher education sector's research in the wider context of the Australian research and development effort.

Types and levels of priority setting

National research priorities

At the broader level, the Council has played a part in moves to establish national priorities, notably at the supra-agency level through the Coordination Committee on Science and Technology (CCST). The CCST has, however, been more valuable as a forum for exchange of information and ideas than as a vehicle for advancing strategic priorities. The Chief Scientist has proposed a number of changes to enhance the role of this organisation within a broader reform of the national priority setting process for science and technology [1]. The Council will participate in this process and ensure that its priorities coordinate with those developed at a national level. However such national priorities will be broad in nature and cannot pre-determine the balance of funding within agencies.

The Committee distinguishes between *structural* or goal-oriented priorities - those to do with the balance of funding mechanisms and the mix of basic, strategic and applied research - and *thematic* priorities - to do with the balance of research disciplines and socioeconomic objectives. However, the Committee does not extend this distinction through to its examination of the issues involved or to its recommendations. It is apparent that national priority setting mechanisms are proposed at both the structural level and at the thematic level, including influencing the mix of disciplines within the allocation of basic research grants through the Large Research Grants scheme. Thus, the Committee proposes to rectify the low success rates for Large Research Grants by restricting the range of grants offered through a national priority setting process (p. 133).

The Chief Scientist, in a report examining national priorities presented to Government in June 1997, wrote:

> *…national-level identification of priorities should concentrate on the structural level. Thematic priorities (related to disciplines or socioeconomic objectives) should only be included when there is a very strong case that the objective or field of science concerned needs special attention.* [2]

The Council supports this view. National research priorities are best expressed in structural terms, addressing the relative importance of research approaches for achieving national economic, social and cultural goals.

Priority setting for Australian Research Council programmes

The Council proposes to establish a programme structure that makes clearer its three principal structural priorities within the national innovation system: a basic research programme to foster the knowledge base; a strategic research programme to respond to areas of strategic importance; and a cooperative links programme to support cooperative

research activities between higher education, industry and other players within the national innovation system.

Structural priorities will be established within these programmes. In the basic research programme, the Council will review the balance of project grants, training awards, and block grants to ensure that the mix is appropriate.

Basic research is, by definition, not linked to particular strategic outcomes. The Council has a special responsibility for higher education research, the key role of which is to maintain and develop a broad knowledge base through the conduct of basic research. Accordingly, the Council is of the view that thematic priorities should only influence the allocation of funding for strategic research. It does not believe that thematic priorities should influence the allocation of funding for basic research, either at the level of assessment of individual applications or in the distribution of resources among discipline panels.

This position was supported by the Industry Commission in 1995 [3], when it stated that "...the ARC has a special responsibility for supporting non-appropriable research consistent with the objectives of higher education institutions." Such research will often be basic in character and the allocation procedures related to its support are ill-suited to the application of criteria other than excellence.

A strategic research programme would provide opportunities to pursue research with particular strategic objectives, including thematic priorities. Priorities for a strategic research programme would be developed in conjunction with key stakeholders, including government and industry, thereby ensuring that the Council's priorities are consistent with broader national priorities. In consultation with other portfolios, emerging areas of strategic research importance could be determined according to the identification of areas in which there is scope for joint funding of research activities. Proposals for research would be sought in defined priority areas, with assessment involving panels drawn from groups with expertise relevant to the area.

The cooperative links programme would provide funding to support cooperative research ventures between universities, other public research institutions, industry and government. This programme would need to be set within the context of the Government's broader industry research and development framework, including the Cooperative Research Centres programme and the initiatives outlined in the December 1997 Industry Development package. To this end, the Council intends to consult with the Department of Industry, Science and Tourism and the Industry Research and Development Board.

Priority setting mechanisms

In its discussion paper, the Committee states that "…the ARC has yet to implement significant priority setting procedures or to initiate collaboration in R&D priority setting with other advisory and research performing agencies." (p. 129). While acknowledging the scope for improvements in the latter, the Council has directed considerable attention to priority setting within its programmes. The discussion paper states that these priorities are being set by default rather than explicitly. The implication here is that

explicit priorities, particularly in thematic terms, should emerge from a formula or prescribed process designed to result in quantifiable priorities among different areas. Noting the work undertaken by the Council in particular, the Chief Scientist has indicated that "…in general, priority setting has been adopted seriously by funding and performing agencies, and considerable effort has been put into developing and refining methods of identifying priority areas, and allocating resources accordingly." [4] The Council has established explicit structural priorities for research. These follow from the identification of benefits and priorities set out in the Council's mission statement:

- making contributions to the quality of our culture;
- producing graduates of high quality;
- the direct application of research results;
- increased institutional capacity for consulting, contract research and other service activities;
- enhancing university-industry links; and
- enhancing Australia's international research links.

As indicated above, the Council believes that the allocation of funds for basic research should not be guided by thematic priorities and should be on the basis of excellence alone. However, it recognises that analysis of resource allocation provides a useful guide to determining structural and thematic priorities that can inform the allocation of strategic research funds.

As noted in its original submission to the Higher Education Financing and Policy Review, the Council has done this in relation to its basic research programmes by closely examining the role and pattern of support for basic research in Australia. Preliminary advice on *The Strategic Role of Basic Research* was given in early 1994. The Council then embarked on an extended process of analysis and consultation, beginning with *The Likely Profile of Research for Social Economic, Cultural and Environmental Benefits in 2010* (1995) [5] and culminating recently in the *Funding Strategies for Basic Research: Part 2 Balance of ARC Funding Across the Disciplines* (1996) [6].

The Chief Scientist has proposed that as a first step in identifying national priorities (in relation to science and technology), information from Commonwealth agencies responsible for the allocation of research resources should be gathered, analysed and published. This information should then be considered in the context of a classification of structural priorities set against a clearly articulated preferred vision by the Government for Australia's development toward national goals in the spheres of economic and industry development, quality of the environment and social well-being. The Council endorses this proposal.

The Committee's discussion paper mentions two mechanisms that have been used in the past to develop priorities: foresighting and the CSIRO matrix approach. It does not, however, discuss the applicability of such mechanisms at different levels of priority setting. The discussion paper suggests that both might be employed by the Council in relation to its own programmes and in linking these to the broader national innovation system. Both of these mechanisms have been examined in some detail by the Council and the CCST.

The foresighting approach is able to inform the development of broad national structural priorities: the "preferred futures" approach of the 1996 Australian Science, Technology and Engineering Council study provides a base in this regard [7]. Alternatively, it can be used to develop scenarios in thematic areas, matching the needs of users with the expected outcomes of scientific research. In either case, while of interest, this mechanism does not provide an appropriate basis for guiding the allocation of resources among the Council's programmes.

The CSIRO model has received considerable attention as an effective method of informing judgements about the distribution of resources between programmes on the basis of strategic potential. On the other hand, its tendency to concentrate funds in areas of established research strength seriously undermines its applicability as a guide for the allocation of basic research funds, since it is from basic research that the unexpected finding that is tomorrow's new industrial opportunity will emerge. Any attempt to develop thematic priorities will therefore need to involve a much wider process of opportunity scanning than the CSIRO process provides.

In summary, the Council supports the development of broad structural national priorities in research. Consistent with its particular role within the national innovation system, it will ensure that its own research priorities reflect those developed at a national level. The Council intends to adopt a programme structure to better reflect its structural priorities. The Council welcomes the suggestion that it adopt a broader role in relation to priority setting for higher education research and linking this with the broader national innovation system. The Council has initiated discussions with the Rural R&D Corporations to identify research areas that could appropriately be jointly funded. Through such collaborative activities, the Council aims to stimulate cross portfolio coordination of priorities within the national innovation system.

Knowledge, technology and skills transfer within the national innovation system

The generation and transfer of knowledge, both directly and through innovation and skills development, are key functions of Australian universities and an integral part of any comprehensive system of post-secondary education. However, universities are only one part of an international network of knowledge developers, providers and users. The effective participation of universities in such intellectually based networks trading in ideas is essential for the continued reinvigoration and growth of the universities themselves and of the national innovation system within which they operate. In a global economy, the quality of university-based education will be dependent increasingly on a broad exchange of knowledge and skills with other developers, providers and users of knowledge and skills.

Because of its role in supporting research and research training, the Australian Research Council is a key node in the national innovation system. However, it has to be recognised that a characteristic of the traditional Australian systems of education, research and innovation has been fragmentation and compartmentalisation of efforts and initiatives. This has been typified by the proliferation of programmes, temporary funding measures and the spread of responsibilities between various State and Federal

Government departments and instrumentalities. This has been a barrier to the Council extending its role beyond that of concentrating on the research and research training requirements of universities.

The future role of the Council within the national innovation system should evolve to provide a focal point for policy development and programme implementation for research and research training within the system as a whole. In this role, the Council would also have a responsibility to encourage the development of strategic networks between universities and corporate, institutional and community partners in the development, provision and use of knowledge.

At present, the major initiative of the Council in developing strategic networks is the Strategic Partnerships with Industry in Research and Training Scheme. This provides funding for collaborative research projects between a wide range of major corporations, small to medium enterprises, State and Federal Government departments and instrumentalities and community groups across a broad range of science, engineering, humanities and social sciences issues. It also provides for the research training of postgraduate and postdoctoral students within the framework of collaborative projects between universities and their strategic partners.

The SPIRT scheme was instituted to:

- stimulate research linkages between universities and industry;
- introduce a flexible approach to research and development project formulation and implementation that is responsive to market demand; and
- encourage the development of long term strategic alliances between university research providers and industry partners to utilise the available intellectual capacity to meet the demands of economic and social development.

The response of both university and industry partners to the scheme has been extremely positive and has justified the injection of new government in 1996 for a three year period. Approximately 900 applications for funding were received in 1997, with industry funding commitments of approximately $50m in cash and $103m in in-kind contributions to projects of two to three years in duration.

The scheme's committee recommended the awarding of 200 project grants, 232 Australian Postgraduate Awards (Industry) and 21 Australian Postdoctoral Awards (Industry) for 1998 for projects with collaborative input from organisations which range from the country's largest industrial corporation to small to medium enterprises and from government instrumentalities to community groups.

A feature of the scheme is that the Australian Postdoctoral Award (Industry) holders are drawn equally from two cohorts - recent graduates and those who are returning to universities for a higher degree after three to ten year's industrial or commercial experience. Experience over the past five years indicates that the majority of the latter cohort returns to key positions in industry after completion of their Australian Postdoctoral Award (Industry). This exchange of personnel between industry and university provides a powerful stimulus to collaboration and facilitates the two-way exchange of expertise and experience between the public and private sectors.

The introduction of Australian Postdoctoral Awards (Industry) in 1997 attracted 50 quality applications from recent graduates with limited research experience to act as project leaders on collaborative projects. The 21 Fellows who were appointed will have the opportunity to develop their research skills and experience, as well as develop an appreciation of the challenges of economic and social change through the activities of the industrial partners.

Experience in Scandinavian countries indicates that a powerful impetus to establishing and maintaining cross-sectoral networks occurs as the result of reciprocal exchanges of more senior personnel between industry and universities. The Australian Research Council believes that there is an opportunity to build on the success of the Strategic Partnerships with Industry – Research and Training scheme by including a new award, Australian Industrial Fellowships, for senior academics and industry leaders to facilitate the exchange of experience and expertise between universities and industry through collaborative projects. Such awards would, for example, encourage high achievers in industry to return to universities in the latter stages of their careers to participate in educating and motivating the next generation of innovators and encouraging young academics to focus on the challenges of industry. They would also provide an opportunity for senior academics to become involved in the innovation process within industry.

The present collaborative interactions under the scheme are meeting participants' expectations in that outcomes are of value in furthering the strategic directions of all partners. A notable contributor to the success of the scheme is the movement of postgraduates across the interface between universities and industry, further enhancing strategic networks.

The scheme is supported by the Key Centres for Teaching and Research which form focal points in the network of interactions between universities, industry, commerce and community organisations. Key Centres link teaching, applied research and more basic research in ways that are not duplicated by other centres or industry-based research activities. A feature of the Key Centres is the provision of specialist components to undergraduate courses as well as the provision of postgraduate and professional courses. The research that is undertaken in the Key Centres is internationally competitive, contributes to national objectives and acts as a national focus in a specific area of teaching and research.

The aims of the Key Centres are:

- to develop and maintain cooperative links with industry and end user communities relevant to the research and teaching activities of the Centre; and
- to make a significant contribution to the commercialisation or utilisation of research, and where appropriate, act as a resource for industry and end users by providing both short and long term research consultancies and by facilitating technology transfer.

In 1997, 15 Key Centres were funded, although funding for six of these will conclude at the end of the year. With a new selection round next year, up to 17 Centres will be

funded in 1998. The Key Centres and the Strategic Partnerships with Industry – Research and Training scheme are essential elements of the national innovation system.

The role of the Australian Research Council in both these two schemes is to encourage the development of strategic alliances between universities, corporations and community groups to provide focussed areas of activity in research and research training and to maximise the flow of knowledge between the partners. This is an essential element of the national innovation system and of the post secondary education system.

Nevertheless, there are a number of interactions that require attention in the further development of the national innovation system. Firstly, the network of relationships between the Council, universities, industry and community organisations and those between the Department of Industry, Science and Tourism, the CSIRO, industry and community groups are driven by different strategic imperatives, are separately funded and interface effectively only through the Cooperative Research Centres programme. Yet these separate networks represent the major proportion of research and research training activity in the country, often with common strategic partners.

Secondly, there is the potential for an enhanced role for the Council in building closer relationships between universities and the CSIRO to ensure that publicly funded facilities and resources are utilised effectively in research and research training in partnership with the private sector.

Lastly, there is the potential for an enhanced role for the Council in coordinating the development and use of major items of infrastructure across the post-secondary education system so that facilities can be used, where possible and desirable, for education, training and research purposes at all levels. This should include a reappraisal of the role of the Council in the development of policy objectives and management of major national facilities. Elsewhere in this paper, the Council proposes enhancements to the Research Infrastructure (Equipment and Facilities) programme to encourage the cooperative development of major national and international facilities that can be used to support the collaborative research and development activities of the various participant institutions within the national innovation system.

Research infrastructure

The Australian Research Council believes that enhancements to support for research infrastructure are necessary to underpin the capacity for universities to continue to play a strong role within the national innovation system. The Council has identified three areas that are in need of attention:

- the level of research infrastructure funding that is available to support the current level of research activity;
- the processes for the allocation of research infrastructure; and
- the need for a more strategic approach to investment in research infrastructure.

Support for research infrastructure in higher education is provided notionally through the Research Quantum of universities' operating grants. The Research Quantum is a component of operating grant funding and is notionally used to support research separate

from those activities directly linked to teaching and research training. It is allocated to universities on the basis of research performance as measured by the Composite Index. As a component of operating grants, Research Quantum funding is distributed within universities at their discretion.

Direct funding support for the project-specific infrastructure requirements of research is provided through Research Infrastructure Block Grants. These funds are allocated on the basis of the National Competitive Grants Index.

Research Infrastructure (Equipment and Facilities) Grants support the purchase of major facilities and items of equipment that can be used cooperatively by two or more universities. Such initiatives may also involve organisations outside the higher education sector. They are competitive grants, awarded annually according to merit and strategic importance.

The level of infrastructure funding

The Australian Research Council believes that support for developing the national research infrastructure is crucial to providing a strong foundation for the national innovation system. It believes that there is an opportunity to secure that strong foundation by addressing current deficiencies in research infrastructure funding across the various programmes.

Having been converted from a proportion of operating grants to a dollar sum, the amount of the Research Quantum did not increase along with growth in operating grants in the first half of the 1990s. On the other hand, reductions in operating grants across the system announced in the 1996 Federal Budget have been accompanied by proportional cuts in the Research Quantum which, as a result, will see funding decline from $220m in 1997 to $214m by 1999.

The current level of infrastructure support through Research Infrastructure Block Grants is $85m, which represents 27 cents for every dollar of Commonwealth competitive research grant funding. The current level of infrastructure support is substantially based on funding increases announced in the 1995 and 1996 Federal Budgets. In each case, these funding increases were for three years only. Funding for Research Infrastructure Block Grants is projected to fall from $103m in 1998 to $42m in 2000. In the absence of additional funding beyond 1998, the infrastructure support ratio will decline to about 15 cents for every dollar of Commonwealth competitive research grant funding by 2000, putting pressure on operating grants to provide further infrastructure support for research projects funded for their direct costs through competitive grants.

The Australian Research Council supports a benchmark ratio of 40 cents of Commonwealth funding for project-related infrastructure costs for every dollar of funding for the direct costs of Commonwealth competitive research grants. The *Report of the Sub-Group on Research Infrastructure* (the SHERI report) [8] observed that the British Government established a similar benchmark in 1992 and that, at that level, funding would be sufficient to remedy current deficiencies undermining the capacity of research projects to remain competitive internationally.

Funding for Research Infrastructure (Equipment and Facilities) Grants is projected to fall from $27m in 1999 to $21m in 2000 in the absence of additional funding. The Australian Research Council believes there are compelling reasons to substantially increase the funding available through this programme. There is a real threat to the research competitiveness of Australian universities in the face of massive investment in university research in East Asian countries such as Malaysia, Singapore, Hong Kong, Korea and Taiwan. The *Report of the Sub-Group on Research Infrastructure* noted that there was evidence that a lack of resources for key items of research equipment over the past 10 to 15 years has resulted in a decline in the international competitiveness of university research in Australia. There is also a need to raise the amount of minimum grant that can be allocated above the current $100,000 threshold to bring the programme into line with current equipment costs.

The Research Infrastructure (Equipment and Facilities) programme underpins the development of links between the Australian national innovation system and innovation systems overseas by supporting Australia's participation in major cooperative international ventures. For example, it is one source of funding for Australia's participation in the Gemini 8 Metre Telescopes Project. This project is a collaboration between the Australian Research Council, the science funding agencies of the United States, the United Kingdom and Canada, and funding agencies in Chile, Argentina and Brazil, to build two of the largest optical-infrared telescopes in the world. Participation in projects such as Gemini is critical if Australian researchers are to maintain their position at the forefront of international research.

A sound infrastructure is important not only in supporting high quality research projects but also in order to train the next generation of researchers to world class standing to maintain our international competitiveness. Research is an international activity and a failure to maintain an adequate research infrastructure would run the risk that an increasing number of our most able and ambitious students will choose to undertake their research training at universities with superior equipment and facilities in countries overseas.

Furthermore, as the Dearing Report [9] observed, decisions by multinational corporations to undertake collaborative activities with universities are sensitive to the breadth and quality of the available research infrastructure. To ignore the deficiencies in research infrastructure in Australia would run the risk that such companies will relocate their activities to national innovation systems overseas.

The allocation of funding for research infrastructure

The Australian Research Council believes that there is a need to enhance the contribution that investment in research infrastructure makes to the national innovation system by rationalising the allocation of funding. This would encompass changes to the mechanisms for distributing funds and for ensuring accountability in the spending of those funds by universities.

The Council believes that it would be preferable for project related infrastructure support to be attached to individual project grants awarded to universities, rather than through Research Infrastructure Block Grants as at present. This would address the tendency for

universities to spread infrastructure funds too thinly, undermining their impact and long-term effectiveness. It would also respond to the criticism that infrastructure support funds are not always directed adequately by universities to support projects that have attracted grants to cover their direct costs only.

At the same time, the Council recognises that universities must have a degree of discretion over how their research money is spent. If infrastructure funding is tied too closely to individual grants, then its strategic potential may be seriously undermined. It is legitimate for universities to expect to be able to have some discretion to deploy infrastructure funds according to their own strategic research priorities.

The Council believes that the tension between the need for infrastructure support to be attached to individual project grants and the need to allow universities discretion in distributing infrastructure funds can be resolved by instituting appropriate accountability procedures to make universities' spending of their research budgets more transparent. This would allow the Council to monitor more effectively the infrastructural support being given to projects funded through its programmes and to ensure that the temptation to fund research activity at the expense of proper investment in infrastructure is avoided. In turn, this would enable the Council to be more accountable to the Government for its research funding outcomes. The Council accepts that such accountability would be necessary for it to operate effectively as a more independent body. The accountability for and transparency of research infrastructure funding will be considered as part of a review of the Research Infrastructure Programme being commissioned by the ARC/DEETYA Research Evaluation Committee.

A more strategic approach to investment in research infrastructure

As noted above, the Australian Research Council is of the view that the national research and development effort within the national innovation system would benefit from more coherent direction setting through better coordination of priorities across government portfolios and between public research institutions and industry.

It is evident also that research, particularly in the fields of science, engineering and technology, is becoming increasingly expensive. It is an international activity and Australian researchers are working in an increasingly competitive global environment. In these circumstances, Australia cannot expect to excel in all research fields and Australian universities cannot expect to be funded for research in all areas.

In this context, the Australian Research Council supports the adoption of a more strategic approach to investment in research infrastructure which is more responsive to changes in research and development priorities over time within the national innovation system. One element to this, as discussed above, would be a transition from the current block funding of project-related infrastructure to a mechanism that attaches infrastructure support to individual project grants. In this way, any development of structural research priorities through changes to the distribution of funding for projects across programmes would automatically also be reflected in the distribution of funding for research infrastructure.

Another element would be enhancements to the strategic role of Research Infrastructure (Equipment and Facilities) Grants. For example, grants could be used to offer wider incentives for industry, universities and other public research institutions such as the CSIRO to cooperate in the purchase and use of major facilities and equipment to support their collaborative research activities. They could also be used to support joint funding initiatives with other government portfolios in circumstances in which there is a commonality of strategic objectives.

Such initiatives would be guided by the sorts of approaches to national priority setting discussed elsewhere in this paper. These include better coordination of priority setting through more active consultations between the Australian Research Council, other government portfolios, industry, universities and other public research institutions and the establishment of specific funding programmes to focus on encouraging innovative research in strategic areas of national importance.

The effectiveness and coherence of the allocation of Research Infrastructure (Equipment and Facilities) Grants could be increased if they were located within an umbrella programme that had a focus on strategic innovation and that was overseen by a committee with a membership expanded by one or two members to include not only representatives from universities but also from industry, public research institutions such as the CSIRO and relevant government portfolios.

Balance between competitive projects and block grants – research funding models

Competitive block grants comprise the Research Quantum component of university operating grants, Small Research Grants, postgraduate awards and Research Infrastructure Block Grants. The allocation of these grants is formula-based, using indicators of activity and income. They are only competitive by proxy, in that competitive grant income is a component of the formula.

There are sound reasons for block grant funding for university research within the operating grant. The Industry Commission noted in 1995 that such funding allowed universities to reflect their institutional priorities, particularly in relation to research, which supported their teaching and research training activities [10]. Block funding can also allow institutions to pursue programmes of longer-term basic research and to foster innovative research that may not be competitive in a peer review system. The Industry Commission's view was that other objectives of research are "…best achieved through selective, competitive grants based on the relative merits of different researchers, programmes and institutions." It concluded by "…endorsing recent approaches to funding of university research which have seen a shift away from use of the operating grant towards the funding of institutions and research projects on a selective basis." [11] Competitive programmes associated with peer review are essential in supporting research of the highest quality and ensuring international validity of Australian research.

The Committee's discussion paper states that under current arrangements "…approximately $200m is allocated annually through a range of peer-reviewed programmes and a further $425m is allocated through competitive block grants"

(p. 135). Two of the three models for future research funding that it canvasses involve new block grant funding, including the Research Quantum component of university operating grants, with a reduced project grant programme. The discussion paper asserts that "…the balance between project grants (allocated primarily on the basis of peer review) and block research grants to institutions appears to have tipped too far in favour of project funding" (p. 26). No evidence is provided to support this view.

The only rationale offered in the discussion paper for shifting funding from a competitive to a formula basis is that of administrative efficiency. In particular, the costs of peer review are cited as being large in relation to the value of project grants. Whilst the Council recognises the need to address administration and accountability issues (see Part 1), it does not accept the view that peer review is simply an opportunity cost. The benefits of peer review include the sharing of ideas and information, the improvement of research through professional scrutiny and the generation of credibility for the allocative process. The cost is willingly born by institutions as a legitimate use of academic time in the research process. The discussion paper notes the distortions inherent in shifting resources from an already strained peer-reviewed project grant system to formula-based block grants that in turn rely on peer-reviewed grant success as an indicator. It nevertheless proposes that such a transfer should take place.

The Council does not believe that it is appropriate to determine the relative size of programmes on the basis of administrative considerations alone. The size of block grant programmes should be judged in relation to structural priorities and the objectives of those programmes. In the case of the Research Quantum, this is intended to provide a broad underpinning for research in the support of teaching - hence its allocation through universities' operating grants. The balance between this component and selective research funding mechanisms needs to take into account the balance of teaching and research within universities and the relative importance of institutional research priorities and those of the national research system. Research Infrastructure Block Grants are to provide project-related infrastructure for competitive project grants and the discussion paper itself recommends that these be combined with the competitive grant system in a way that ensures an appropriate level of direct infrastructure support (p. 133).

Selectivity in the allocation of research funding has its basis in the objective of supporting research of the highest quality. For funding programmes that are competitive in their allocation, this is best determined through peer review. Peer review is recognised internationally as the best mechanism for assuring research quality. It is therefore essential to maintaining a high quality knowledge base within the national innovation system and to ensuring international validity and accreditation for Australian research. Peer review also provides a mechanism for the sharing of knowledge among researchers.

The effect on the national research system of increasing block funding relative to competitive peer-reviewed funding needs to be considered. At present the formulae for allocating block grants are based heavily on success in securing competitive grants. With the distortions noted above, there is a risk that a spiral effect could occur, locking resource allocations in to a limited number of institutions with negative implications for the diversity and strategic direction of the national research effort. In such circumstances it will be crucial to ensure that an element of contestability is introduced. The discussion paper suggests that this could be achieved by reallocating the grants every three to four

years "…on the basis of performance against key indicators (including measures of quality of research outcomes)". If based on indicators alone, this could do little more than substitute one formula for another and so might only increase administration without enhancing contestability.

An alternative might be to pursue a larger peer review exercise as has been undertaken in the United Kingdom. The benefits and shortcomings of the UK Research Assessment Exercise have been examined with a view to assessing the feasibility of introducing a similar exercise in Australia. It was concluded that such an exercise would not be cost-effective in the light of the size of the existing block grant allocation and the size of Australian research community: "…a likely and undesirable effect of adopting a RAE system in Australia would, therefore, be that a small set of institutions would be reviewing the rest of the system, including that small set of institutions." [12]. The Council does not consider that such an exercise would be feasible even if the block grant proportion were increased to 10 per cent of operating grants. It notes that this would still represent considerably less than the (approximately) 60 per cent of operating grants of some university operating grants on which the RAE exercise is based [13].

The Council considers that the relative size of research programmes should be determined in accordance with structural objectives and not simply based on considerations of the administrative costs of allocation. Further work is needed to determine appropriate methods for allocating block grant funding for research, including options for improving contestability.

The Council believes that to increase block funding at the expense of funding through nationally competitive grants subject to national and international peer review would cause a decline in the quality of Australian research and therefore undermine the credibility and standing of Australian research internationally. As discussed elsewhere in this paper, the Council believes that the more pressing need is to address the declining success rate for applications for funding under the Large Research Grants Scheme so as to more fully utilise the innovative capacity within the higher education sector.

Research Training

The Australian Research Council is concerned to ensure that students undertaking research higher degrees do so in an environment that:

- ensures high quality supervision;
- ensures suitable research infrastructure; and
- encourages mobility between universities.

Research training requires financial support for individual research students through the offering of scholarships and a research environment that offers qualified supervision from people with relevant knowledge and experience who are active researchers in their particular field, access to necessary materials such as equipment, libraries and computers, and a peer culture among students.

The Council has a responsibility to ensure that scholarships provided under the Australian Postgraduate Awards and Australian Postgraduate Awards (Industry)

Schemes are awarded to the best students on academic merit across all disciplinary fields and that the allocation of scholarships to universities takes into account the quality of the research environment available to students. Research training is likely to be most effective when high quality students are located within high quality research environments. To date, the Council has worked successfully in partnership with universities to achieve this.

Australian Postgraduate Awards and Australian Postgraduate Awards (Industry) are allocated to universities according to a formula that recognises higher degree research load (40 per cent), higher degree research completions (20 per cent) and research income and publications (40 per cent). The purpose of the formula is to align the allocation of scholarships with the extent and quality of the research training environment within universities.

The Committee's discussion paper raises concerns expressed previously by the Council in its submission to the *Review of higher education financing and policy* about the difficulties in maintaining the quality of research training in the face of declining resources and the need to ensure career paths for talented young researchers.

Since the establishment of the unified national system of universities in 1987, all Australian universities have been engaged in research training, awarding bachelor degrees with Honours, Masters degrees by research and PhDs. There has been a very substantial expansion in the level of research training undertaken in universities, so that in the decade 1986-95 higher degree research completions rose 238 per cent from 1,792 to 4,272 per annum, with 26,500 completions for the decade.

Growth in research higher degree load for the unified national system as a whole has been very rapid in recent years, but even more marked in the post 1987 universities, where it has averaged 31.6 per cent per annum between 1989 and 1995. This growth has not been matched by an increase in research income and discrepancies between higher degree research load and research income for these universities raises questions about their ability to maintain a high quality environment for research training. To address this issue, the Council believes there is a need for a quality assurance framework to ensure that the quality of research training is maintained.

The Committee's discussion paper proposes a student centred system of research training with funding of research training via portable scholarships. It is not clear how the changes proposed will address the issue of quality.

There are a number of other concerns that need to be taken into account in considering changes to the current system. The proposed introduction of a student centred mechanism for funding research training implies that portability of scholarships is a problem. However, under current arrangement students are able to apply for a scholarship through the university they have selected and then to move between institutions taking the scholarship with them.

Mobility of researchers between institutions has been limited but the Council does not consider that the proposed changes will rectify this. A lack of mobility is more related to student and institutional preference than to rigidities in financing mechanisms. The

Council proposes to enhance mobility through the provision of better information to students about research study options and through incentive mechanisms. One option would be to extend the duration of scholarships for study at a different institution.

The allocation of postgraduate scholarships is closely linked to the need to consider the issue of research environment and resource provision. These are matters over which prospective individual students have no control, but which are critical to their success and consequently may be considered as an argument for institutions to play a role.

The introduction of a student centred model assumes that prospective research students know what they need in terms of research environment and research support in their particular area of study in advance and can assess the capacity of universities, of which they have no first hand knowledge, to provide these. The Council believes that this is highly unlikely in the current environment and notes that improved information to students about the hosting and supervision capacity of universities would be a necessary component of any moves to establish a student-centred model of financing research training.

The report implies that a student centred model would be an effective way of ensuring that universities (or at least those which want to attract research postgraduate students) increase or improve the teaching and research they provide. However, the provision of these supports in any particular area requires a prior commitment and resources allocation by the university, based on strategic priorities rather than being a student activated process.

The report also notes that for such models to work, some system of nationally ranking applicants would be needed. The interim model proposes that this be adopted for honours students through the adoption of an index which assesses research performance and the quality of research supervision. The Council notes that it is unclear how such an index could be used to convert university rankings to a national basis, and that acceptable measures of the quality of research supervision have yet to be developed.

The Council endorses the discussion paper's emphasis on teaching as a necessary part of research training, on quality of supervision, and on the importance of coursework elements in postgraduate research programmes.

References

[1] Professor John Stocker, *Priority Matters*: A report to the Minister for Science and Technology on Arrangements for Commonwealth Science and Technology, by the Chief Scientist, Canberra, June 1997

[2] ibid, p33

[3] Industry Commission, op.cit., p23

[4] Professor John Stocker, op.cit., p30

[5] Australian Research Council, *The Likely Profile of Research for Social, Economic, Cultural and Environmental Benefits in 2010*, 1995

[6] Australian Research Council, *Funding Strategies for Basic Research: Part 2 Balance of ARC Funding Across the Disciplines*, 1996

[7] ASTEC, *Matching Science and Technology to Future Needs: 2010*, 1996

[8] Report of the Sub-Group on Higher Education Research Infrastructure (SHERI)

[9] Report of the National Committee of Inquiry into Higher Education (the Dearing Report), 1997

[10] Industry Commission, op.cit., p21

[11] Industry Commission, op.cit., p22

[12] National Board of Employment, Education and Training, *Evaluating University Research: The British Research Assessment Exercise and Australian Practice*, Australian Research Council, Commissioned Report No. 56, 1997, p28

[13] ibid., p26

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