New Knowledge, New Opportunities

A Discussion Paper on Higher Education Research and Research Training

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Foreword

Australia’s capacity to generate new knowledge is fundamental to the strength and health of our society. It must underpin our economic growth and our capacity to effectively solve social problems. It is necessary to ensure that we continue to make a significant contribution to a more humane and progressive world, and that we can share in the advances in knowledge taking place in other countries.

The existing framework for Commonwealth support of higher education research and research training was put in place over a decade ago. It is timely to review and reform our approach to ensure we realise the economic and social benefits of the knowledge created and developed in our research institutions. As we move into a new century we must ensure that Australia’s research and research training system keeps pace with the global revolution in knowledge production and use, is attractive for research and development (R&D) investment, and provides opportunities for our best and brightest research talent.

We are living today in the midst of two great research-based technological revolutions: in information technology and in biotechnology. Provided our research is conducted within an entrepreneurial culture and within settings which effectively address issues of intellectual property and encourage investment, there is no reason why our research strengths cannot lead to many new enterprises and the jobs that will accompany them. Such spin-offs are also possible from other research domains as well. Research that is responsive to the needs of industry and developed in a collaborative way should also help create an entrepreneurial climate attractive to venture capital. Our universities have a key role to play in securing these benefits, both nationally and within their regions, and the proposals in this paper are designed to facilitate and encourage this role.

Australia’s public investment in research is large by world standards, and private investment is growing, but our national research effort is still only a relatively small proportion of world investment. It is essential that we maximise the gains from the resources we have available—making sure that we do not spread our efforts too thinly, that we take priority setting seriously, that we are conscious of the need to build up critical mass in areas of opportunity, and have rigorous incentives for excellence. The proposals in this paper aim at these objectives: encouraging strategic focus within the research effort and rewarding those who provide excellence in research and research training.

The centrepiece of the drive for excellence and innovation in this paper is an invigorated and strengthened national competitive grants system based on investigator initiated research. The key is a restructured Australian Research Council providing strategic advice to government and administering more
flexible programmes with strengthened capacity to encourage innovative research linked to industry. The Chair of the present Council, Professor Vicki Sara, has played an important leadership role in the development of the proposals in this paper and I express my thanks to her.

The other major pillar of the policy framework set out here is an enhanced strategic and priority setting role for institutions, both in relation to research and research training. Under the proposed funding arrangements, institutions will be rewarded for their achievements in attracting research-related income from all sources (including industry) and for their success in attracting research students through the quality of their research training achievements. A system of portable research scholarships will give Australia’s brightest young researchers the opportunity to select the best institution for their crucial training years, providing a powerful incentive for excellence in these environments and challenging institutions to identify their areas of excellence.

The policy framework set out in this paper provides incentives for increasing diversity in research patterns and plans. Australia is a large and diverse country and it is entirely appropriate that our research effort reflects this unique character and builds on its opportunities. Regional universities have a vital role to play in regional economic, social and cultural development. Clear strategic plans which are conscious of the needs of and opportunities for regional industries will provide the framework for effective and dynamic research development in which universities can be regional leaders in stimulating business growth and new enterprises, and in supporting vibrant regional societies. The proposals in this paper, while confronting all institutions with the challenge of being excellent, provide the basis for regional research missions which can be of immense benefit in spreading prosperity.

In its report to the Government on *Learning for Life: Review of Higher Education Financing and Policy*¹, the Committee chaired by Mr Roderick West canvassed a number of issues about research and research training within our universities. That committee identified the need to develop greater flexibility and responsiveness in the policy and funding framework for universities. We need a framework that will encourage and support collaboration, accompanied by the exchange of technology and information, across the academic, industry and community sectors, between research institutions and users, research providers and business, across institutions and the nation and internationally. The Government believes that a broad ranging discussion within the research and wider community on the policy framework for research and research training is the best way to develop this framework.

This paper complements the Government’s initiatives announced recently in biotechnology, and health and medical research. It reflects this Government’s commitment to ensuring that Australian research is at the cutting-edge of world research activity. The proposals canvassed in the paper are intended to benefit all parties participating in the generation and application of research—research students, researchers, institutions, industry and the community. In issuing this

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paper on the policy framework for research, the Government is canvassing ways that research and the provision of research training can be enhanced. We invite comment from interested parties on how best to progress the reforms that are needed. The direction set for higher education research now will influence Australia’s performance for years to come. We welcome your participation in the process.

The Hon. Dr David Kemp MP
Minister for Education, Training and Youth Affairs
30 June 1999
New Knowledge, New Opportunities
1 Higher education research: a national investment

The importance of research to Australia

1.1 Knowledge is fast becoming a key factor determining the strength and prosperity of nations. Research—as a key source of knowledge and new ideas—is central to success in the new ‘knowledge economy’. Those nations with strong research systems will be well placed to prosper both economically and socially.

1.2 The vital importance of knowledge to a country’s economic health and living standards is now widely recognised internationally. Investments in the generation and transmission of knowledge—in the education and training of young people, in updating skills and know-how of the workforce, and in the generation of knowledge through research—are increasingly accepted as an essential requirement for a nation’s long-term growth and competitiveness. Equally important is the capacity to innovate, to apply knowledge to productive ends and to exploit the benefit of new ideas.

1.3 These observations carry particular force for a country such as Australia. In an environment increasingly influenced by international and global factors, Australia is making a major transition from an economy based on the wealth of its physical resources and commodities to an economy which draws its competitive advantage from the skills and creativity of its people. The success of that transition will profoundly influence the quality of life for all Australians: the availability of jobs for our young people, the quality of working life for those in employment, and the living standards of Australian families. Critical to success will be our national ability to innovate—to generate knowledge, ideas and technologies through high-quality basic research and the commercial development of its findings, and to link effectively with knowledge generated elsewhere in the world.

1.4 The capacities of individuals to propose interesting ideas and a funding base adequate to support long-term basic research are fundamental to underpin the discovery of fresh insights and knowledge. In its policy statement, Investing for Growth, the Government has made it clear that it sees innovation as crucial to Australia’s future economic security and prosperity, and that the generation of knowledge through scientific and technological research must be a vital component of the national innovation system. Equally, the Government recognises the important role of research in other fields—in the arts,

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2 World Bank, 1998 World development report
4 Department of Industry, Science & Tourism 1997, Investing for growth: the Howard Government’s plan for Australian industry
humanities and social sciences—and its contribution to the shaping of our national culture, society and institutions, as well as to economic innovation.

1.5 Research in fields such as marketing, communication, business and law will be important if we are to take full advantage of the commercial opportunities created by new developments in science and technology. Just as important, research will play a major role in assisting societies to manage the consequences of continued rapid change, including managing the social changes and adjustments flowing from the transition to a knowledge-based economy. High-quality social research, for example, will be vital to dealing with the ethical issues arising from developments in biotechnology; to preparing citizens for the changes flowing from the rapid growth in information and communications technology; and to ensure that there is not a widening gulf between the ‘information-rich’ and ‘information-poor’.

1.6 Research in the humanities and social sciences makes a major contribution to our sense of identity and cohesiveness as a nation. It promotes an appreciation of our culture and history; fosters an understanding of different traditions and customs, and of the importance of tolerance and respect; and stimulates and informs debate on the goals, directions and values to which our democratic society aspires.

1.7 Research of this kind helps to promote—indeed, is itself a mark of—a civilised society. Increasingly, citizens are required to take or at least to sanction complex decisions. The quality of our democratic process is coming to depend more and more on our ability to generate and make effective use of advanced knowledge and to develop policy analysis based on this knowledge.

The changing environment for research

1.8 The nature of knowledge creation is changing, not only in Australia but internationally. While the inspiration and persistence of individuals will always remain the foundation stone of discovery, breakthroughs do not occur in a vacuum. Increasingly, the important questions for research are not based on disciplines but on issues or problems, demanding multi-disciplinary research solutions. As a consequence, there is now a growing emphasis on teamwork in research and complementarity of skills, with many networks of researchers pooling their diverse talents in a flexible way to pursue a common goal.3

1.9 At the same time, the traditional distinctions between ‘pure’ and ‘applied’ research are rapidly breaking down. While research unconnected to an ultimate use must continue to have a prominent place in our research institutions, there is no longer a simple one-way flow from ‘basic’ to applied research; rather there is a constant and increasingly rapid interaction between the two, with applied research efforts often generating questions which can only be answered at the ‘basic’ level.

1.10 The locations of research activity are also changing, and knowledge generation is increasingly crossing the traditional boundaries between institutions and sectors. For example, in addition to their traditional task of generating knowledge, universities now receive and transform knowledge. At the same time, the primacy of the universities in basic research is being strongly challenged in a variety of fields such as the computer sciences, many applied sciences and engineering where the emphasis is on application of research.\(^6\) There is an increasing role for applications-driven approaches in many spheres of research, and a growing share of the national research effort is occurring in commercial settings. These trends are particularly pronounced in the fields of science and technology research, but are by no means confined to them; similar trends can also be observed across a range of the social sciences and humanities.\(^7\)

## The need for an international perspective

1.11 Research has always been a global enterprise. International publication and peer review has been central to maintaining excellence and the free flow of knowledge. This globalisation is increasing with the advent of the knowledge economy, involving international partnerships through the exchange of personnel, shared infrastructure and collaborative projects across national boundaries. A world survey by the National Science Foundation in the United States found a sharp rise in the percentage of research papers that were internationally co-authored: overall, from 13.4 per cent in 1981–87 to 20.4 per cent in 1988–93; and in Australia from 15 per cent to 22 per cent over the same period. International networks are particularly important for a country of Australia's size and location if we are to gain access to the great bulk of research which is conducted offshore. Strong international links also provide market opportunities for promoting and developing Australian ideas, discoveries and inventions. Australian researchers and research organisations have long recognised the value and importance of these linkages to the excellence of their research endeavours, evidenced in the substantial increase in overseas science and technology linkages by the Australian higher education sector over the last 15 years.\(^8\)

1.12 The new information and communication technologies are providing increasing opportunities for Australia to become better integrated into the emerging global economy. No longer is geography, language or time-zone a limitation to participation in the global market for ideas.

1.13 In this globalised environment for research, Australia needs to be able to attract and retain the best and brightest researchers. While Australia is currently benefiting from a net 'brain gain', through the net immigration of over 30 000

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\(^7\) Academy of Social Sciences in Australia 1998, *Challenges for the social sciences and Australia: volume 1*, Australian Research Council Discipline Research Strategies, National Board of Employment, Education and Training

\(^8\) Australian Academy of Science & Australian Academy of Technological Sciences and Engineering 1997, *International science and technology: its value to Australia and the role of the Academies*, Canberra, p. 6
academics, scientists and engineers between 1987–88 to 1995–96\(^9\) there is an increasing trend for Australian-born academics, scientists and engineers to leave Australia on a permanent or long-term basis for professional reasons. Between 1982–83 and 1990–91, there was a net loss of 13 639 Australian-born professionals who departed Australia on a long-term or permanent basis.\(^{10}\) The Wills Strategic Review of Health and Medical Research has also identified the need to develop incentives to entice young researchers to return to Australia after completing further training overseas.\(^{11}\)

1.14 In combination, these profound changes in the external environment carry major implications for education policy in general, for the research endeavours of all Australian universities, and for our national research efforts as a whole. Those implications go to the skills which university researchers will need to be effective in the new environment; to the relationships which they will need to forge, not only with their traditional academic colleagues but also with researchers from other disciplines and institutions and with industry; to the quality and breadth of the training opportunities provided to young people beginning a career in research; and not least, to the way in which research in our universities is planned, managed, delivered and funded.

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**Funding of research: the importance of commercialisation**

1.15 Compared with other advanced economies, Australia is a mid-ranked performer in terms of total expenditure on R&D. Among 24 economies (of which 20 were from the OECD) included in a recent survey, Australia ranked twelfth in terms of gross domestic expenditure on research and development (GERD) and thirteenth in terms of the ratio of GERD to gross domestic product (GDP).\(^{12}\)

1.16 However, Australia differs from other nations in that it has a relatively high level of R&D expenditure in government research organisations and universities and a comparatively low level of business expenditure on R&D.

1.17 Australia had the third highest ratio of public R&D expenditure to GDP (0.86 per cent of GDP) of the countries included in the above mentioned survey. In recent years Australia has progressively increased its level of direct government expenditure on R&D.\(^{13}\)

1.18 The Government accepts the need to fund good researchers undertaking high quality research which may have no immediate social or economic payoff. At the same time, there must be structures and incentives in place which

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\(^9\) Department of Industry, Science and Tourism 1997, *Australian science and technology at a glance*, AGPS, Canberra, p. 10

\(^{10}\) Hugo, G. 1994, *The economic implications of emigration from Australia*, AGPS, Canberra, p. 110

\(^{11}\) Health and Medical Research Strategic Review 1999, *The virtuous cycle: working together for health and medical research* Ausinfo, Canberra, p. 77


ensure that Australia gains the maximum benefit from its investment in research and capitalises on the innovations and discoveries of Australian researchers. Whereas Australia has consistently performed highly in many fields of basic research, it has lagged significantly in commercialising the findings of that research—i.e. in turning them to economic advantage through business and trade. Too often the commercial benefits of Australian research have been reaped offshore.

1.19. There are many requirements to be met if Australia is to lift its performance in this critical area. Improving the availability of venture capital is one: in too many cases we have failed to commercialise promising research discoveries because small, highly innovative firms have struggled to attract funding for the early stages of commercial development. It is important we have a taxation system which is internationally competitive, and perceived as such by overseas investors; without this, investment funds will be diverted from Australia for no other reason than the prospect of higher returns available elsewhere in the world.

1.20. Among other key requirements, we need to strengthen Australian access to overseas technology and international markets; to develop our skills in the management of intellectual property; to foster an environment conducive to the growth of small and medium enterprises; to remove unnecessary regulation and red tape; and, not least, to promote a national culture which encourages creativity, values entrepreneurship and rewards risk-taking.

1.21. The Government has already embarked upon policies to deal with these needs. In the area of venture capital, for example, it has recognised the importance of encouraging new high-technology businesses and the need to develop systems to finance them; its Innovation Investment Fund programme, in particular, is a direct response to that need. In commissioning the Ralph Review of Business Taxation, the Government has made clear its objective of developing a business tax regime which promotes investment, exports and jobs and improves the capacity of Australian business to compete internationally. The Cooperative Research Centres and Strategic Partnerships with Industry – Research and Training (SPIRT) programmes have not only been an important source of innovation in research but also, through promotion of stronger links between research institutions and business, a significant spur to commercialisation and culture change.

1.22. In these and other ways the Government has recognised the importance of commercialisation and acted to encourage it. In this area especially, however, responsibilities for action extend well beyond the Government alone. The business sector clearly has a role to play. Business expenditure on R&D in Australia is low relative to comparable nations. In 1997–98, business invested just over $4 billion in R&D, or 0.72 per cent of GDP, compared to an OECD average ratio of over 1 per cent. While investment in R&D by business in Australia has improved markedly since the early 1980s, this investment has declined over the past two years. Business must lift its own level of investment

15 Australian Bureau of Statistics, 8104.0 Research and Experimental Development, Businesses, Australia, 1997–98
in research—a level which is low by international standards. It must also become more aware of the commercial opportunities created by institutional research, and become more adept at exploiting these.

1.23 The Government is addressing the issues of business investment in R&D. In its 1997 statement, *Investing for Growth*, it announced a series of initiatives to create a climate which encouraged business R&D. These included increasing support for business research and development and the commercialisation of that research, and substantially increasing targeted support for innovation with the provision of $1 billion over the four years from 1998–99.

1.24 A further factor that affects business R&D is the current taxation system. This may have an adverse impact on the availability of venture capital for investment in business R&D. Both the Review of Business Taxation and the Wills Review have received submissions which have advised that the taxation of capital gains in Australia penalises investment and management participation in high technology start-up companies and emerging industries such as biotechnology. The Wills Review also identified a number of other instances where the current treatment of capital gains tax and other taxation incentives inhibits both Australian and overseas superannuation funds from investing in Australian private sector research. The Review of Business Taxation is currently examining options for the treatment of capital gains tax in relation to these matters.

1.25 While a key strength of Australian institutions lies in basic or fundamental research, institutions too have an important responsibility to foster an environment which is conducive to effective commercialisation. There are two major challenges for our institutions in this regard. Institutions need to create a more entrepreneurial culture within their own domain: they need to recognise the importance of commercialisation to our national economic and social interest; to value effective linkages with the business sector; and to recognise that knowledge and utility should be complementary, rather than competing, objectives. The other, related challenge is to put in place the structures and internal management arrangements which can give effect to a set of cultural objectives along these lines. In many cases this will require a review of institutional arrangements for the management of intellectual property, the employment and remuneration of staff, and the sharing of benefits from commercial ventures between institutions, individual researchers and third parties.

1.26 Since its election in 1996, the Government has continued to support a high base of R&D in the higher education sector. In its first budget, the Government announced additional funding of over $120 million over four years for targeted research programmes and has provided additional support for collaboration with industry, additional Australian Postgraduate Awards and Australian Postgraduate Awards (Industry) scholarships and increased funding for research infrastructure. In the 1999–2000 budget, an additional $93.3 million

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18 Health and Medical Research Strategic Review 1998, *The virtuous cycle: working together for health and medical research*, Department of Health and Aged Care, Canberra, p. 149
is being provided over three years for research infrastructure and an additional $58.1 million over three years for the Strategic Partnerships with Industry – Research and Training (SPIRT) Scheme.

1.27 The 1999–2000 Budget also provided additional funding to put Australia at the forefront of health and medical research, with an injection of $614 million over the next six years. By 2004, this will have doubled the existing research funding of the National Health and Medical Research Council. The Government has recognised that biotechnology is one of the most important revolutions of the modern age, and is developing an integrated strategy for development and advances in this field; the additional funding for the National Health and Medical Research Council reflects this priority.

The research role of Australia’s universities

1.28 Our universities play a vital part in the national research and innovation system. They are major contributors to the generation and transmission of knowledge in Australia. Many of our leading university researchers have world standing in their fields of research, enhancing Australia’s reputation as a serious and credible contributor to the global development of knowledge. Our universities play a critical role, unparalleled by any other research organisation, in the selection, training and professional development of Australia’s researchers of the future.

1.29 The higher education sector accounts for some 27 per cent of national expenditure on research and development, and 78 per cent of all expenditure on basic research. It is a major employer of research personnel, accounting for well over half of Australia’s total research workforce.\textsuperscript{20} In addition, our universities provide research training opportunities for more than 30,000 postgraduate students at any one time, of whom some 5,000 graduate each year.

1.30 Total expenditure from all sources on higher education research amounted to some $2.3 billion in 1996,\textsuperscript{21} of which 59 per cent was spent on basic research, 35 per cent on applied research and 6 per cent on experimental development. Public funding through Commonwealth grants accounted for some 88 per cent of all expenditure. Industry support for higher education research accounts for less than 5 per cent of total expenditure, but has grown steadily in recent years.

1.31 These are impressive statistics, and underline the importance of maximising the returns to the community from this major national investment.

\textsuperscript{20} Department of Industry, Science and Tourism 1997, Australian science and technology at a glance, AGPS, Canberra, p. 8

\textsuperscript{21} Australian Bureau of Statistics 1998, 1996 research and experimental development Australia, higher education organisations, 8111.0 (Categories based on OECD guidelines)
Strengths and achievements of higher education research

1.32 Measured against accepted international standards, Australia’s research activity displays many significant strengths. Its share of world knowledge production, as a proportion of world output of scientific publications over the period 1993–97, is some 2.7 per cent—an impressive achievement, relative to a share of world trade of about 1 per cent. The research output of Australia’s universities specifically is also well regarded internationally, despite some recent indication of a decline in citations of Australian scientific research. A recent evaluation study found that 61 per cent of research funded under the Commonwealth’s Large Grants Scheme—the principal source of competitive funding for university research—is considered to be at the forefront of international research in its field. A further 24 per cent was found to produce outcomes of high quality which are likely to exert an influence internationally.

1.33 Australia is recognised as having research strengths in such diverse fields as agricultural sciences, anthropology, astronomy, biological sciences, chemistry, engineering, geosciences, material science and technologies, mathematics, medical microbiology, oceanography, philosophy, soil and water sciences, and veterinary sciences. In the bulk of these fields, the citation impact of Australian research publications is well above world average. Australian research has also made unique contributions to the development of knowledge in areas such as telecommunications, computer animation, remote sensing, mining and mineral processing, Aboriginal culture, multicultural settlement, tropical ecology, sensor perception, marine sciences and Antarctic research.

1.34 Even this brief account highlights the fact that, whatever the limitations and deficiencies of our higher education research system, there are also many vital strengths which need to be preserved and developed. The Government will be sensitive to this in its consideration of any changes to the current policy and funding framework for university research.

The need for reform

1.35 Despite these many undoubted strengths, there is mounting evidence that Australia’s policy framework for higher education research has not kept pace with the rapidly changing demands of the external environment. Elements of
reform are summarised in paragraphs 1.36–1.50 below, and elaborated in following chapters.

**Strengthening linkages**

1.36 Research in our universities is too often disconnected from the national innovation system. Acknowledging that there are some outstanding exceptions, there are mostly only weak linkages between the producers of research and its users, especially in industry.

1.37 A key to successful innovation is the flow of ideas, creativity, skills and people between different parts of the overall innovation system—in particular, between the generators of knowledge in our universities and public research institutes and the private companies which create most of Australia's wealth. The interaction between the two has already been fostered, to mutual advantage and national benefit, through initiatives such as the Cooperative Research Centres and the SPIRT programme. Still more needs to be done to bring the providers and users of research together: to involve users more effectively in contributing their knowledge and experience to the research agenda; to promote collaborative research; and to commercialise the results of research conducted in the public sector. Government policy has an important part to play in encouraging and promoting such partnerships.

1.38 The benefits which can flow from successful linkages are well demonstrated by the prolific growth of high-technology firms—mainly small to medium-sized businesses—in regions adjacent to major universities, such as Boston and Silicon Valley in the USA, Cambridge and Manchester in the UK and Kyoto Research Park in Japan. An Australian example is the Australian Technology Park, situated near its three participating universities—The University of New South Wales, The University of Sydney and the University of Technology, Sydney. By the year 2005, the Australian Technology Park is expected to support some 7000 jobs.

1.39 Given the rapid changes in the nature of knowledge production, linkages will also need to be strengthened between the research activities of our universities and the planning and resourcing of the research training system; between the work of researchers from different but related disciplines; and between funding for research and the planning and provision of research infrastructure.

**Better institutional management of research**

1.40 The success of our national research effort relies not only on the quality of the work of individual researchers but also, vitally, on the institutional environment in which they operate. Important strategic decisions need to be made by our institutions about the areas in which their research will be concentrated; on their quality assurance processes for research; on the alliances to be formed with industry and other parties; on issues of intellectual property, copyright and consultancy income; and on the management and allocation of their institutional resources for research.
1.41 The current structure of incentives encourages all universities to be comprehensive research institutions, rewarding them for the breadth of research they undertake. As institutions struggle to remain competitive across many fields, as well as take up opportunities in emerging areas of research, there is greater call on an institution's limited resources, which may jeopardise the overall quality of Australia's research endeavours. If Australia is to be competitive in a global knowledge economy, we must be at world standard in every field in which we are research-active. This requires institutions to determine their own research strengths and concentrate available resources to create a critical mass of internationally reputable expertise. Institutions must be encouraged to set their own clear priorities for research and research training, as well as provide an environment that will attract the best researchers and postgraduate students in its chosen fields.

1.42 Many of our universities have recognised this need, and have acted to improve the planning and management of their overall research activity. Some, for example, have made strategic decisions to concentrate their efforts on particular areas of strength or potential excellence, and to direct their resources accordingly. Some have reviewed their employment arrangements, internal reward structures and intellectual property frameworks, encouraging entrepreneurship and strengthening the incentives for researchers to pursue commercial development of their work. Some too have moved to diversify their styles of research training, offering new opportunities to their postgraduate research students for collaborative work in multi-disciplinary project teams and experience in industry.

1.43 These are all promising developments, to be encouraged and supported. They are still, however, more often the exception than the rule. A primary objective of Government policy will be to advance and accelerate such progress across the higher education system as a whole.

**Improving research training**

1.44 There is an urgent need to improve the quality and effectiveness of the research training system. Many of our best graduate students find themselves frustrated and dissatisfied with the quality of their research training experience.\(^{28}\) They report that too often the training provided is narrow and limiting in its specialisation; poorly supervised; and out of line with the needs and expectations of employers. Many students feel trapped by their initial choice of specialisation, institution and supervisor, and find their options to change course extremely limited. Employers express dissatisfaction with the skills and narrow focus of many graduates.\(^{29}\) Not surprisingly, in these circumstances, the research training system is marked by high rates of drop-out and a significant waste of both talent and investment. Unemployment among


higher degree graduates increased appreciably over the decade to 1994 and has plateaued since.30

1.45 It is important also to recognise the increasing diversity of employment destinations of postgraduate research students, well beyond the traditional destination of a career in academia or in a professional research organisation. The rapid growth in the numbers of postgraduate research students over the past 10–15 years has far outstripped even the relatively strong growth in employment opportunities in those traditional avenues of employment. The result has been that, whether by choice or necessity, increasing proportions of graduating students have sought employment in non-traditional fields—especially in industry and the public sector.

1.46 For reasons such as this, countries such as Japan, Korea, Finland, Norway and Germany have reviewed and begun to reform their graduate training programmes. Details vary from country to country, but common objectives have been to broaden the base of the research training experience, strengthen the creativity, communication and problem-solving skills of graduates, and provide training opportunities and experience outside of the academic environment.31 Some Australian institutions, too, have experimented successfully in this direction, but the pace of change needs to be lifted across the higher education system as a whole.

**Improving programme integration, incentives, coordination and advisory structures**

1.47 More than a decade has passed since the current framework was put in place, following the 1988 White Paper on Higher Education.32 The structures and mechanisms established at that time are now under evident strain. Current funding arrangements involve a proliferation of funding schemes which not only lack coherence, taken as a whole, but are poorly articulated, unnecessarily complex and unduly fragmented. They are fragmented and inefficient, both in their design and in aspects of their administration. More fundamentally, however, there needs to be a better match between funding programmes and their underlying objectives, and a stronger set of incentives consistent with desired directions of change. Current incentive structures are out of date and, in some cases, severely flawed, tending to promote uniformity rather than diversity, and still offering too little encouragement for collaborative research. The design of many programmes encourages short-term grant-getting rather than long-term, strategic research.

1.48 These are all important challenges within the current system of university research. With the external environment changing rapidly, the pressures already evident will become even more intense unless the current policy framework is significantly improved. The following chapters detail a number of proposals for change in this respect.

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31 OECD 1998, University research in transition, pp. 63–67
32 Department of Employment, Education and Training 1988, Higher education: a policy statement, AGPS, Canberra
1.49 It is also timely to review the coordination and advisory framework supporting national policy in higher education research. The Government believes it is important to establish a new and more strategic role for the Australian Research Council, with greater emphasis on significant issues of national policy interest and a more streamlined approach to grants administration.

1.50 The goal must be to provide a policy and programme framework which will help our universities to maintain and build upon their traditional excellence in basic research while strengthening their links with the national innovation system, with Australian society more broadly and with the international research community. Reform should promote a national research system which is more diverse and outward-looking than the present system; offers stronger incentives and rewards for excellence; respects the autonomy of universities to manage their own affairs, but strengthens the current accountability framework for higher education research; enables universities to concentrate on their research strengths and to take advantage of emerging fields of research; and provides a broader and more rewarding range of training opportunities for young researchers.
2 Vision and principles for reform

A vision for Australian university research

2.1 The Government appreciates that the return on investment from research is long-term. The social and technological progress of humanity is underpinned by the discovery and dissemination of knowledge, critical scrutiny of argument and evidence, creative design, clever application and an entrepreneurial culture. A vigorous research base makes an essential contribution to a democratic, learning society.

2.2 A key purpose of the Government’s reforms to higher education research and research training is to ensure that Australia stays with the pace of global change in the generation and application of knowledge. Our researchers must be demonstrably world class and we wish to see Australian researchers active in and at the leading edge of the international exchange in knowledge. Our reforms will ensure that universities will continue to be places where discovery and creativity are fostered and encouraged, and places where ideas are discussed freely and critically in a spirit of openness and tolerance. Australian and overseas enterprises will seek to locate their research and development investments in Australia.

2.3 Students will have wider choice of quality research training environments. Our young researchers will be highly skilled, adaptable and entrepreneurial. Our research graduates will also be sought after for their abilities to operate anywhere in the world at standards consistent with best practice. Australia’s research training environments will attract quality international students.

2.4 Our research and research training system will be rich through the breadth and diversity of its specialisations. Our research institutions will be strategically focussed, more self-reliant and flexibly organised. We will see dynamic and extensive collaboration of researchers across disciplines, institutions and regional borders. Our universities will pursue diverse missions. Some universities will focus on achieving international excellence across a wide range of fields. Others will focus on excellence in niche areas—e.g. in serving the needs of their regions.

2.5 Our institutions will be able to respond quickly to new ideas and research opportunities. By being alert to emerging opportunities, more entrepreneurial in their own organisation and more responsive to business needs, institutions will attract more private investment. Their ability to develop new ideas and move quickly to apply them will create a reinforcing cycle of opportunities, investment and rewards which can be shared by individual researchers and research teams.

2.6 Institutions will have an operating environment that allows researchers to move easily between various settings, in collaborating across fields,
organisations, industries and countries. Institutions will be able to quickly pull together teams from a variety of settings to address new issues and opportunities. They will take advantage of specialist knowledge regardless of whether it exists within the institution or in a commercial setting. Their internal structure and employment arrangements will support this sort of flexibility. Institutions will then have scope to access revenue streams, royalty benefits, or equity shares for themselves and their researchers.

2.7 Our young researchers and our researchers-in-training will see worthwhile existing opportunities for themselves to make a contribution. They will be nurtured in an environment which provides relevant experience, delivers high quality learning and values creativity and talent.

2.8 Public funding for research will reflect the critical role that governments play in supporting basic research and nurturing a research culture. Public funding will encourage and support excellence across the breadth of the research enterprise, especially through the competitive allocation of grants for individual investigator-initiated projects on the basis of peer review and through mechanisms which encourage and support collaboration when necessary.

**Principles for reform**

2.9 The reforms to the framework for funding university research which the Government is proposing in this paper will be guided by a number of important principles which will give effect to the Government’s vision. These are, in summary:

- **Excellence**

  Arrangements for allocating public funds should focus on the achievement of world class research and research training to ensure that Australia develops and maintains high quality and innovative research which is respected in a global context. Flexible and responsive programmes should support the varied needs and opportunities of research. Institutions should be encouraged to concentrate their resources so as to build a critical mass in their particular strengths, thus providing the optimal conditions for maintaining excellence over the long term. Individual researchers and research teams should have access to an environment that fosters excellent research.

- **Institutional autonomy and responsiveness**

  Institutions should be free to determine how they function and contribute to the generation, preservation, transmission and application of knowledge, what research they conduct and how they conduct it, and whom they engage to undertake research and research training. The research base should be diverse in terms of the fields in which research is undertaken, the settings in which it takes place and the perspectives that inform its conduct. Institutions should be responsive to global market opportunities.
• **Student choice**

*Institutions should be responsive to the varying needs, interests and circumstances of students. Students should be able to make choices about where they undertake their research training, with whom they work and obtain supervision, what research they do while training, and the ways by which they undertake their research. They should be able to make informed decisions on the basis of knowledge about the range of institutional research environments available to them.*

• **Linkage and collaboration**

*The policy framework should encourage and reward the development of an appropriately entrepreneurial culture in which researchers and the various institutions collaborate among themselves, across the world and with other players in the innovation system. Collaboration should encompass the sharing of knowledge, technique, expertise and research infrastructure and take varying forms, including cooperative projects and student and staff exchanges. Universities should have policies and structures in place to facilitate the commercialisation of discoveries. Key among these is the development of an entrepreneurial culture among researchers.*

• **Transparency, contestability and accountability**

*The processes for allocating funds for research and research training should be competitive in nature, as simple as possible to administer, and be readily intelligible to researchers, institutions, students and the wider community. All funding allocation decisions should be free from conflict of interest. The claims made by researchers and institutions regarding their performance should be open to scrutiny and verification. Taxpayers should be able to identify how public funds have been used and to what effect. The true costs of research and responsibility for meeting those costs should be apparent.*
3

Roles and responsibilities for action

3.1 This chapter examines the roles of the key parties—the universities, national research agencies, their partnerships with the business sector, and the Government itself—in making best use of the public resources allocated to higher education research. Each of these parties has an important and distinctive role to play if the benefits of research are to be maximised in the national interest. Equally, the chances of success will be significantly boosted if collaboration occurs at all levels of a diverse and differentiated system.

3.2 The starting point is the need for a commitment to excellence. In an intensely competitive environment, research which is not of the highest quality is an opportunity lost. Arrangements for allocating public funds should promote excellence in all aspects of research: in the conduct of research and the quality of its output; in the environment and infrastructure for research; and in the delivery of research training to postgraduate students.

3.3 A key question is at what level, and by whom, judgements on excellence should be made. This in turn raises important issues of priorities within available resources.

The need for priorities

3.4 A country of Australia’s size cannot realistically hope to be excellent in all fields of research; rather, it needs to focus its efforts in areas where we can genuinely excel, against international standards, or where there are special needs which will not be met by others. Too thin a distribution of our research resources will quickly work against excellence; there is considerable evidence of the need for a ‘critical intellectual mass’ or ‘threshold effect’, particularly in the natural sciences, below which quality is affected and research performance reduced. In short, we need to focus resources and set priorities.

3.5 The importance of priority-setting is now widely recognised and accepted, both in Australia and internationally; the policy debate turns rather on issues such as who should set priorities; at what level; and in what balance—e.g. as between basic and applied research, short-term and long-term research, individual and team-based research, discipline-based and cross-disciplinary research, and among the arts and humanities, social sciences, natural sciences and technologies. These matters have recently been the subject of debate.

within Australia in the context of the Stocker Review of Science and Technology Arrangements, *Priority Matters*.34

3.6 Accepting that priorities need to be set, and resources appropriately focussed, the Government believes that this will best be achieved by decision-making at a number of levels. Allocative systems based on highly centralised priority-setting processes have a poor track record, even in a relatively stable environment, and are clearly unsuited to the dynamism of modern research. Given the rapidity and unpredictability of knowledge development, no-one—least of all governments and central funding agencies—can completely foresee the directions from which the new developments of the future will arise. While it will be important from time to time to identify some strategic priorities for research at the national level, overly prescriptive central planning is only likely to stifle the prospects for significant advances.

3.7 Clearly the nation benefits if research conducted within universities is related to the opportunities and competitive advantages which Australian enterprises display or are developing. Sometimes these opportunities are immediate; at other times they are longer term, requiring patient pre-competitive inquiry. The mechanisms which can secure this market responsiveness in the higher education research effort are diverse. They range from user representation on national research granting bodies and institutional councils to joint university–industry appointments of key researchers and market rewards for researchers in terms of equity in spin-off developments and in direct funding of research. They impose objectives and present opportunities for both the business and research communities. Both need to be active participants in the dialogue about where Australia’s research interests lie.

The strategic role of institutions

3.8 The great bulk of public funding for higher education research—well over $1 billion annually—is allocated to our universities in block grants for management and expenditure at their discretion. In one sense this is entirely appropriate, in so far as many decisions in research are best taken at the institutional level where they can be informed by the expert knowledge of the local research community. Equally, however, this substantial commitment in untied funding places a major responsibility on our universities to demonstrate that these resources are being spent to best advantage—not only through financial accountability but also, even more significantly, in terms of the quality of the development and production of knowledge through this investment.

3.9 The Government regards it as essential that each of our universities individually should form a judgement as to its particular strengths and capabilities in research, and how best it can contribute to the broader national research effort. The choices involved will often be difficult and complex, and may sometimes pose a significant management challenge within the

34 *Stocker, J. 1997, Priority matters: a report to the Minister for Science and Technology on arrangements for Commonwealth science and technology*, AGPS, Canberra
universities. Ultimately, however, both the national interest and the standing of the universities themselves will be well served if strategic judgements are made as to how best to focus limited resources.

3.10 It is important, nevertheless, that the autonomy of universities to make their own decisions in these matters be maintained, and the Government's approach to this issue will be through incentives rather than directives. It will encourage universities, through funding mechanisms and by other means, to pursue a more integrated, systematic and strategic approach to the planning of their overall research efforts; to focus on what they do best, and concentrate their resources accordingly; to forge more effective links both within their own institutions and with other institutions and industry; to better relate their strategies for the conduct of research and for the delivery of research training; and to monitor rigorously the quality of their research activities and outputs.

3.11 These issues are treated in more detail in Chapter 5.

**National competitive peer review**

3.12 The Government, through such bodies as the Prime Minister's Science, Engineering and Innovation Council, has a broad role in identifying and advising on research priorities at the national level. It has been quick to act as it identifies those national priorities, as has been the case with emerging industries such as biotechnology and information technology. However, the bulk of the curiosity-driven higher education research supported by Government through competitive funding is identified through the peer review process. While recognising the importance of national and institutional priorities, peer review encourages a diverse range of research activities across the nation and ensures a strong base of research into new fields of knowledge.

3.13 In recognition of this, virtually all of the major industrialised countries have put in place arrangements to support outstanding research through the direct funding of individuals, projects and programmes at the national level. While details of these arrangements differ somewhat from country to country, a common thread is the promotion of excellence through contestable processes based upon peer review. The Government accepts that, where decisions are taken at the national level, this is the best and surest way to guarantee the quality and international competitiveness of Australian research.

3.14 Australia already enjoys a strong system of contestable research along these lines, and the strengths of those existing arrangements need to be preserved. At the same time, there is significant scope to make current processes more efficient and effective, and to supplement them in ways which enhance the capacity of this system to respond to new developments and which promote a diversity of research activities, styles and modalities. Key priorities are a stronger emphasis on long-term, strategic research; greater incentives for cross-institutional, multi-disciplinary and collaborative research in all its forms; and a stronger voice for users in decisions on the allocation of limited funds. These matters are examined further in the next chapter.
3.15 A key strength of the competitive peer review system is the wealth and diversity of ideas and proposals generated by thousands of individual researchers across Australia. These investigator-led proposals, typically driven by a quest for deeper knowledge, provide a vital source of new ideas, fresh perspectives and creative approaches. It is essential to maintain this feature of the competitive grants process, and not in any way to limit or thwart it centrally. There must always be room for the individual researcher to bring forward ideas or proposals which may have escaped, or even be at odds with, the collective wisdom. While such considerations are especially important at the national level, they also apply at the level of individual institutions.

The role of Government

3.16 It is important to consider the role of the Government itself in support of higher education research. The rationale for that role is highlighted by several recent studies\(^\text{35}\) which point to high rates of ‘public good’ benefit from investment in research, beyond any direct commercial benefits which may accrue to immediate users. This, indeed, is the rationale for the Commonwealth Government’s major investment in higher education research.

3.17 While the Government does not conduct research directly through the education portfolio, it reserves the right to mark out some broad strategic priorities for the national expenditure of public funds in order to ensure that national priorities are properly met. For this purpose it relies on Prime Minister’s Science, Engineering and Innovation Council, the Australian Research Council and National Health and Medical Research Council and similar institutions to ensure that community needs are properly identified and brought to the Government’s attention. Biotechnology, for example, is one area in which the Government would wish to see greater focus at present, reflecting its potential significance to Australia. However, beyond identifying such strategic priorities, the Government does not see it as its own role to direct in any detailed way the areas for research or the terms on which research should be conducted. As explained above, these roles are properly and best performed by others.

3.18 It is, moreover, the legitimate and necessary role of Government policy to ensure that there is an environment conducive both to excellence in research and to the application of research outcomes in the wider national interest. This goes partly to the Government’s role as funder, in providing the resources needed for high-quality research which meets ‘national benefit’ or ‘public interest’ criteria. It goes also to the Government’s role in promoting public awareness and understanding of the importance of research to Australia, and in informing public debate on scientific or research-related issues of community interest or concern. Not least, it goes to the structure of incentives within the public policy framework; to the design and structure of funding programmes; to the promotion of excellence, including through competition; and to the encouragement of a national culture of enterprise and innovation.

\(^{35}\) OECD 1998, University research in transition, pp. 21-25
4 Reforming competitive programmes

4.1 The Australian Research Council together with the National Health and Medical Research Council are the main funding bodies in Australia for basic research. The role of the National Health and Medical Research Council is dealt with elsewhere. The Australian Research Council allocates funds within its charter to the country’s most capable researchers through a competitive process of peer review.

4.2 The open and competitive nature of the research funding programmes together with reliance on peer review provide an important mechanism for assuring the quality, international benchmarking and reputation of Australian research.

4.3 To strengthen Australia’s capacity to support high quality research, the Government believes that reforms to the Australian Research Council programme structure, assessment processes and organisational structure are needed to improve:

• effectiveness in achieving national goals and responsiveness to new directions in research in a rapidly changing scientific, economic and social environment;
• efficiency of the funding process; and
• greater transparency and accountability.

Improving effectiveness

4.4 The Government believes that investigator-initiated proposals and the associated processes of peer review are essential elements of the national research effort. The effectiveness of funding processes will depend on the capacity of the Australian Research Council to be flexibly organised and responsive to innovation and excellence in research proposals. To achieve this, the concept and practice of peer review needs to be enhanced.

Enhancing peer review

4.5 Enhancing peer review involves:

• improving the capacity to identify and fund excellent investigator-initiated research which falls outside traditional discipline boundaries or which is proposed by investigators with a limited track record;
• providing a greater role for users in shaping funding decisions; and
• improving the capacity of the peer review process to discriminate between high quality proposals.

4.6 Increasingly, the important and interesting scientific questions are not disciplinary ones but problem-based ones which demand cross-disciplinary research solutions. In addition, many ground-breaking discoveries often occur at the interstices of disciplines.

4.7 One of the limitations of the peer review process as it currently operates is its inherent conservative tendency arising from its disciplinary focus and emphasis on the track record of investigators. Whilst this is understandable given past patterns of research, a preference for known performers and research within existing boundaries may limit opportunities for the funding of innovative and breakthrough types of research, particularly by emerging researchers.

4.8 The peer review process needs to be flexible enough to rigorously and fairly evaluate the quality of proposals involving novel, innovative research directions and cross-disciplinary work. It also needs to protect the interests of early career researchers and others who, although lacking an extensive track record, appear to have the potential to contribute to breakthrough discoveries.

4.9 The National Science Foundation in the United States deals with these issues, in part, through the operation of its system of programme managers—typically scientists engaged by the National Science Foundation, either as visiting fellows or permanent staff. The programme manager plays a valuable role in identifying, monitoring and responding to key research developments and issues, especially of a cross-disciplinary kind. While it is not proposed to replicate the National Science Foundation model in the Australian context, given the wide differences in national circumstances and needs, this aspect of the National Science Foundation arrangements has potential to be adapted to Australian circumstances.

4.10 The engagement by the Australian Research Council of several visiting researchers, with experience in research management, as full-time programme managers working with a part-time expert advisory committee, would provide the Australian Research Council with greater flexibility and capacity to respond to emerging disciplinary and cross-disciplinary developments and innovative approaches to research.

### Increasing the role of users in defining the research agenda

4.11 The most effective way of determining the quality of research proposals is through review by experts in the relevant field(s) of research. The Government believes that the strengths of the peer review process must be retained, while taking account of the observations in 4.6–4.7.

4.12 While acknowledging that the benefits of basic research are long-term or may be unknown, users of research are also able to assist in identifying the
potential relevance and contribution of research. Users already influence the research agendas of institutions, individual researchers and research teams in many ways. Contract research and research involving collaboration with private firms and public sector organisations is by its very nature user-oriented. Such activity may have flow-on effects by stimulating investigator-initiated activity and raising fundamental research questions. As universities undertake more user-funded research, user impact on the direction of research will necessarily grow.

4.13 The Government believes that a user perspective on the merit of proposals in terms of future benefits to society will provide an important adjunct to the more traditional processes of peer review. The Government accepts that decisions regarding the provision of publicly funded grants should continue to be based on the excellence of proposals. At the same time, the involvement of users would help both in discriminating between proposals and also in achieving the public acceptance of outcomes.

4.14 The Government proposes that the peer review process be expanded through the inclusion of users in a broad discipline area on the committees of general discipline experts. In addition to including users at this level in the Australian Research Council structure, the Government believes that there is a need to broaden the membership of the Council itself to reflect a diversity of knowledge producers and users in universities, industry, public agencies and the community. Further detail on the Australian Research Council’s governance and organisational structure is discussed in Chapter 8.

*Improved discrimination between high quality research proposals*

4.15 The overall high quality of research proposals received by the Australian Research Council requires a fair and sensitive discrimination process. Determining which proposals should be funded requires fine judgement at the margin, as choices must often be made between many proposals of similar quality. To improve the Australian Research Council’s capacity to make these funding judgements, each committee will be assisted by discipline-specific readers, including international experts, who will provide, electronically, ranked assessments of proposals in that area of research. The increased use of international experts will further enhance the reputation of Australian research as being at the forefront of international practice.

### Improving efficiency

#### Fewer, more flexible programmes

4.16 At the national level it has been estimated that, including those administered by the Australian Research Council and National Health and Medical Research Council, there are over 40 competitive research granting programmes relevant to universities including Cooperative Research Centres, Special Research Centres, rural industry R&D funds, industrial research collaborative grants and others. The Australian Research Council itself
administers some nine competitive funding programmes, which range from the Large Grants programme, with an annual budget of approximately $100 million, to the Special Research Initiatives programme with a budget of approximately $250,000.

4.17 Provided there is little overlap of purpose between agencies, the existence of a plurality of research funding agencies has much to recommend it. Diversity in funding sources should lead to greater diversity in the research undertaken by universities.

4.18 At the level of the research funding agency, however, it is less clear that there are benefits in having a large number of programmes, several with small budgets and highly specific objectives. In the case of the Australian Research Council, there is a strong argument for reducing the number of programmes, and for their rationalisation into a set of larger, more coherent, better integrated and more flexible programme streams.

4.19 The current arrangements place a heavy burden on institutions, researchers and the assessors engaged in the peer review process. Over time they have led to high indirect administrative costs (primarily opportunity costs) relative to the size of the grants awarded.

4.20 More broadly, the balance struck between the funding of different forms of research activity is something which should appropriately emerge as a consequence of the development and evolution of Australian research. The Australian Research Council should possess the flexibility to support excellence in whatever form it occurs.

4.21 To provide the level of flexibility needed to support investigator-led research in a rapidly changing environment, the Government proposes that the current array of competitive programmes referred to the Australian Research Council should be rolled into a single flexible programme with broad strategic objectives.

4.22 This programme would provide grants to individuals, teams and institutions based on an open national competitive process. It will subsume all those application-based programmes currently referred to the Australian Research Council with the exception of the Small Grants Scheme.

4.23 The flexibility afforded by this broad programme structure should also enable the Australian Research Council to introduce more than one application and funding round per year, which in turn will improve the opportunities for universities to respond to new research developments in a rapidly changing environment.

**Use of technology**

4.24 The introduction of the early stages of an electronic platform for receiving and assessing applications for grants has assisted significantly in recent years in the management of the annual granting process. The extension of this platform to all aspects of the application, assessment and reporting process is a high priority and will be made simpler through the introduction of a more generic
Improving transparency and accountability

4.25 Under the current ‘dual’ arrangements, funding for research is a shared responsibility of granting agencies and institutions. Competitive grants allocated by the Australian Research Council (and other funding bodies such as the National Health and Medical Research Council) do not (and are not intended to) cover the full costs of research projects. Funding for infrastructure on-costs, some investigator salaries and other associated costs are funded through other mechanisms.

4.26 A large component of infrastructure on-costs is funded through the Research Infrastructure Block Grant (RIBG) Programme. RIBG funds are currently allocated on the basis of an index of success in gaining national competitive grants over the previous two years. Some investigator salary costs are met by institutions from operating grant or other sources. Basic infrastructure such as libraries, computer networks and capital infrastructure may be funded from the Research Quantum, the capital roll-in components of operating grants or general operating grant funds.

4.27 There are both benefits and risks associated with these arrangements. On the one hand, such arrangements recognise that much of the infrastructure which supports research and teaching is shared.

4.28 On the other hand, failure to identify the full costs of research and ensure the accountability of the funding partners (granting agencies, universities and others) for their respective inputs has potential negative impacts. Institutions may fail to support grant-funded activities to the level necessary to ensure that they have the maximum chance of achieving successful outcomes, preferring to utilise what are discretionary funds to meet their own (legitimate) priorities. Granting bodies may increase their demands on institutions—e.g. to commit institutional funds as a condition of receiving certain types of grant funding—in an effort to make available funds go further by seeking growing levels of institutional commitment.

4.29 A more transparent set of arrangements involving explicit identification and agreement over inputs would go a considerable way to addressing these issues. One important means of achieving greater transparency would be for granting bodies to require identification of the full costs of proposals for which funding is sought, together with an attribution of these costs to the respective funding sources. Whilst accepting this may be difficult to achieve in practice, greater awareness of the costs of research activities would reduce the likelihood that the parties will under-fund research proposals.

4.30 In relation to the infrastructure funding provided through the RIBG Programme, the allocation of such funds as part of the project grant would significantly increase the transparency of arrangements through a more obvious and direct relationship than is currently the case between
infrastructure funding and actual grants received. It would also provide an incentive for granting bodies to focus on the total funding available in allocating funds.

4.31 The Government proposes that the RIBG Programme be abolished and that funds associated with the programme be allocated to the relevant Commonwealth granting agencies in proportion to their share of total national competitive grant funding. Granting agencies should be expected to include an infrastructure overhead component in competitive grants.
5 Improving institutional management of research and research training

5.1 Ensuring the excellence of Australian research and research training is a task which is shared between the Government, funding agencies and universities. Governments and funding agencies have a responsibility to ensure that funding arrangements, incentive structures and regulatory arrangements enable the generation of high quality research outcomes. Institutions have the key responsibility to create the conditions and manage the resources entrusted to them to achieve the best possible research performance.

Facilitating commercialisation

5.2 Universities can play a key role in facilitating the generation of economic activity and the development of new spin-off enterprises, both in their local region and nationally. There are enormous potential benefits to institutions, researchers and Australian society from linkages between universities and others which create the conditions for the effective commercialisation of discoveries.

5.3 Elements of a positive environment for commercialisation include the existence of employment arrangements which facilitate the movement of researchers between universities and firms, remuneration and incentive arrangements which ensure that researchers share in the benefits flowing from commercialisation of their work, and clear institutional policies on commercialisation including the management of intellectual property.

5.4 The performance of universities in these areas is mixed. There are, of course, many examples of innovative approaches to support the commercial exploitation of good ideas: e.g. the work of the Photovoltaic Special Research Centre at The University of New South Wales, which is now at the forefront of international developments in solar cell technology. We need a more pervasive entrepreneurial culture which positively encourages the commercial development of research discoveries and effective links with the business sector, together with transparent institutional structures and management arrangements which support such a culture. We should ensure, for example, there are not unnecessary barriers which prevent researchers from holding equity in companies, or from performing research in the private sector, while holding staff positions. Greater and more creative use could be made of decentralised industrial relations arrangements to tailor terms and conditions of employment and reward structures to suit the particular circumstances and needs of collaborative ventures involving institutions and business partners.
Improving transparency and accountability

5.5 Accountability in terms of both planning and reporting is an important element of good management. Transparency in the setting of institutional goals and strategies for research and research training and public reporting about measures of success in achieving those goals are key elements of a management culture focussed on performance.

Research and Research Training Management Plans

5.6 Universities currently do not have to report publicly on their plans for the use of public funding for research and research training, nor on the measures they use for assessing their success in achieving their goals.

5.7 As a means of giving impetus to strategic management by institutions and to facilitate the transfer of good practice across the system, the Government proposes that institutions be required to develop strategic Research and Research Training Management Plans. These plans would become a condition of receipt of block research funding and funding for postgraduate training. Such a requirement provides a clear signal of the emphasis placed by the Commonwealth on effective and efficient management of research and research training by institutions and accountability for the use of public resources.

5.8 These plans will also help to improve the internal linkages that institutions make between their research activity and the environment they establish for research training. No institution, however large, can support high quality research or research training across all potential areas of research activity. There are benefits to be gained from clear definition of priorities and the concentration of resources in areas of strength as too wide a spread of activity inevitably results in a thin spread of resources with consequential effects on quality.

5.9 There should be no single, preferred model to which plans should aspire. Most institutions already engage in a process of research planning. Research and Research Training Management Plans will build on the processes already in place. They would provide the opportunity for institutions to articulate their diverse strategies, and approaches to both research and research training, their criteria for success and achievements against these criteria. Diversity would be actively encouraged, consistent with the particular strengths of individual institutions.

5.10 Research and Research Training Management Plans would be public documents and would form the basis for a strategic discussion between institutions and the Commonwealth on the strategies proposed to manage research and research training and institutions’ performance. The intention of these arrangements is to focus on directions and strategies, rather than detailed procedures. Information requirements are outlined in Chapter 7.
5.11 Funding formulae have a considerable impact on behaviour. Quite rationally, institutions seek to structure their affairs to score well against the measures included in formulae in order to attain a greater share of available funds. One area in which incentive structures need to be reviewed is the formula for allocation of block research funds.

5.12 Currently, considerable resources in the form of the Research Quantum component of the operating grant, as well as research HECS exemption scholarships, Australian Postgraduate Awards (APA) (which provide stipends for research students) and the RIBG Programme are allocated by formula.

5.13 The formula which allocates the Research Quantum, Research HECS exemptions and Australian Postgraduate Awards (known as the Composite Index) contains both an input component in the form of research income (80 per cent) and output components in the form of research publications (10 per cent) and higher degree research completions (10 per cent). The input component of the Composite Index attributes to a dollar of national competitive grant funds twice the weight of a dollar gained from other sources.

5.14 The higher weighting attributed to national competitive grants income creates a direct financial incentive for institutions to seek to win competitive grants, at the cost of pursuing linkages with users which generate other income streams. Universities which have made the decision to focus their research effort on links with their regional economies and communities, rather than winning competitive grants, are particularly disadvantaged. This is inappropriate in an environment in which universities should be encouraged to diversify their sources of funding and engage more closely with the national innovation system.

5.15 The publications component of the Composite Index has been subject to a range of criticisms since its implementation in 1995. These concern the reliability of the information provided by institutions, the costs of data collection and the incentives created by the inclusion of a publications component in the index. It seems likely that the publications component of the Composite Index has stimulated an increased volume of publication at the expense of quality due to the view that every publication is associated with additional funding through the Research Quantum. This is not in the best interests of Australian research.

5.16 On these grounds, the Government proposes to equalise the weight given to national competitive grants and other research income and to drop the publications measure in any future indices used to allocate block research funds.

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30 See, for example, Anderson et al 1996, Performance-based funding of universities, Commissioned Report No. 51, Higher Education Council, Canberra, for a discussion of the Composite Index. The publications item is ostensibly the least efficient and reliable element in the index because of the high cost involved in data collection and the difficulties of verification it presents (p. 56).
funds. In addition, the definition of research income should be refined to include consultancy income which contributes to innovation. The formula will better reflect and reward universities’ ability to attract research income from a diverse range of sources.

Further detail on the proposed index provided at 7.13.
6 Improving research training

6.1 Research training represents one of the most significant areas of national investment in research. It is estimated that in 2000 some $545 million of universities’ operating grant funding will support the teaching of postgraduate research students, with a further $94 million being provided in the form of stipends for holders of Australian Postgraduate Awards and International Postgraduate Research Scholarships Scheme. This compares with an estimated $345 million available through targeted research programmes.

6.2 The public investment in research training is significant, not only in dollar terms but also in its impact on the research community and society more generally. Research students constitute the next generation of researchers, providing the basis for the on-going renewal and revitalisation of the research community.

6.3 Equally importantly, research students provide a conduit for the dissemination and transfer of skill and knowledge from the university sector to the broader community. Research students are not only academics in training. Most enter employment (or are already employed) outside the university sector, often in positions without direct connection to their field of study. In each of the last three years, some two-thirds of recent PhD graduates surveyed through the Graduate Destination Survey have been employed in non-academic positions.

The need for reform

6.4 A number of facts point to the need for reform of postgraduate training arrangements. There have been persistent concerns expressed regarding the lack of breadth of research training and the quality of supervision. Both employers and students have expressed concern about the outcomes of postgraduate research training. The evaluation of the 1990 postgraduate cohort under the Australian Postgraduate Research Award Scheme found a level of dissatisfaction with both supervision and departmental support. The West Committee found strong anecdotal evidence to suggest that the quality of supervision for research students was highly variable.\(^\text{38}\) Other problems identified by students included a lack of access to suitable infrastructure, the mismatch of research programmes to their interests and limited opportunities to move to, or gain experience in, appropriate research environments.

6.5 Employers, in particular, have expressed concern with the standard of communication, interpersonal, presentational and leadership skills of research degree graduates, and comment that they are commonly too narrow, too specialised and too theoretical.\(^\text{39}\) They point to the existence of a ‘cultural gap’


between academic researchers and staff in industry which can cause difficulties in collaborative research projects. This concern was echoed by the Wills Review, which also found that there was a need to broaden and update graduate training to produce more diverse and well-rounded PhD graduates.

6.6 It is interesting to note that a greater proportion of research students are failing to complete their studies in comparison with other university students. In 1997, the attrition rate for higher degree research courses, at 34 per cent, was considerably higher than for either undergraduate study or for postgraduate coursework programmes (20 and 25 per cent, respectively), even taking account of the transfer of students from Masters to PhD study.

6.7 The value of research degrees in the labour market is not as high as would be expected. While the overall rate of post-course employment for PhD graduates has fluctuated between 72 and 81 per cent between 1994 and 1998, the proportion of graduates seeking full-time work (including some in part-time employment) has risen from 7.4 per cent to 10.9 per cent over this period.

6.8 Many postgraduate students take considerably longer than the minimum necessary time to complete their studies. The average time taken to completion is over four years in the case of a research masters degree and nearly six years in the case of a PhD. An analysis of the 1992 cohort of postgraduate research students found that only 38 per cent of students had completed their studies after six years. This may limit institutions’ capacity to provide training to other students.

6.9 Much of the responsibility for reform of postgraduate training arrangements rests with institutions. The design of research training programmes is appropriately a matter for universities. Improving the relevance and quality of research training is a particular challenge which needs to be addressed.

6.10 Excellence must be the hallmark of research training. In order for institutions to secure excellence, there is a need to explore options for broadening the base of research training, for example, through:

- expanding the curriculum to involve both coursework and thesis-based learning;
- providing a greater focus on the broader range of skills needed by graduates to operate successfully in an increasingly diverse range of employment destinations;
- offering access to a range of research training settings under appropriate supervision arrangements, including industry, public agencies, consultancy firms and collaborative research centres; and
- developing multi-disciplinary approaches to postgraduate training and research.

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40 Tyler, J. 1999, Research training for the 21st century, DETYA
41 Health and Medical Research Strategic Review 1999, The virtuous cycle: working together for health and medical research, Ausinfo, Canberra, pp. 66-67
42 Department of Education, Training and Youth Affairs 1998, Student data collection
43 Morgan, V. & Guthrie, B. 1998, 1997 postgraduate destination survey, Graduate Careers Council of Australia
44 Morgan, V. & Guthrie, B. 1998, 1997 postgraduate destination survey, Graduate Careers Council of Australia
45 Department of Education, Training and Youth Affairs, Student data collections
6.11 At the same time, funding arrangements for postgraduate research represent an important factor contributing to the deficiencies in the provision of research training to the extent that they provide few, if any, direct incentives for institutions to improve the quality and relevance of research training.

6.12 At present, institutions are funded through their operating grant to deliver a total student load target, which includes postgraduate provision. Provided that student load targets are met, institutions retain funding irrespective of the rate at which students drop out or express dissatisfaction.

6.13 Student preferences and demand also play little role in determining the balance of research training places between institutions. Currently there is no mechanism which would allow resources to move freely between institutions in line with student preferences.

6.14 Growth in research places has been occurring at a rate greater than the provision of funds. Within a fixed allocation, the expansion of research training beyond a certain point will entail costs in the form of reductions in the quality of the training provided or the redirection of resources from other activities, such as undergraduate teaching and/or postgraduate coursework programmes. However, without some means of making these ‘costs’ explicit, institutions are under no pressure to account for them in their decisions.

A new framework for funding research training

6.15 The Government believes that many of the above weaknesses would be addressed through the allocation of funding for research training to students in the form of portable tuition scholarships tenurable for a period equal in duration to the periods for which Australian Postgraduate Awards are currently provided. These scholarships would offer HECS-exempt tuition and not be subject to further tuition fees. They would be tenurable only at institutions whose research awards included external assessment. Scholarships with stipends would continue to be available for the same number of students as are currently supported through Australian Postgraduate Awards.46

6.16 Portability of scholarships would allow students to move to those environments which suit their interests and abilities and so would create greater pressure on institutions to provide high quality research training which meets student needs. A university which lost students would lose funds. A defined period of tenure for scholarships would create direct incentives to reduce inordinately long completion times. An examination of the 1992 cohort of postgraduate research students, for example, has shown that less than half of all masters (research) and doctorate students had completed their degrees by 1997.47 Reduced wastage would improve efficiency in the use of public resources.

46 The Government is aware that a number of postgraduate research students currently occupy a HECS-liable place. The treatment of these places will be subject to further consideration

47 Department of Education, Training and Youth Affairs, Student data collections
6.17 Allocating scholarships direct to students would create the strongest 
incentives for universities to respond to student demand and through this to 
the demands of the labour market. Given that there is at present no national 
moderation of the standards of honours degrees, it is not practical to allocate 
scholarships directly to students at the current time.

6.18 It is therefore proposed that scholarships would be allocated in the first 
place to institutions, which would then allocate them to students. Once 
allocated to the student, funding would follow that student should he or she 
wish to move to another institution to complete his or her studies. To avoid a 
situation where students receive a scholarship and immediately seek to transfer, 
creating funding uncertainties for institutions, students will not be able to 
transfer until a study load of one EFTSU (i.e. one academic year) has been 
completed.

6.19 Directly tying funding to students will create far stronger incentives for 
institutions to be responsive to students. The benefits expected to flow from 
this include increased quality and relevance of training and stronger incentives 
for students to complete their studies within the period of their funding.

6.20 Students may elect to study overseas at approved institutions for a period 
of up to one year, transferring with their scholarship. Australian institutions 
would be expected to enter into reciprocal study-abroad arrangements with 
institutions overseas and testify to the Department of Education, Training and 
Youth Affairs as to the quality of the research training environment of the 
institutions with which they have arrangements.

6.21 Prospective research students must have access to accurate information to 
enable informed choice. The recently developed Postgraduate Research 
Experience Questionnaire and feedback from employers should provide useful 
information to students to supplement that already available from the Directory 
of Postgraduate Study and other sources. The Postgraduate Research 
Experience Questionnaire is expected to yield information from recent 
graduates concerning their views of their research training experience 
including supervision, thesis examination, understanding of goals and 
expectations, intellectual climate and infrastructure.

6.22 To provide additional recognition for outstanding students at honours 
level who have the potential to make a major contribution to research, the 
Government proposes that the Australian Research Council offer a small 
number of prestigious postgraduate scholarships as part of the national 
competitive programmes. These would be known as Prime Minister's 
Scholarships. Universities will be invited to bring forward nominees for these 
awards.
Providing more postdoctoral opportunities

6.23 Postdoctoral research represents the first step in a research career for many higher degree graduates and represents an important means of nurturing the development of the next generation of Australian researchers.

6.24 As a consequence of the rapid growth in postgraduate provision, opportunities for postdoctoral research, particularly those funded through programmes referred to the Australian Research Council, have declined relative to the numbers of students completing postgraduate research degrees.

6.25 The Government proposes that approximately $8 million be transferred from the current research training component of operating grant to the Australian Research Council to provide for additional postdoctoral positions and research fellowships.
A new framework for university research

7.1 The proposals for reform outlined in this paper encompass:

- establishment of a single flexible national competitive grant programme;
- establishment of a new institutional block funding programme allocated under a formula which supports institutional diversity;
- provision of support for postgraduate research training in the form of portable research scholarships;
- the funding of research infrastructure as a component of research grants;
- improved accountability processes; and
- an enhanced Australian Research Council.

The balance between competitive and other programmes

7.2 In establishing the new funding structure, the existing balance of funding between competitive peer-reviewed programmes and other funding for research and research training will be maintained. The revised programme structure provides a transparent attribution of funds to function and clear delineation of administrative responsibilities. The current programme structure is described at Attachment A. The mapping of existing programmes to the proposed programme structure is at Attachment B.

The National Competitive Grant Programme

7.3 The National Competitive Grant Programme will provide grants to individuals, teams and institutions for investigator and institution initiated proposals through an open national competitive process. It will subsume all those programmes currently referred to the Australian Research Council with the exception of the Small Grants Scheme, Australian Postgraduate Awards and International Postgraduate Research Scholarships Scheme. Added to this pool will be the proportion of RIBG funding associated with Australian Research Council competitive programmes and a small amount of funding to be transferred from the research training component to support additional
postdoctoral fellowships and prestigious research training awards, to be known as Prime Minister’s Scholarships.

7.4 The National Competitive Grant Programme will comprise two elements:

• The Discovery element will provide funding to individuals and teams to undertake research projects and programmes of undoubted excellence. Individuals and teams will apply for funds. Applications will be assessed by domestic and international academic experts and key users of research.

• The Linkage element will provide support for the development of research ventures involving national and international collaboration between institutions and/or collaboration between institutions and other parties, such as industry partners and the CSIRO. Funding will primarily be of a seeding nature. The programme will also support strategic investment in the collaborative use of infrastructure. Funding will be competitively allocated. Proposals will be initiated by individual investigators and institutions.

7.5 The balance of funding between the Discovery and Linkage elements of the National Competitive Grant Programme will be flexible. The Minister will approve the annual balance of funding between elements having received the Australian Research Council’s recommendation.

7.6 Peer review will form the basis of decisions in the competitive programme in both the Discovery and Linkage elements. The process will be expanded to involve user assessment of potential short-term and longer-term benefits to national economic growth, as well as social and cultural development.

7.7 The Australian Research Council will manage all aspects of the National Competitive Grant Programme, including the related processing activity currently undertaken by the Department of Education, Training and Youth Affairs. Decisions on the allocation of funds will be made by the Minister upon consideration of the advice of the Australian Research Council.

Access of the Institute of Advanced Studies to the National Competitive Grant Programme

7.8 The Institute of Advanced Studies at The Australian National University is the one fully block-funded university within the Australian university system. With the exception of Australian Postgraduate Awards and the Research Infrastructure Equipment and Facilities Programme, the Institute of Advanced Studies does not currently have access to other research funding programmes managed by the Australian Research Council or the Department of Education, Training and Youth Affairs.

7.9 The changes to research funding arrangements proposed above offer an opportunity to assess the appropriateness of current arrangements: in particular, whether the Institute of Advanced Studies and its researchers should have access to competitive funds for research, and, if so, on what terms.

7.10 The Department of Education, Training and Youth Affairs and the Australian Research Council will pursue these matters with The Australian
National University to determine its interest in gaining access to competitive granting arrangements, and the terms on which such access would be made available.

The Institutional Grant Scheme

7.11 The Institutional Grant Scheme will provide block funding to institutions to support flexibility and quality of research and research training in each institution.

7.12 The Institutional Grant Scheme will include all funding from the current Research Quantum and the Small Grants Scheme. As a transitional measure, some funding will be transferred from the research training component of operating grant (see point 7.19) to provide infrastructure support to research students.

7.13 Allocation of block research funds will be formula-based. The formula used will include two components: share of research student places (60 per cent), and share of total research-related income earned by universities from all sources (40 per cent), including income from research-related activities leading to innovation. The exact balance between elements of the formula is an issue which will be taken up with the sector as part of the consultation process following release of this paper. There will be no guaranteed minimum level of funding for institutions.

7.14 In order to equalise the incentives for institutions to seek competitive funds or research funding from private sources, research-related income will not be weighted differently according to source.

7.15 The existence of a transparent and auditable definition of research-related income is essential for the acceptance and operation of the allocative arrangements for the Institutional Grant Scheme. Definitions and specifications will also need to be developed for consultancies contributing to the national innovation system. The Department will work together with institutions and the Australian Research Council in the process of defining eligible income for the purposes of the formula.

7.16 All institutions undertaking research and research training, including Bond University and University of Notre Dame Australia, will be eligible to receive block funding on the condition that they furnish an acceptable Research and Research Training Management Plan and are listed on the register of bodies for the Australian Qualifications Framework.
Chapter 7: The Australian Postgraduate Research Student Scheme

7.17 The Australian Postgraduate Research Student Scheme will provide portable scholarships representing the Commonwealth’s direct subsidy for research training to students. In addition, there will be a number of stipends available to support the living costs of some research students.

7.18 Scholarships will be tenurable for a period of up to two years in the case of masters studies and up to 3.5 years in the case of studies leading to the award of a doctorate. The scholarships will be HECS-exempt and not subject to further tuition fees set by the university. Scholarships would be held by students until they complete their course, until the value of the scholarship is fully expended or until they discontinue their studies. In the event of a student changing institution, the funding associated with that student will transfer to the receiving institution. To minimise scope for unproductive competition for students, funding will not be able to be transferred between institutions until a student has completed a study load of one EFTSU.

7.19 At least initially, scholarships will have a single value. Institutions will be compensated for the different infrastructure support costs of students in laboratory and non-laboratory based disciplines through the Institutional Grant Scheme. As a consequence, some funds will be transferred from the operating grant to the block grant scheme by the time of full implementation. The Department will undertake a series of cost studies to identify the relative costs of research training in different disciplines in consultation with the sector. The appropriateness of a single value scholarship will be reviewed in the light of the findings.

7.20 The allocation of scholarships to institutions will be based on a formula which includes:

- share of research scholarships awarded the previous year;
- share of total research-related income from all sources; and
- share of Commonwealth-funded or fee-paying research degree completions.

7.21 The Department of Education, Training and Youth Affairs will consult institutions on the composition of the allocative formula for scholarships and the weights to be attributed to items. All institutions eligible for the Institutional Grant Scheme offering research training will be eligible to receive funding in respect of research students.

7.22 Funding for the scholarships will be drawn from the component of operating grant currently supporting research training and the Australian Postgraduate Awards Scheme. The Australian Postgraduate Research Student Scheme will include funding for International Postgraduate Research Scholarships, the management of which will be devolved to institutions. A small amount of funding (approximately $8 million) will be transferred from the current research training component to the National Competitive Grant Programme to support additional:
• postdoctoral research positions, and fellowships for distinguished researchers; and
• scholarships for outstanding honours graduates undertaking doctoral studies, to be known as Prime Minister’s Scholarships.

Funding for research infrastructure

7.23 Funding available under the RIBG programme will be transferred to granting agencies with the expectation that those infrastructure overheads formerly funded through RIBG will be covered by grants.

Research and Research Training Management Plans

7.24 Institutions participating in the Institutional Grant Scheme and teaching publicly funded research students will be expected to submit Research and Research Training Management Plans to the Commonwealth on an annual basis as part of the profiles documentation. The preparation of such plans will represent a minimum requirement for gaining access to funding through the Institutional Grant Scheme and the Australian Postgraduate Research Student Scheme.

7.25 Discussion of institutional research strategies and performance will be a standing agenda item in profiles discussions with institutions. Comparable arrangements would be made with other providers.

7.26 Research and Research Training Management Plans will be expected to form strategic documents which describe an institution’s approach to the planning and management of its research and research training activity and its assessment of its research and research training performance.

7.27 Issues of key importance include:
• institutional priorities for research and research training and the strategies in place to realise their goals;
• the processes by which resources are allocated in line with priorities;
• policies regarding the management of intellectual property;
• incentive and reward structures and employment conditions for staff which support priorities;
• pricing policies for research; and
• the performance measures by which the institution wishes to be judged and its performance against these measures.
7.28 While there will be no prescribed model for Research and Research Training Management Plans, at a minimum they will be expected to:

- demonstrate links to an institution’s strategic plan and distinctive mission statement;
- provide auditable performance indicators which allow for institutions to compare themselves with the higher education research and research training system as a whole;
- allow for self-assessment against these indicators, demonstrating how well an institution has met its strategic objectives;
- demonstrate that there are clear quality assurance mechanisms in place; and
- be both concise and publishable either in hard copy and/or on the Internet.

7.29 Research and Research Training Management Plans will need to demonstrate how an institution’s research and research training management links to its strategic plan and mission statement. Institutions would, for example, be expected to specify attributes expected of postgraduates, areas of research specialisation and concentration, and key aspects of research training environments.

7.30 Research and Research Training Management Plans will be public documents to inform student choice and to ensure a transparent method of measuring accountability for public funds.

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**Supporting institutions to strengthen their regional links**

7.31 In recognising that the arrangements proposed in this paper will impact on institutions in different ways, consideration will need to be given to a structural adjustment package. Such consideration would need to recognise the substantial contributions institutions make to the economic development needs and viability of regional communities, beyond that of being simply employers and local purchasers.

7.32 Institutions will need to be more assertive in the way they involve themselves with the economics of the region in which they are located, and contribute more to their own and to national objectives through their teaching, research, leadership, information and networking. They can create and foster an entrepreneurial culture within their regions, and act as powerhouses for further enterprise development in those regions. This will provide the right environment for institutions to commercialise their research activities and foster spin-off companies, further supporting their regions. Encouraging this strategy would be the objective of any structural assistance package.
8 The role of the Australian Research Council

8.1 In most countries the role of government in supporting and developing the research system is advanced through independent agencies which provide expert advice on policy and the allocation of government funds for research. In Australia, within the context of a pluralistic R&D system, the Australian Research Council is one such agency performing this function.

8.2 The Australian Research Council was established in 1988 under the Employment, Education and Training Act. The functions of the Australian Research Council are to make recommendations to the Minister regarding the allocation of resources to research schemes referred to the Council and to provide policy advice to the National Board of Employment, Education and Training. The Government has indicated its intention during 1999 to amend the Employment, Education and Training Act to abolish the National Board of Employment, Education and Training and four of the Councils which are also established under this Act.

8.3 The abolition of the National Board of Employment, Education and Training provides an opportunity for the Government to redefine the role of the Australian Research Council and its structure and to reaffirm its importance as an independent research funding and advisory body. The Government proposes that the Australian Research Council should be established under a new Australian Research Council act. Funding for schemes referred to the Australian Research Council under the Higher Education Funding Act 1988 should be appropriated to the Australian Research Council under the new act.

8.4 Key elements of the new Australian Research Council will be:

• an enhanced role in the provision of strategic advice to Government regarding research in the university sector and more broadly;

• increased responsibility for the management of research funding programmes;

• a reformed governance and organisational structure reflecting the need to link university research with the innovation system; and

• an accountability framework emphasising transparency and performance.

Strategic advisory role

8.5 The Australian Research Council is a valuable source of national expertise and independent advice to the Government on research policy and the allocation of funding to support research. However, in addition to its core
responsibility to develop and maintain a broad foundation of high quality, internationally competitive research across a range of disciplines, the Australian Research Council could play a broader and more strategic role in maximising the contribution of higher education research to the national innovation system, through the following additional functions:

- helping to form and maintain effective linkages between the research sector and the business community, government organisations and the international community;
- developing and improving public understanding and appreciation of the contribution that research makes to the community; and
- reporting on the comparative performance of Australia with other research-active countries and assessments of the national return on investment in research.

8.6 To enable it to fulfil this clearer role, the membership of the Council needs to be broadened to ensure that it reflects a diversity of knowledge producers and users in universities, industry, public agencies and the community. Council members should have relevant experience to foster excellence in research in the higher education system and its connections to the economy and society. They should be able to advise on ways in which the benefits of research can be made more readily apparent and available to the wider community.

Programme management role

8.7 A key feature of the Australian Research Council’s programme management is its reliance on a system of peer review to ensure quality and international validity of the research funded, and fairness in grant distribution. A clear strength is the strong commitment and heavy involvement of the research community through representation on the Council and various committees that do much of the work in overseeing the Australian Research Council’s peer review process and assessing and making decisions on funding applications. However, the members of the committees and panels are normally full-time employees of universities and this additional workload and the rising costs associated with it has become harder to sustain.

8.8 The administration of the Australian Research Council’s referred programmes is currently undertaken within the Department of Education, Training and Youth Affairs. This arrangement does not permit a close alignment between the Council’s strategic advisory and programme management functions. The Government proposes that the new Council will take on those programme administration tasks now performed by the Department. This will ensure that programme management and advice on policy will be well informed by knowledge of the operation of research within the sector.

8.9 In taking on the programme administration role, the Australian Research Council will be expected to adopt the continuous improvement framework for
grants processing and programme administration which has been pursued by the Department in recent years, and achieve further efficiency gains in the future.

A reformed governance and organisational structure for the Australian Research Council

8.10 Changes are needed to the governance structures and organisational arrangements of the Australian Research Council to ensure that the Council can fulfil its responsibilities most efficiently and effectively. The new structure will seek to better align the strategic direction-setting and decision-making role of the Council with supporting programme management and administrative arrangements. The Australian Research Council will be more effective if it operates in a manner similar to that of a corporate board, receiving advice from its chief executive officer and senior managers.

8.11 Key features of the new structural arrangements for the Australian Research Council will be:

• a prominent member of the community as part-time chair;
• a full-time chief executive officer, to be filled by a person with a distinguished record in research and research management;
• a broader base of council membership to reflect the breadth of the national innovation system, including increased representation by the users of research;
• several positions of programme manager as described below; and
• transfer of responsibility for programme administration from the Department of Education, Training and Youth Affairs to the Australian Research Council.

8.12 Programme managers would be visiting researchers with experience in research management, appointed for up to three years and with responsibility for:

• overseeing the conduct of the peer review process;
• integrating the views of external reviewers with the views of the advisory committee;
• liaising and communicating with the research community and users of research;
• identifying emerging disciplinary and cross-disciplinary developments and innovative approaches to research; and

The positions of Chair, other Board members and the CEO would be appointed by the Minister and subject to scrutiny as per all senior Governmental appointments.
• conducting forums and reviews of the state of Australian research in an international context.

**Transparency and accountability mechanisms**

8.13 Enhanced strategic and management responsibilities for the Australian Research Council require an enhanced and transparent planning and accountability framework. Accountability of the Council to Government, through the Minister, is paramount.

8.14 The Government proposes that the Council will bring forward each year, for Ministerial approval, a three-year rolling plan that outlines the objectives to be achieved over the triennium, making budget commitments more explicit and secure. Within the context of this plan, the Council will continue to make recommendations to the Minister on the allocation of funding across and within the Australian Research Council's schemes.

8.15 The Government proposes that in addition to its annual report, which will be tabled in Parliament, the Australian Research Council will also publish regular reports on the comparative performance of Australia with other research-active countries, emerging developments in fields (and across fields) of research and innovative approaches to research, and assessments of the national return on investment in research. The Australian Research Council will also develop and implement a communications strategy to increase community awareness of the importance of research and the benefits derived from it.

8.16 The Australian Research Council and the Department of Education, Training and Youth Affairs will regularly evaluate and review programme parameters to ensure they reflect the most cost-effective way of using resources and research capability in the national interest. In programme management it will apply new technology and will adjust programmes from time to time to meet new and emerging needs.

8.17 The Government expects that a reformed and restructured Australian Research Council will serve as a peak forum for a diverse range of interested parties, make policy and funding recommendations to the Minister and ensure that accountabilities and external links are being well served. In framing its advice, the Council will have regard to guidance provided by the Minister on the Government's overall economic, social and cultural objectives.
9 Implementation

9.1 This paper has proposed reforms to the current policy and funding framework in four key areas:

- the National Competitive Grant Programme;
- the Institutional Grant Scheme;
- the Australian Postgraduate Research Student Scheme; and
- the role and structure of the Australian Research Council.

9.2 Implementation issues need to be considered separately in relation to each of these major programme elements. The proposed new arrangements are presented in more detail in Attachments C and D.

9.3 It will be important to ensure that students, researchers and institutions gain the benefits of the proposed reforms as quickly as practicable, while also allowing for adjustment to the new arrangements to be made in an orderly manner. Students, researchers and institutions will need adequate lead times and full information about the new systems before they are introduced.

9.4 The changes proposed for the National Competitive Grant Programme will have implications for those researchers and institutions currently holding grants under the schemes to be subsumed into this programme, some of whom hold grants which will continue for several years. It is proposed that the new arrangements will be phased in from the year 2000. This will allow institutions to plan, develop and implement systems for the new programme arrangements following amendments to legislation and administrative arrangements within the Australian Research Council and the Department of Education, Training and Youth Affairs. The Research and Research Training Management Plans submitted by institutions during 2000 will assist in this process. Existing grants will continue to operate under current arrangements.

9.5 The proposed changes to research infrastructure funding will need to be worked through with other funding agencies. Phase-in arrangements will be necessary to ensure institutions and projects are not disadvantaged as a result of the changes.

9.6 The changes proposed in the Institutional Grant Scheme, in a technical sense, may be the most readily implemented. The rolling-in of the Small Grants Scheme funding for discretionary use by the institutions is an extension of the current practice whereby institutions already allocate this funding. However, the changes to the allocative formula for the Institutional Grant Scheme will be phased in over three years to enable institutions to adjust to the new incentives. Institutional views on appropriate phase-in arrangements will be sought before final decisions are made.
9.7 Of the proposed reforms, it will take longest to implement the Australian Postgraduate Research Student Scheme in a way that enables institutions and students affected by the changes to prepare for their introduction. Given the lead times involved, the new arrangements will be introduced for the cohort of commencing research students in 2001. Students in the system at that time will continue their studies under current arrangements.

9.8 The administrative reforms to the Australian Research Council will progress as quickly as possible within the constraints of current legislation. The Government will proceed to introduce a new Australian Research Council act with the aim of giving legislative backing to a new structure for the Australian Research Council during the year 2000.
10 Consultation

10.1 The proposals outlined in this paper represent a major agenda for reform in the funding of university research and research training in Australia. The Government is firmly committed to the broad framework presented above.

10.2 At the same time, the Government is committed to ensuring an orderly period of transition to the new arrangements and sufficient lead times to ensure that all affected by the proposals have an opportunity to adapt to the new environment and adjust their strategies accordingly. The proposals concerning the funding of research training and the allocation of block research funds, in particular, entail a significant change in how funding is allocated, and under what ground rules. The implications of these changes for the strategies and priorities of many institutions are likely to be significant and institutions will need time to adapt to the new pattern of incentives.

10.3 There are also important matters of detail which will need to be resolved during the consultation process, including the composition of indices for the allocation of funds and the working of the portable scholarship scheme. To aid the consultation process, more detailed outlines of the proposed new arrangements are presented in Attachments C and D.

10.4 Before the Government finalises its decisions on the reforms outlined in this paper, the Department and the Australian Research Council will engage in a process of consultation with universities, researchers and students, as well as other interested parties. Profiles discussions later in 1999 will also provide an appropriate forum for consultation with institutions on some issues.

10.5 Written comments on the proposals outlined in this paper are invited by 1 October 1999.

They should be sent to:

Assistant Secretary
Higher Education Research Branch
LC 441
DETYA
GPO Box 9880
Canberra City ACT 2601

e-mail: rbpolicy@detya.gov.au
Attachment A: Current funding arrangements

Funding for research managed under the Education, Training and Youth Affairs portfolio is provided through a number of programmes.

Research training

Funding to support research training is provided through university operating grants and in the form of HECS exemptions and student stipends known as Australian Postgraduate Awards. The component of operating grant supporting research training (the notional ‘Research Training Component’) is estimated to have totalled $473 million in 1997 and will increase to $545 million in 2000.

The Research HECS Exemptions and Australian Postgraduate Awards are allocated to institutions in accordance with a formula comprising:

- higher degree research student load (40 per cent weighting);
- higher degree research student completions, weighted 3:1 in favour of PhD completions (20 per cent weighting); and
- the Composite Index, excluding the completions component to avoid double counting (40 per cent).

Awards allocated to institutions under this formula are then distributed by the institutions to research students on the basis of merit.

The Research Quantum

The Research Quantum ($221 million) forms part of the university operating grant and supports the general ‘fabric’ of university research and research training activities.

The Research Quantum is reallocated each year according to a Composite Index which takes into account research inputs (research funding) and research output (publications and award completions) components.
## Targeted research funding

In 2000 outturn pricing, estimated funding (accrual basis) for the 1999–2000 targeted higher education research programme, to be provided through the Education, Training and Youth Affairs portfolio, is:

<table>
<thead>
<tr>
<th>Targeted research programmes</th>
<th>$m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large Grants</td>
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</tr>
<tr>
<td>Small Grants</td>
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<tr>
<td>Australian Postgraduate Awards</td>
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<td>International Researcher Exchange</td>
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<tr>
<td>Research Fellowships</td>
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<td>Special Research Centres and Key Centres</td>
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<td>Research Infrastructure Block Grants</td>
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<td>Research Infrastructure Equipment and Facilities</td>
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</tr>
<tr>
<td>International Postgraduate Research Scholarships</td>
<td>16.173</td>
</tr>
<tr>
<td>Strategic Partnerships with Industry Research and Training</td>
<td>57.203</td>
</tr>
<tr>
<td>Other Grants (ANZCCART, Indigenous Researchers Development, etc.)</td>
<td>2.367</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>436.806</strong></td>
</tr>
</tbody>
</table>

The **Large Grants Scheme** provides research grants on a competitive basis for high quality research by individuals or research teams throughout Australia in all major discipline areas, except clinical medicine and dentistry. Applications are assessed by the Australian Research Council’s Research Grants Committee and its expert discipline panels with the aid of external assessors.

The **Small Grants Scheme** provides block grants to higher education institutions to fund research grants for amounts less than the minimum amount required for Large Grants. All institutions participating in the Scheme receive a base grant of $50,000. The remaining funds are distributed according to a formula which takes account of each institution’s success in obtaining Large Grants the previous year.

The **Australian Postgraduate Awards Scheme** assists the participation of Australian postgraduate students in research training programmes, by enabling persons of exceptional research promise to undertake a higher degree.

The **Strategic Partnerships with Industry – Research and Training Scheme** supports high quality research involving collaboration between higher education institutions and industry. Funding is provided on a dollar-for-dollar matching basis with industry. Applications are assessed by the University–
New Knowledge, New Opportunities

Industry Research Collaboration Committee of the Australian Research Council.

The International Researcher Exchange Scheme’s key function is the movement of researchers between Australian research institutions and centres of research excellence overseas. It consists of fellowships and awards.

The Indigenous Researchers’ Development Scheme aims to encourage participation in, and to improve the standard of, research conducted by Indigenous Australians.

The Research Fellowships Scheme provides approximately 100 new full-time fellowships each year. Fellowships have been awarded in four categories: Australian Postdoctoral Fellowship; Australian Research Fellowship; Queen Elizabeth II Fellowship; and Senior Research Fellowship. With the exception of the Senior Research Fellowship, successful applicants also receive a research support grant.

The International Postgraduate Research Scholarships Scheme provides 300 scholarships which meet the tuition fees and health cover of overseas postgraduate students and their dependants.

The Key Centres of Teaching and Research aim to promote excellence in teaching and research activities in higher education institutions, particularly in areas of national importance, and to encourage interaction with industry and other user groups.

Special Research Centres are established in higher education institutions to support research of outstanding quality in fields that will contribute substantially to Australia’s development. They can be funded for a maximum of nine years.

The Research Infrastructure Scheme provides direct support to higher education institutions to maintain and develop their research infrastructure (e.g. equipment, special facilities, support staff, outfitting and maintenance). Its purpose is to enhance support for areas of research strength and ensure that areas of recognised research potential have access to the support necessary for development. It comprises Research Infrastructure Block Grants and Research Infrastructure Equipment and Facilities Grants.

- Research Infrastructure Block Grants are allocated to publicly-funded institutions on the basis of an index which measures institutional success in obtaining competitively awarded research funding.

- Research Infrastructure Equipment and Facilities Grants fund large equipment and facilities. In most cases, these are for collaborative use by two or more institutions or the higher education system as a whole.
## Attachment B:
### Mapping of existing programmes to new programme structure

<table>
<thead>
<tr>
<th>Programme</th>
<th>Allocation</th>
<th>Current Elements</th>
<th>Objectives</th>
<th>Allocative Criteria</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discovery element of the National Competitive Grant Programme</td>
<td>$177m</td>
<td>Large Grants Fellowships, SRCs, IRDP Grants, RIBG**, ANZCCART, Unallocated*</td>
<td>To support excellent fundamental research by individuals and teams</td>
<td>Peer/merit review Investigator initiated application</td>
<td>ARC</td>
</tr>
<tr>
<td>LINKAGE element of the National Competitive Grant Programme</td>
<td>$103m</td>
<td>SPIRT, RIF, Key centres, RIBG**, IREX, SRI, Learned Academies***</td>
<td>To seed fund collaborative research ventures between institutions; between institutions and industry; and between institutions and research institutes, such as CSIRO. To also fund investment in strategic national and international infrastructure.</td>
<td>Peer/merit review Individuals/ institutions initiated application</td>
<td>ARC</td>
</tr>
<tr>
<td>Postdoctoral and senior fellowships</td>
<td>$6m</td>
<td>Possibly Research Training Component of operating grant</td>
<td>Possibly Research Training Component of operating grant</td>
<td>Peer/merit allocation</td>
<td>ARC</td>
</tr>
<tr>
<td>PM’s Scholarships</td>
<td>$2m</td>
<td>Possibly Research Training Component of operating grant</td>
<td>Stipends for exceptional research students</td>
<td>Peer/merit allocation</td>
<td>ARC</td>
</tr>
</tbody>
</table>
## Attachment B: Mapping of existing programmes to new programme structure (continued)

<table>
<thead>
<tr>
<th>Programme</th>
<th>Allocation</th>
<th>Current Elements</th>
<th>Objectives</th>
<th>Allocative Criteria</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institutional Grant Scheme</td>
<td>$458m</td>
<td>Small Grants RQ</td>
<td>To support Institutional investment in research and the development of a vibrant research</td>
<td>Formula based allocations Institutions required to have research management plans.</td>
<td>DETYA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A share of the Research Training Component</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Formula based allocation of scholarships to institutions.</td>
<td>DETYA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Institutions required to have research management plans.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Once awarded to individuals, scholarships are portable.</td>
<td></td>
</tr>
<tr>
<td>Australian Postgraduate Research Student Scheme</td>
<td>$432m</td>
<td>APAs IPRS Most of Research Training Component of operating grant</td>
<td>To support high quality and responsive research training.</td>
<td>Institutions required to have research management plans.</td>
<td>DETYA</td>
</tr>
</tbody>
</table>

* Funds not yet allocated to a programme. May be split across Discovery and Linkage programme elements.
** Final distribution of RIBG to be determined.
*** Learned Academies included here but excluded for purposes of RIBG calculations.

**Note:**
1. Indicative funding based on allocations in the 1999–2000 Budget (cash basis).
2. The total value of the notional Research Training Component is based on total Commonwealth-allocated HECS exemptions and Australian Postgraduate Awards for 1998.
Attachment C: Changes to the Australian Research Council's referred programmes and organisational arrangements

This paper has proposed reforms to the current array of research funding programmes which are referred to the Australian Research Council as well as to the organisational arrangements which underpin the peer review process used to allocate research funding to grant applicants. It is expected that the revised arrangements would begin in 2001. To enable informed consultation, the reforms are elaborated below.

For their duration, existing grants will continue to operate under current arrangements. Existing appeal and conflict of interest provisions would apply to the proposed arrangements.

National Competitive Grant Programme

Under the National Competitive Grant Programme there will be two programme elements, Discovery and Linkage, each of which will support people, projects and programmes and their related infrastructure, through a single application. A Centres of Excellence scheme will span both. The Linkage programme element will support collaborative national and international infrastructure.

Under these new arrangements applicants will need to identify the full cost of the proposals for which funding is sought, and indicate which of these are being sought from the Australian Research Council or other research funding agency and which are being provided by the host institution and other participants.

Discovery element

The objective of the Discovery programme element is to support excellent fundamental research by individuals and teams. Attachment B indicates which of the existing Australian Research Council referred programmes would be subsumed within the broad umbrella of this element of the National Competitive Grant Programme.
Funding under this element of the programme would be available for individuals (from Australian Research Council postdoctoral to Australian Research Council Professorial Fellow) and for projects and programmes of research (maximum funding of $500,000 for up to five years).

A new feature is the introduction of Prime Minister’s Scholarships to support outstanding doctoral students who are associated with research that is funded under the Discovery programme element.

In summary, the new features are:

- a single new Discovery programme element;
- duration of grants increased to five years;
- introduction of programmes to support major research;
- increase in the number of fellows; and
- introduction of the Prime Minister’s scholarships.

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**Linkage element**

The objective of this programme element is to fund:

- collaborative research ventures, both national and international, between institutions and industry and research institutes such as CSIRO; and
- investment in strategic national and international infrastructure.

Attachment B indicates which of the existing Australian Research Council referred programmes would be subsumed within the broad umbrella of the Linkage element of the National Competitive Grant Programme.

As above for the Discovery element, applicants would choose from a menu of funding options for individuals (Australian Postgraduate Award Industry, Australian Postdoctoral Fellowship Industry); a new option of Australian Research Council Industry Fellows and Professorial Fellows); and project or programme (maximum of $500,000 for up to five years).

In summary, the new features are:

- grant duration increased to five years;
- introduction of programmes to support major research; and
- introduction of Industry Fellows and Professorial Fellows for movement between universities and industry for periods of up to one year.

The application procedure would be through a single generic application form for both the Discovery and Linkage programme elements, with applicants choosing from a menu of funding options. The selection criteria would be weighted to reflect the particular emphasis of the programme element—Discovery or Linkage.
Centres of Excellence

Key and Special Research Centres will be refocused into a single Centres of Excellence programme which spans both Discovery and Linkage and which supports significant national research. The programme would be directed at collaborative ventures involving universities, industry and research institutions such as CSIRO, with a multi-disciplinary focus. It is envisaged that the annual maximum government funding would be $1 million for seven years, with matching contributions from the partners.

Other programme features

The current International Researcher Exchange Scheme would be incorporated into both the Discovery and Linkage elements to facilitate international research collaboration under the programme.

The Research Infrastructure Equipment and Facilities Programme would be refocussed to support major national and international collaborative infrastructure under the Linkage element, on a matching funding basis.

As a further development, the Australian Research Council would also move to more than one application round per year for the Discovery and Linkage elements of the National Competitive Grant Programme.

In summary, the new features are:

- two programme elements, Discovery and Linkage;
- introduction of Centres of Excellence; and
- multiple application rounds.

Assessment of applications

Applications for funding under both the Discovery and Linkage programme elements (including the International Researcher Exchange Scheme and the Research Infrastructure Equipment and Facilities Programme) would be considered by one of the following six programme committees:

- Biological Sciences and Biotechnology;
- Engineering, Earth and Environmental Sciences;
- Mathematics, Information and Communications Sciences;
- Physical Sciences;
- Social, Behavioural and Economic Sciences; and
- Humanities.

A full-time programme manager, who would be a visiting expert researcher/research manager in the broad discipline area, would work with each committee, with the exception of the Social, Behavioural and Economic
Sciences and Humanities Committees which would share one programme manager.

The programme committees would consist of part-time members drawn from researchers and users of research who are recognised for their expertise and comprehensive understanding of the broad discipline area. In addition to the input provided by the programme manager, specific discipline expert assessment would be provided by a field of research readers, including international experts, who would provide electronically ranked assessments of all referred proposals in their specific field. Three paid readers will rank each application.

Based upon the collation of the readers' views and the judgement of the advisory committee, including the programme manager, funding recommendations would be made to the Council.
Attachment D: 
New programmes for research and research training to be administered by the Department of Education, Training and Youth Affairs

Institutional Grant Scheme

The Institutional Grant Scheme is intended to provide block funding to institutions to support flexibility and quality of research and research training in each institution.

It is envisaged that all institutions undertaking research and research training, including Bond University and University of Notre Dame Australia, would be eligible to receive block funding on the condition that they furnish an acceptable Research and Research Training Management Plan and are listed on the register of bodies for the Australian Qualifications Framework.

Under the proposed framework, the Institutional Grant Scheme would include all of the funding derived from the current Research Quantum and Small Grants Schemes. It would also include approximately $210 million derived from the notional Research Training Component of operating grants.

It is proposed that funds would be allocated to institutions in accordance with a formula consisting of two components. The first of these, possibly weighted at 60 per cent, would be the share of actual equivalent full-time research places. Places in high-cost research fields, such as agriculture, dentistry, engineering, medicine, science, surveying and veterinary science would be expected to be weighted more heavily than those in lower-cost fields.

The second element would reflect the value of research-related income. It would include the value of income from National Competitive Grants, other public sector funding, industry and other research funding, which is currently collected as input data for the Composite Index. In addition, it would include consultancy income for activities related to research and research training which contribute to the national innovation system. Research-related income from all sources would be equally weighted.

To enable institutions to adjust to their desired research and research training profile, it is proposed to phase in the formula progressively. The formula would be expected to be applied twice yearly to take account of variations in the
number of higher degree research places. All research income data would be subject to audit for accountability purposes.

**Australian Postgraduate Research Student Scheme**

The Australian Postgraduate Research Student Scheme is intended to support high quality research training which is responsive to the needs of students and the broader community. Under the proposed scheme, the Commonwealth would provide institutions with scholarships for students. The scheme is intended to enable students to exert a greater influence over what, how and where they study and enable student choice to more directly influence funding allocations. Increased competition for students should ensure that institutions support their students as important partners in the research enterprise.

Most of the funding for the scheme would be derived from a share of the notional Research Training Component of the operating grant. The scheme would also absorb the existing Australian Postgraduate Awards Scheme and the International Postgraduate Research Scholarships Scheme. It is intended that the proposed changes to allocating resources for research training would be based on the agreed distribution of resources for the year 2000 in accordance with the *Higher Education Report for the 1999 to 2001 Triennium*, issued by the Minister for Education, Training and Youth Affairs.

All institutions offering research training would be eligible to receive funding for research students in receipt of scholarships. However, this is only on the condition that they furnish an acceptable Research and Research Training Management Plan and are listed on the register of bodies for the Australian Qualifications Framework.

It is intended that the scholarships would be HECS-exempt and not subject to further tuition fees. Scholarships would be available to Australian citizens, permanent residents of Australia or New Zealand citizens for study leading towards the award of higher degrees by research (masters or doctorates) offered by an approved institution. Students may enrol on a part-time basis or defer study for up to one year (subject to the approval of the institution), in which case payments to the institution would be adjusted on a pro rata basis. To qualify as a research degree, at least two-thirds of the assessable component of the degree must comprise research. It is proposed that the maximum period of support for full-time doctoral study would be three and a half years and two years for masters students. This is consistent with existing Australian Postgraduate Award provisions. Institutions may ‘carry’ students whose entitlement has expired or choose to charge fees without additional funding.

Students may elect to study overseas at approved institutions for a period of up to one year, transferring with their scholarship. Australian institutions would be expected to enter into reciprocal study-abroad arrangements with institutions overseas and testify to the Department of Education, Training and Youth Affairs
as to the quality of the research training environment of the institutions with which they have arrangements.

All scholarships could be expected to have a common annual value of approximately $13,736, irrespective of the course or field of study. Research students who accept an offer of a scholarship would effectively own their place until the completion of their course, or they discontinue studies or the value of their scholarship is fully expended. Students who transfer from one institution to another would take the residual value of their scholarship with them to their new institution.

Studies would be commissioned to investigate the cost of research training in different research fields and by different research methods taking account of the changing use of technology in the humanities and social sciences as well as in the natural sciences, to acquire a better understanding of the interaction between research teaching and infrastructure costs. The use of a single value scholarship initially would reduce the administrative burdens of transition from the current to the new system and give institutions flexibility to diversify their research training offerings to better reflect student choice. As a transitional measure, block funding to institutions would include an allowance to recognise additional infrastructure requirements for laboratory and field research.

It is envisaged that research places for commencing students would be allocated to institutions in accordance with a formula that could include the following components:

<table>
<thead>
<tr>
<th>Possible elements of allocative formula</th>
<th>Possible weightings (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The number of commencing research scholarships awarded the previous year, with consideration to be given to moving a student prefere</td>
<td>30</td>
</tr>
<tr>
<td>The value of research related income from all sources</td>
<td>35</td>
</tr>
<tr>
<td>The number of Commonwealth-funded or fee-paying research degree completions</td>
<td>35</td>
</tr>
</tbody>
</table>

These components would provide incentives for institutions to be responsive to student choice, provide institutions with a measure of stability, encourage the provision of research training in research rich environments and promote student mobility.

The formula would also allocate current funding for the Australian Postgraduate Awards with stipend and International Postgraduate Research Scholarships, by allocating whole numbers of these awards and devolving management more fully to institutions. A single stipend rate could be introduced for both elements (around $16,000 per annum).
Research and Research Training Management Plans

As a means of placing greater focus on the strategic management by institutions and to facilitate the transfer of good practice across the system, it is proposed that institutions be required to develop Research and Research Training Management Plans (RRTMPs). They would serve three purposes:

• to encourage institutions to develop their own strategies in the context of a changing global climate for research and innovation;

• to serve as a key statement of an institution’s role in the national research and innovation system

  by clarifying within an institution itself precisely what this role is, and

  informing postgraduate research students, industry, the wider research community, government and research users generally, and

• to encourage effective and efficient management of research and research training by institutions and their accountability for the use of public resources.

RRTMPs would be public documents and would form the basis for strategic discussion between institutions and the Commonwealth on the strategies adopted by institutions to manage research and research training and institutions’ performance. It is expected that such discussion would take place in the context of the profiles process. RRTMPs are intended to ensure that institutions take a comprehensive view of their capacity, priorities and strategies for research and research training. There is no single preferred research model to which RRTMPs should aspire; rather such plans should reflect the diverse strengths of institutions.

All institutions would be required to have an RRTMP to receive research funding under the Australian Postgraduate Research Student Scheme and the Institutional Grant Scheme. RRTMPs are primarily based on self-assessment by institutions. It is envisaged that the first drafts of RRTMPs would be valid for one year, until institutions have an opportunity to incorporate self-assessment into their plans. Thereafter, institutions would have considerable flexibility to determine the life-span of their RRTMPs, allowing for adjustments for annual reporting on outcomes for self-assessment purposes.

RRTMPs should have certain minimal requirements—i.e. the RRTMP would need to:

• demonstrate links to an institution’s strategic plan and distinctive mission statement;

• provide auditable performance indicators which allow for institutions to compare themselves with the higher education research and research training system as a whole;

• allow for self-assessment against these indicators demonstrating how well an
institution has met its strategic objectives;

• demonstrate that there are clear quality assurance mechanisms in place; and

• be both concise and publishable either in hard copy and/or on the Internet.

Links to a strategic plan and mission statement

An RRTMP would need to demonstrate how an institution’s research and research training management links to its strategic plan and mission statement. Institutions would, for example, be expected to specify attributes expected of postgraduates, areas of research specialisation and concentration, and key aspects of research training environments.

Performance indicators

RRTMPs should indicate an institution’s preferred performance indicators for research and research training, against which an institution can progress in achieving its strategic objectives. Institutions should also include sufficient performance indicators to permit system-wide comparison:

• research student completions;

• research outputs (publications, patents, consultancies);

• research impact (citations, successful innovation and commercialisation);

• collaboration (cross-disciplinary, cross-institutional, with industry, regional, national, global); and

• research income, including consultancies for activities related to research and research training and which contribute to the national innovation system.

Self-assessment

RRTMPs should provide for an institution’s own assessment against its preferred performance indicators—i.e. a comparison of targets against actual achievements and reporting on actual outcomes. This would not be required until the second year following the introduction of the RRTMP. Self-assessment could be carried out annually and indicator data should be auditable.

Quality assurance mechanisms

RRTMPs would need to demonstrate that there are quality assurance mechanisms in place and provide an outline of:

• the policies and practices that an institution has in place to assure quality;

• effectiveness of assurance procedures for evaluation and monitoring