

# Submission to the Review of the National Innovation System

## Declaration of Interests and Affiliations

Griffith University is a leading university located in South East Queensland with campuses in Brisbane, Logan City and Gold Coast – three of Australia's fastest growing cities. The presence of Griffith University is significant within the local economies of the three cities. With catchments largely comprised of major service industries such as tourism, hospitality, and financial services plus a large number of Small and Medium-Sized Enterprises (SMEs), and lower to middle range socio-economic status participants, Griffith is strongly committed to the principles of human capital development, social inclusion and knowledge transfer at the regional level.

Griffith University is also a major research university with globally acknowledged research strengths allowing it to form partnerships with leading international universities and research organisations. Griffith is a member of *Universities Australia* and foundation member of a national alliance of seven research-intensive universities, the *Innovative Research Universities Australia*. The University also maintains strong links with its local university partners in Queensland and is a member of numerous other international and national partnerships including the Australian European Network, Cooperative Research Centres, ARC Networks, and Centres of Excellence.

The University therefore perceives itself as a member of global, national, regional and local communities and positions itself accordingly. This declaration is critical to the stance the University has taken in framing its response to this Review. It is hoped that our submission will provide fresh insights into the complex missions of universities and will lead to National Innovation policies that reflect the unique role that these institutions play.

Where possible the University has refrained from raising issues dealt with in previous reviews. Griffith University also contributed to the submission from the *Innovative Research Universities Australia* and is supportive of its recommendations, several of which are reflected in our submission.

## Executive Summary and Recommendations

This submission examines the transformational role played by universities within the National Innovation System both in the development of human capital and as creators of new knowledge. It observes that the modern university offers a more diverse range of services to a wider range of communities than at any previous time, although core business remains the provision of higher education and the generation of high quality research.

This submission contends that the Government has a wide range of policy levers and funding options available to enhance the productivity and performance of the university sector in a way that is beneficial to the 'business' of running universities while ensuring better, closer engagement with other participants in the National Innovation System. The following key points are emphasised:

### The globalisation of higher education

1. Higher education is becoming increasingly globalised and Australia needs to respond rapidly to position itself within the new knowledge economy if it is not to fall behind economically and socially. Griffith University recommends policies enabling institutions to develop world class areas of strength supported by international programs enabling the improved flow of researchers and information.

**Developing the next generation of researchers for industry, government and academia**

2. Attaining 'world class' innovator status also entails development of the next generation of researchers for industry, government and academia. Urgent action is needed if more young people are to be attracted into research training. This involves increasing financial incentives for those undertaking a PhD and providing better career structures and job security for early career researchers.

**Improving intergovernmental coordination**

3. Intergovernmental coordination is critical if Australia is to maximise its innovative potential. The most important outcome of such coordination is for national innovation priorities to simultaneously reflect global directions while cascading down to the regional and local level. Mechanisms for achieving better exchange of policy and information between the Commonwealth and States are proposed.

**Funding the full cost of research**

4. Several nations now fund their university research at the full economic cost (FEC). A shift to FEC involves a major change of institutional culture and systems but is essential if Australia is to achieve 'first tier' innovator performance. An associated issue is that some excellent university research will continue to go unfunded unless the Australian Research Council is provided with sufficient additional funding required to maintain a 30% success rate.

**Extending the role of Humanities, Arts and Social Sciences research**

5. Griffith University regards research carried out within the Humanities, Arts and Social Sciences (HASS) as an important element almost absent from National innovation policy. HASS research is often acknowledged only for the support role it plays to other research and yet much more can be achieved through engagement with the HASS sector to better understand new policies, economic and social trends, technical processes, and management practices. A major elevation of the role of HASS research is recommended.

**Improving collaboration between universities, government and industry**

6. Several proven and innovative concepts have been tested overseas leading to improved collaboration between universities, industry, government and the community. This submission supports closer collaboration with all levels of industry, especially small and medium-sized enterprises given their current under-utilisation of university research. Griffith recommends adoption of the 'public space' concept, Knowledge Transfer Partnerships, Professors of Practice, and a National Student Internship Scheme within or alongside the Enterprise Connect suite of programs to foster closer collaboration with government and industry.

**Recommendations**

A number of the recommendations contained in this submission involve increases in expenditure which seems unavoidable in an environment where many OECD nations have committed to increasing their expenditure on R&D to 3% of GDP by 2010.

Griffith University offers 20 practical recommendations for consideration by the Review Panel:

***Recommendation 1***

*The National Innovation System, as a core principle, should seek to enable individual institutions or organisations to develop distinctive missions and enhance their world class areas of strengths.*

***Recommendation 2***

*To position Australia competitively as a recruiter of leading international talent it is recommended that the Future Fellowship scheme be doubled in size over a five year period.*

**Recommendation 3**

*Create an International Knowledge Links Program incorporating existing schemes and creating a range of new 'visitor' schemes aimed at attracting expatriates, adjunct staff, international alumni and research students to Australia.*

**Recommendation 4**

*At least 1,400 of the 4,800 new Australian Postgraduate Awards scheme places should be offered as International Postgraduate Research Scholarships.*

**Recommendation 5**

*Increase the annual PhD stipend (currently \$20,007) substantially to a level that will attract more high quality research students especially into fields of national priority (e.g. \$30,000 p.a.).*

**Recommendation 6**

*For domestic PhD graduates, introduce a remission of the Higher Education Contribution Scheme debt for previous studies.*

**Recommendation 7**

*That additional funding under the Research Training Scheme be designated as a high priority, equal in standing to the provision of additional Australian Postgraduate Awards.*

**Recommendation 8**

*That improved career structures and job security for early career researchers be made a high priority by both the government and the university sector to sustain their contribution to the National Innovation System. Knowledge Transfer Partnerships (referred to in more detail in section 8 of this submission) might provide possibilities in this regard.*

**Recommendation 9**

*That innovation is set as a new national reform priority for the Council of Australian Governments (COAG).*

**Recommendation 10**

*That a new central body, Innovation Australia, set national innovation priorities and provide whole of government policy coordination and performance assessment across federal and state jurisdictions.*

**Recommendation 11**

*That industry-specific research and innovation priorities be established by Industry Innovation Councils.*

**Recommendation 12**

*That the ARC and NHMRC be charged with "developing broad thematic priorities for basic research whilst also ensuring that the university sector has the flexibility to undertake high quality research across a wide range of fields.*

**Recommendation 13**

*That 'networked nodes' attuned to regional research and innovation priorities be utilised to develop areas of research and research infrastructure concentration.*

**Recommendation 14**

*Fund the full economic cost of research. In order to achieve this, it is recommended that the Department of Innovation, Industry, Science and Research conduct an investigation into methods to support transparent and fully costed activities and to then assist universities to refine and apply the method.*

**Recommendation 15**

*It is recommended that the ARC investigate the possibility of every funding scheme having a global orientation and that restrictions on international research collaboration be removed over time including the enabling the outsourcing of entire laboratories in overseas partner institutions or outsourcing university research assistance overseas.*

**Recommendation 16**

*That strong consideration be given to a discrete funding stream under the Department of Industry, Innovation, Science and Research that allows:*

- engagement with the HASS sector by organisations and communities which seek to achieve better understanding of new policies, technical processes, and management practices, or*
- sectors, communities, organisation and individuals seeking answers about future directions (economic, social and environmental) to extend their understanding of issues and their ability to proactively address change.*

**Recommendation 17**

*It is recommended that Knowledge Transfer Partnerships and a National Student Internship Scheme be trialled and that these be aimed at small and medium-sized enterprises.*

**Recommendation 18**

*That a PhD in government internship program be considered as sub-program of the National Student Internship Scheme.*

**Recommendation 19**

*That the public space concept be explored as a means of promoting joint problem solving between universities, commerce and industry, governments and the wider community.*

**Recommendation 20**

*That universities be encouraged to appoint embedded Professors of Practice and other ex-industry appointments supported by programs similar to the UK Innovation Fund. Funding might also be considered for honorariums for retired industry professionals to work in universities.*

## Introduction – Griffith University within the national innovation ‘ecosystem’<sup>1</sup>

Griffith University, like most other universities, serves a wide range of communities. A primary concern when addressing our role within the national innovation system, is one of balance:

- Recognising that to play a significant global role we need to focus in a number of world class areas whilst meeting national standards in our other disciplines as a minimum requirement;
- Balancing our regional commitment with national priorities, which are not always aligned; and
- Understanding that while research performance is the most important determinant of reputation for universities we balance this with our obligation to respond to the increased emphasis on education and training, employability, the quality of skills within the labour force, lifelong learning, community engagement and research extension, social cohesion and full participation in society.

As a university with a firm footprint in Australia’s third and sixth largest cities, Griffith University is highly conscious of its integrative role at the regional, national and international level. An example to illustrate this concept is the role of teaching hospitals which receive mainly national funds to train medical practitioners for the national healthcare system, undertake research funded by foreign companies and health research agencies such as the US National Institutes of Health, while providing high quality medical facilities at a regional level. Intergovernmental cooperation is therefore a high priority for this University in preventing an artificial distinction being drawn between global projects, national priorities, and regional activities.

The University has selected key themes to address these concerns within the framework of the Review Terms of Reference. Each theme carries recommendations and in one case a range of innovative new programs is presented for inclusion within the national innovation system framework. The key themes are:

1. Supporting a world class university system;
2. The ‘new geopolitics’ of higher education – from brain drain to brain circulation;
3. Improving intergovernmental coordination;
4. Research and innovation priorities – thinking globally, acting locally;
5. Funding the true cost of research;
6. Globalisation of ARC funding;
7. The next innovation breakthrough – extending the role of the Humanities, Arts and Social Sciences;
8. Improving collaboration with Government and Industry with a focus on Small and Medium-sized Enterprises.

The University’s response is restricted to the role of higher education within the national innovation system. Most of the recommendations contained in this submission involve increases in expenditure which seems unavoidable in an environment where many OECD nations have committed to increasing their expenditure on R&D to 3% of GDP by 2010.

## 1. Supporting a World Class University System<sup>2</sup>

Australia has a genuinely world-class university sector. It is highly regarded overseas for the quality of its university sector, attracting a high proportion of the global international student market while maintaining internationally competitive research performance. International education contributed \$11.7 billion in export income to the Australian economy in 2006-07.<sup>3</sup> Education services became Australia’s third largest export industry in 2006-07 behind coal (\$21.9 billion) and iron ore (\$15.5 billion) overtaking tourism (\$11.5 billion).

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<sup>1</sup> The term ‘national innovation ecosystem’ is attributable to: Sainsbury, D. *The Race to the Top: A Review of Government’s Science and Innovation Policies*. H.M. Treasury, October 2007.

<sup>2</sup> The University acknowledges that the overall well-being of the Australian higher education sector is the remit of the Review of Australian Higher Education reporting to the Deputy Prime Minister and Minister for Education, Employment, Workplace Relations and Social Inclusion.

<sup>3</sup> Australian Education international, Research Snapshot, Number 34, March 2008

Twenty-four Australian universities are represented in one or both of the major world university rankings – the Times HES-QS World University Rankings (Top 400) and the Shanghai Jiao Tong University Academic Rankings of World Universities (Top 500). A majority of universities can claim to hosting one or more world class centres of research or teaching excellence.

The National Innovation System depends on a world-competitive university sector which needs to enhance its position which is under threat as other nations embark on major higher education capacity building projects, such as Project 985 in China or the German 'Initiative for Excellence'. While these projects aim to direct major funding to create 'top 20' world universities, leaders in the sector point to the danger of policies aimed at promoting the reputation of a small number of leading universities over the needs of the university system and the national innovation system beyond those sectors served directly by a few favoured universities. Over concentration of scarce resources in a small nation such as Australia runs the strong risk of reducing the contribution to innovation in a broad range of industries broadly dispersed throughout the country and risks undermining our third largest export industry.

Griffith University therefore supports a National Innovation System which allows all universities to play to their diverse strengths on the global, national and regional stages and be properly funded for doing so. Relevant policies and programs which will enable this include research funding compacts, the Excellence in Research for Australia Initiative and the Higher Education Endowment Fund. Policies which encourage conformity and inhibit institutional flexibility should be removed over time.

**Recommendation 1**

*The National Innovation System, as a core principle, should seek to enable individual institutions or organisations to develop distinctive missions and enhance their world class areas of strengths.*

## 2. Moving from brain drain to brain circulation

### 2.1 The 'new geopolitics of higher education'

Professor Jan Sadlak, Director of UNESCO - European Centre for Higher Education (UNESCO-CEPES)<sup>4</sup> coined the phrase 'new geopolitics of higher education' 'to describe a new phase in national higher education and innovation policy where emphasis is shifting from mass education and recruitment of foreign students to attracting "superstar" researchers and high quality research students – a shift from quantity to quality'. The concept of the 'new geopolitics' is expanded upon by Alex Usher of the Educational Policy Institute, Canada:

*"There exist a finite number of top professorial brains out there – maybe 50,000 at most – who are genuinely worth fighting for because of the prestige and economic benefits that their presence brings. They are incredibly valuable economic property because of the potential value in future commercialisable research they represent. As an economic resource, they are as important to the North American economy as Mexico's silver mines were to the Spanish in the 16th century."*

**Alex Usher, Educational Policy Institute**

This is an important new trend for Australia to take account of in redefining its national innovation system and is central to the issue identified in the Call for Submissions of the 98% of knowledge production occurring elsewhere. Australian universities need to remain competitive in the quest for talent at all levels. While there is already a suite of programs addressing the attraction and retention of global talent<sup>5</sup>, Australia needs to expand its recruitment of international staff rapidly to effectively position itself in this new global environment. The Future Fellowship scheme, with its focus on early and mid-career researchers, represents a highly effective means to recruit high quality young

<sup>4</sup> Quoted by Alex Usher, EPI Week in Review, 8 February 2008, <http://www.educationalpolicy.org/>

<sup>5</sup> These include the ARC Federation Fellowships (144 awarded in total, annual cost \$33.06 million in 2006-07), Linkage International (approx. \$4.13 million in 2006-07), and International Postgraduate Research Scholarships (approx 350 awarded annually at a cost of \$23 million). Figures sourced from the ARC Annual Report 2006-07.

researchers, as opposed to placing undue emphasis on attraction of more established researchers through the Federation Fellowship scheme.

**Recommendation 2**

*To position Australia competitively as a recruiter of leading international talent it is recommended that the Future Fellowship scheme be doubled in size over a five year period.*

**2.2 Increasing ‘brain circulation’**

Griffith contends that far too much emphasis is placed on the so-called brain drain when Australia clearly derives much benefit from having one million diaspora (around 4.5% of its population). The benefits of the brain circulation are discussed in the 2004 parliamentary briefing paper by Professor Graeme Hugo<sup>6</sup> and in a paper commissioned by the Committee for Economic Development of Australia (CEDA)<sup>7</sup> co-authored by Professor Hugo.

Griffith University proposes a range of coordinated programs aimed not at stemming brain drain but rather improving brain circulation with the resultant flow meaning that new knowledge and ideas occurring anywhere in the world are absorbed much faster into the Australian economy and society. Griffith proposes the creation of a new **International Knowledge links Program**<sup>8</sup> with the following schemes:

<b>Existing Schemes</b>
ARC Federation Fellowships (leave as is)
Future Fellowships (increase to 2,000)
Linkage International (increase four fold)
International Postgraduate Research Scholarships (double in size)
<b>New Schemes</b>
<u>Visitor program – expatriates</u> Designed to attract expatriates for short or long-term stays to transfer knowledge and expertise gained overseas.
<u>Visitor program – international visitors</u> Aimed at enabling universities to create positions for international researchers on a part-time basis up to 50%. This program might also be used to re-engage with valuable staff that have been recruited overseas. These could then return on visiting appointments much more routinely than is the case at present to maintain networks, conduct joint research and transfer knowledge.
<u>Visitor program – international alumni</u> Programs to better link universities with their alma mater overseas will also achieve knowledge transfer in a cost effective manner. This could include the establishment of alumni networks aimed at employing suitable qualified alumni in offshore campuses,
<u>Visitor program – research students (two way flow)</u> This scheme might provide scholarships for domestic and international research students some of whom might be studying under joint supervisory or joint degree arrangements with an overseas partner.

<sup>6</sup> <http://www.aph.gov.au/LIBRARY/pubs/rn/2003-04/04rn54.htm>

<sup>7</sup> G. J. Hugo, D. Rudd and K. Harris, Australia’s Diaspora: its size, nature and policy implications, *CEDA Information Paper*, no. 80, CEDA, Melbourne, 2003.

<sup>8</sup> Administered by the Australian Research Council

Fellowships will play an important role and notwithstanding the welcome recent announcements from the Minister that Future Fellowships will be open to international applicants, consideration might be given to doubling the numbers to 2,000 subject to early success of the program.

**Recommendation 3**

*Create an International Knowledge Links Program incorporating existing schemes and creating a range of new 'visitor' schemes aimed at attracting expatriates, adjunct staff, international alumni and research students to Australia.*

**2.3 International doctoral program enrolments – repositioning Australia as a 'giver' not a 'taker'**

Australia's position as a major recruiter of international students is tarnished by its reputation in some quarters as a 'taker' aiming at the second tier of international students and offering fewer scholarships than many other developed nations. There is a high risk of Australia's position in international higher education becoming firmly entrenched as the service provider for educating Chinese accountants or Indian IT specialists.

Only 4.2% or 7,503 of Australia's 177,760 international university students are enrolled in doctoral programs<sup>9</sup> illustrating the dependence of Australian universities on international undergraduate and coursework masters students as a source of revenue. Income is currently the prime objective, not innovation. This is not the case in many OECD nations where a much higher proportion of international enrolments are at the PhD level and where a majority are provided with scholarships.<sup>10</sup> For as long as there are genuine shortages of domestic PhD students more can be done through the National Innovation System to support recruiting a significantly higher proportion of research higher degree students from overseas on scholarship. *International Postgraduate Research Scholarships* (IPRS) could easily be doubled to 700 per year by transferring 1,400 of the new 4,800 Australian Postgraduate Research Awards over a four year period.

**Recommendation 4**

*At least 1,400 of the 4,800 new Australian Postgraduate Awards scheme places should be offered as International Postgraduate Research Scholarships.*

**2.4 Domestic PhD enrolments**

The Group of Eight 'backgrounder' paper *Researcher supply and demand* spells out some disturbing trends in research training.<sup>11</sup> Australia is producing only 2.3 new doctorates per 100 university graduates compared with 3.9 in Canada, 10.1 in Switzerland and 11.2 in Germany. Low numbers of PhD students are enrolling in some areas which are critical for Australia's competitiveness including earth sciences, accounting, finance and business, environmental sciences, and several health sciences including dentistry and radiography. Young people may be attracted into PhD programs and to academic and scientific careers by increasing PhD stipends and offering more secure career paths post graduation.

The Group of Eight paper provides strong evidence that the academic workforce will struggle to replenish itself given the projected retirements in the order of 1,725 per annum (2006-2016) alongside a supply of PhD graduates to the academic labour market of 906 per year. The figure of 906 is based on the estimate of 27.4% of PhD graduates (4,250 per year) entering the academic workforce. This is a serious issue that needs to be dealt with for the health of the National innovation System. There are

<sup>9</sup> Australian Education international, Research Snapshot, Number 31, March 2008

<sup>10</sup> "In the US, almost two-thirds of foreign PhD students, are financed by scholarships or work in universities. By contrast, less than 25% of international graduate students in Australia receive support from Australian sources." Extract from Group of Eight media release PhD decline puts Australia's future at risk, 9 November 2007

<sup>11</sup> Group of Eight, Go8 Backgrounder No3: Researcher supply and demand, November 2007

several means available for the Government to encourage higher uptake of PhD study including increasing the annual APRA stipend and providing a remission of the Higher Education Contribution Scheme debt for earlier studies.

A further serious issue for the national innovation system is that growth in the number of HECS-exempt research training places has stagnated since 1999 leaving universities to carry large numbers of unfunded PhD students. This is not the hallmark of a thriving innovation economy and has consequences for the quality of research supervision and the overall quality of graduate outcomes.

**Recommendation 5**

*Increase the annual PhD stipend (currently \$20,007) substantially to a level that will attract more high quality research students especially into fields of national priority (e.g \$30,000 p.a.).*

**Recommendation 6**

*For domestic PhD graduates, introduce a remission of the Higher Education Contribution Scheme debt for previous studies.*

**Recommendation 7**

*That additional funding under the Research Training Scheme be designated as a high priority, equal in standing to the provision of additional Australian Postgraduate Awards.*

**Recommendation 8**

*That improved career structures and job security for early career researchers be made a high priority by both the government and the university sector to sustain their contribution to the National Innovation System. Knowledge Transfer Partnerships (referred to in more detail in section 8 of this submission) might provide possibilities in this regard.*

### 3. Improving intergovernmental coordination

*Innovation Nation*, the UK Government White Paper<sup>12</sup> released in March 2008 recommends that government departments can play a much more influential role in stimulating innovation in organisations with whom they interact. This would be achieved by embedding innovation in departmental strategic objectives and setting targets for R&D spending. Under the UK scheme, assistance would be provided by the Technology Strategy Board (TSB) which the Sainsbury Review recommended should be given a new leadership role to coordinate public sector technological innovation activity, leverage public sector resources and simplify access to funds for business. With increased resources the TSB should extend into new areas such as the services sectors including the creative industries. The TSB would also develop an international strategy to enhance the UK's position as a centre for investment by leading global companies.

In a similar vein, the Business Council of Australia (BCA)<sup>13</sup> proposed in 2006 that innovation be set as a new national reform priority for the Council of Australian Governments (COAG). The BCA has also called for creation of a new central body, *Innovation Australia*, reporting to COAG and tasked with the responsibility of 'bridging across silos' and providing whole of government policy coordination and consistent innovation performance assessment across federal and state jurisdictions. Griffith University supports these proposals while acknowledging, like the Government, that most State and Territory Governments have their own innovation strategies.<sup>14</sup> The establishment of a framework to

<sup>12</sup> Department for Innovation, Universities & Skills, *Innovation Nation*, March 2008

<sup>13</sup> Business Council of Australia, *New Pathways to Prosperity: A National Innovation Framework for Australia*, November 2006

<sup>14</sup> Rudd, K. and Carr, K., *New directions for innovation, competitiveness and productivity*, Australian Labour Party, April 2007

steer the National innovation System is detailed within the IRU Australia submission and has the broad support of Griffith University.

*Innovation Australia* might be modelled in part on UK's TSB and also on the Canada Foundation for Innovation which was established in 1997 to fund research infrastructure in universities, colleges, research hospitals and non-profit research organisations. More information about the CFI is provided in Attachment One. Industry Innovation Councils, already proposed by the Government, would set industry-specific research and innovation priorities and advise on the administration of Enterprise Connect, Researchers in Business and other schemes relevant to their designated industries.

**Recommendation 9**

*That innovation is set as a new national reform priority for the Council of Australian Governments (COAG).*

**Recommendation 10**

*That a new central body, Innovation Australia, set national innovation priorities and provide whole of government policy coordination and performance assessment across federal and state jurisdictions.*

#### 4. Research and innovation priorities – thinking globally, acting locally<sup>15</sup>

##### 4.1 National research and innovation priorities

The submission from IRU Australia argues that in practice, national research priorities are extremely broad and have done little to influence the directions of university research. The IRU Australia recommends that the current national research priorities should be abandoned and that the ARC and NHMRC be charged with “developing broad thematic priorities for basic research whilst also ensuring that the university sector has the flexibility to undertake high quality research across a wide range of fields”. The Industry Innovation Councils would develop targeted and fine-grained research priorities specific to their sectors. This will ensure that sufficiently broad research priorities exist which are relevant to the needs of universities and industry ranging from basic to applied research and applicable from the global and local levels.

Griffith University supports these recommendations, again emphasising that universities need flexibility to direct their research efforts at the local, regional, national or international levels in accordance with their distinctive missions.

**Recommendation 11**

*That industry and sector-specific research and innovation priorities be established by Industry Innovation Councils.*

**Recommendation 12<sup>16</sup>**

*That the ARC and NHMRC be charged with “developing broad thematic priorities for basic research whilst also ensuring that the university sector has the flexibility to undertake high quality research across a wide range of fields.*

<sup>15</sup> Term originated by Rene Dubos as an advisor to the United Nations Conference on the Human Environment in 1972 in relation to environmental action. The term is now used in business to describe the strategic environment faced by organisations which need to adapt global products and services to meet local needs.

<sup>16</sup> IRU Australian recommendation 6(b)

#### 4.2 Redefining Hubs and Spokes as ‘networked nodes’

While Griffith University strongly supports the Government’s intentions to foster greater collaboration we urge some caution with respect to the Hubs and Spokes concept. What works well in a geographically small nation such as the UK may not function well in a geographically dispersed country such as Australia. Distance and regional differences in industrial structure and concentration and in research and innovation priorities will be an impediment to collaboration between hubs and far-flung spokes.

The Hubs and Spokes terminology also carries connotations suggesting a hierarchical model when in fact such arrangements will best operate as a network where partners have complementary strengths. As pointed out by the IRU Australia, the model would need to go down to the third level of research classification to be meaningful resulting in a large number of hubs.

The concept of networked nodes better reflects the nature of an arrangement that might suit Australian conditions. This might entail one or more nodes for each discipline in each state which would be closely aligned to national research priorities whilst ensuring that regional research and innovation priorities are served. The state-based nodes would enable a two-way flow of knowledge ensuring regional problems and solutions can influence national priorities and vice-versa.

#### **Recommendation 13**

*That ‘networked nodes’ attuned to regional research and innovation priorities be utilised to develop areas of research and research infrastructure concentration.*

### 5. Funding the full economic cost of research

A major impediment to more effective interaction between universities, industry and commerce is that the universities tend to sell their services at less than the full economic cost (FEC) of providing such services. They seek to offset losses on the initial project by retaining control of intellectual property in the hope that a future revenue stream will eventually recoup some of their initial investment. Universities’ attempt to control their intellectual property inhibits the free flow of ideas that lead to innovation and introduces considerable obstacles and extensive delays to technology transfer agreements. This stems from Commonwealth grant arrangements and research project funding arrangements which recognise and entrench cross subsidies between teaching and research. Universities in turn balance budgets not based on the FEC of discrete activities but rather using the same cross subsidisation principles.

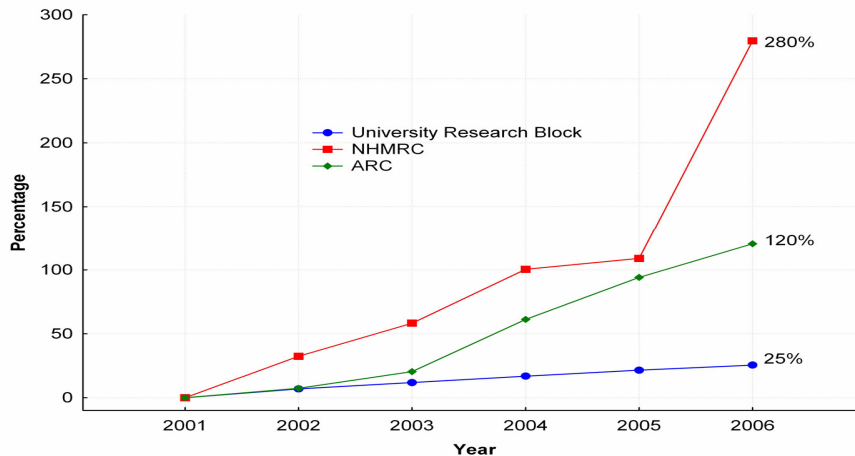
The United Kingdom provides a recent example of a government that now requires universities to recover the full economic cost of activities. Under the FEC model, traditional definitions of direct and indirect costs no longer apply. Instead, costs are classified as:

- **Directly Incurred Costs** – actual costs that are explicitly identifiable as arising from the conduct of a project (e.g. staff salaries, equipment, materials, travel).
- **Directly Allocated Costs** – costs of resources used by a project that are shared by other activities and based on estimates (e.g. principal and co-investigator costs, estates costs).
- **Indirect Costs** – non-specific costs charged across all projects that are based on estimates (e.g. HR and finance services, library costs).

Fortunately more and more Australian universities are developing systems that will track the full cost of activities. In the meantime there is a growing disparity between university research block funding and direct total funding provided for research grants through the NHMRC and ARC. The figure below shows that university research block funding has grown by 25% over five years while research council grants have increased by 120% (ARC) and 280% (NHMRC). In effect, the more successful a

university has been at competing for ARC and NHMRC grants the greater the need for internal cross subsidisation.

**Figure: Relative increase in research funding by entity, 2001 to 2006 (2001 base = 0)**<sup>17</sup>



FEC will require substantial increases to Commonwealth research grants schemes and also improvements in the Australian Government’s research purchasing practices and funding level. Any shift to FEC by Australian universities will also require evolution of accounting systems and institutional culture to break habits of cross subsidisation. FEC is however necessary for Australian university research to properly conform to the needs of commerce and industry and international funding bodies which expect research to be fully costed and intellectual property transferred accordingly. FEC is essential if Australia is to achieve ‘first tier’ innovator performance. It will take several years for funding to cover 100% of the FEC – the UK will achieve this over 3-4 years commencing at 80%.

**Recommendation 14**

**Fund the full economic cost of research.**

*In order to achieve this, it is recommended that the Department of Innovation, Industry, Science and Research conduct an investigation into methods to support transparent and fully costed activities and to then assist universities to refine and apply the method.*

## 6. Globalisation of the ARC and its funding programs

The Government and the Australian Research Council are moving very quickly to internationalise ARC programs. Fellowships and awards such as the Future Fellowships and Australian Postgraduate Awards (Industry) will be open to international applicants and restrictions on the use of ARC funds for collaboration-related international travel will be lifted. Enhanced international collaboration will be a priority for all ARC fellowship schemes. Griffith University warmly supports all of these changes.

Griffith University also proposes the consideration of innovative ideas such as establishing laboratories in overseas partner institutions or outsourcing university research assistance overseas to

<sup>17</sup> *Universities Australia* figure generated from DEST Triennium Reports and Higher Education Reports 2001 to 2005; DEST Science and Innovation Budget 2006-07 Table 1.

fast developers such as Brazil, Russia, India and China. An example might be ARC Discovery grants where an Australian university can provide the research leadership but lacks the capacity to undertake the research, particularly in areas where there is a shortage of domestic research skills. In such a case a chief investigator could use competitive grant funds to employ research assistance from a partner university overseas which might have excess capacity and which meets our quality control standards. This in turn would assist in making international networks much more tangible. It is predicted that 'knowledge outsourcing' will be as common in the future as it is for manufacturing now and that smaller developed nations will need to do this to keep pace - all subject to quality control which is also the case with manufacturing.<sup>18</sup> As predicted in the US Augustine Report,<sup>19</sup> researchers and businesses have the potential to now work on joint projects 24 hours per day.

**Recommendation 15**

*It is recommended that the ARC investigate the possibility of every funding scheme having a global orientation and that restrictions on international research collaboration be removed over time including the enabling the outsourcing of entire laboratories in overseas partner institutions or outsourcing university research assistance overseas.*

## 7. The next innovation breakthrough – extending the role of the Humanities, Arts and Social Sciences

The Council for Humanities, Arts and Social Sciences (CHASS) submission to the Productivity Commission study on science and innovation provides a good starting point for considering the role of the HASS sector in national innovation. The submission presented examples of collaborative research involving the HASS and STEM sectors and has contributed to a widespread appreciation of the role of the sector in providing society with the complete picture needed to fully understand and act on scientific breakthroughs. CHASS has successfully argued, on behalf of the HASS sector, for representation on the Prime Minister's Science, Engineering and Innovation Council and continues to advocate the adoption of a National Research Priority focussed on HASS disciplines. CHASS also draws attention to the folly of excluding HASS research from qualifying for the R&D tax concession. This elevation of the HASS sector is strongly supported by Griffith University.

This University however maintains that there is significant unexploited capacity for researchers and practitioners in the HASS sector to contribute more significantly to innovation in Australia. While many of our research programs seek to provide a bridge between disciplines (e.g. climate change adaptation, preventative health, and water security), others are focussed on HASS research for its own sake and its intrinsic benefits for societies and individuals. Griffith University has an extensive range of research themes which are directed at enhancing innovation with triple-bottom line benefits while providing the evidence base needed for rigorous public policy development. Examples include the nationally acclaimed *Pathways to Prevention* program and other recent programs including:

- *Smart Workplaces* which address issues of workforce commitment, discretionary effort, and work-life balance; and
- *Creative for Life* which takes a fresh look at creativity and healthy living across all ages and cultures and celebrates the creative processes and the ways they enrich our communities.

Unfortunately these valuable programs remain ineligible for the R&D tax concession and are not connected to innovation grant programs. This means their potential benefit is mainly limited to a handful of sponsoring organisations. Griffith University therefore recommends that innovation programs allowing universities and other HASS sector organisations to link with 'hard to get at' sectors

<sup>18</sup> Prediction made by DeltaScan, the 50-Year Science & Technology Scan project conducted by Institute for the Future for the Horizon Scanning Centre of the UK Government's Office of Science and Innovation. (<http://humanitieslab.stanford.edu/deltascan/Home>)

<sup>19</sup> Augustine, Norman R., *Rising Above The Gathering Storm: Energizing and Employing America for a Brighter Economic Future*, Statement before the Committee on Science, U.S. House of Representatives, October 20, 2005

(e.g. building and construction, mining, agriculture and manufacturing) to produce triple-bottom line benefits be considered. These are the sectors of boom and bust which often leave individuals and communities stranded asking questions about future directions. Extending the role of humanities, arts and social science to provide innovative solutions to individuals, organisations and communities which are both thriving and in decline could well represent the single largest innovation breakthrough that Australia can achieve.

**Recommendation 16**

*That strong consideration be given to a discrete funding stream under the Department of Industry, Innovation, Science and Research that allows:*

*- engagement with the HASS sector by organisations and communities which seek to achieve better understanding of new policies, technical processes, and management practices, or*

*- sectors, communities, organisation and individuals seeking answers about future directions (economic, social and environmental) to extend their understanding of issues and their ability to proactively address change.*

## 8. Improving collaboration with Government and industry with a focus on Small and Medium-sized Enterprises

The Queensland economy has traditionally been dominated by the agriculture, mining, tourism and building and construction sectors. As a result of State innovation strategies new industries are proliferating including advanced manufacturing, aviation, biotechnology, creative industries, food processing, information and communication technologies, marine, pharmaceuticals, services and venture capital<sup>20</sup>. Griffith University has five campuses in the Brisbane-Gold Coast corridor – a corridor which is a beneficiary of much of the transformation occurring.

One significant issue for Griffith University is that much of this innovation activity occurs in Small and Medium-Sized enterprises (SMEs). Individual SMEs rarely undertake R&D and are highly unlikely to seek university assistance to do so. However sector associations (e.g. tourism) are more inclined and able to do so. The *Enterprise Connect* scheme will go some way to facilitating interaction with SMEs provided the sectors are well chosen.

The under-utilisation of university research and engagement services by SMEs and communities in Australia is an imbalance in government policy and funding that requires further attention. The Lambert Review<sup>21</sup> in the UK recommended as a priority that the government identify non-collaborating SMEs which have the potential to gain significant benefits from working with universities. The Review strongly commended the role of the Knowledge Transfer Partnerships (refer Attachment Two) in which 87% of participants have come from micro, small and medium-sized enterprises.

Griffith University is a strong advocate of work-integrated learning (WIL) and also sees this as one largely unexplored area of national innovation policy. An example of WIL at Griffith University within the Department of Tourism, Leisure, Hotel and Sport Management is provided in Attachment Three. Universities Australia (UA) is currently advocating the introduction of an ambitious student internships scheme, paying minimum wages, to help address skills shortages, improve productivity and social inclusion and lift income support levels for students. UA suggests that these internships should ideally happen in the first semester of the final year of study with some aspects being credited to their degree programs. The UA internship scheme, like the Knowledge Transfer Partnerships, would require funding from government as well as commerce and industry.

<sup>20</sup> Smart State, Smart Industries website at: <http://www.investqueensland.com.au>

<sup>21</sup> Lambert, R. (2003). *Review of business-university collaboration. Final Report*. Retrieved April 5, 2008, from <http://www.lambertreview.org.uk>

One highly innovative model that the Government might wish to investigate in the context of the UA proposal is the *Growing the Smart State PhD Funding Program* which is designed to support doctoral research at Queensland universities that can inform public policy development (Refer Attachment Four). The grants of between \$1,000 and \$5,000 per annum assist students with expenses related to their PhD projects and final outcomes, but not living expenses or conference attendance. The program aims to enhance evidence based public policy development, make available research outcomes to the Queensland Government to assist policy development, and to develop relationships between universities, students, and the Queensland Government. It is proposed that a program such as this could be investigated as a sub-program of the National Student Internship Scheme.

Recent discussions in the context of this Review have identified a powerful new role for universities as providers of 'public space' where various stakeholders can come together and interact. The public space concept suggests that the university sector can best assist business, industry, government and community by provision of conferences and other forms of interaction which allow universities to engage in applied problem solving. Outcomes could include the provision of advisory services, access to specialist equipment or facilities, short courses, consultancy, contract research, or graduate programs. Naturally not all prospective beneficiaries of such services have the capacity to pay market rates and therefore universities could be funded to pursue such activities on a fee-paying basis or as a fee exempt service in lieu of research or teaching load as part of compact negotiations.

Aligned with the public space concept is the notion of "Professors of Practice" and "ex-industry university employees". Universities in the UK are already acting on recommendation 4.2 of the Sainsbury Review – that universities use some of their funding under the HE Innovation Fund to initiate pilot schemes for senior industry professionals to be embedded into departments, acting in parallel to the scientific leader of major projects. Two models of "embedded professional engagement" which are being considered are:

- Appointment of University "Professors of Practice" which are positions reserved for distinguished practitioners from industry; and
- Ex-industry university employees.

Such positions would be different to existing adjunct or honorary positions in that they would have equal status to other academic positions, they would be funded positions, and be fully embedded in the research community.

**Recommendation 17**

*It is recommended that Knowledge Transfer Partnerships and a National Student Internship Scheme be trialled and that these be aimed at small and medium-sized enterprises.*

**Recommendation 18**

*That a PhD in government internship program be considered as sub-program of the National Student Internship Scheme.*

**Recommendation 19**

*That the public space concept be explored as a means of promoting joint problem solving between universities, commerce and industry, governments and the wider community.*

**Recommendation 20**

*That universities appoint 'embedded' Professors of Practice and other ex-industry appointments supported by programs similar to the UK Innovation Fund. Funding might also be considered for honorariums for retired industry professionals to work in universities.*

## **Canada Foundation for Innovation**

The Canada Foundation for Innovation (CFI) is an independent corporation created by the Government of Canada to fund research infrastructure. The CFI's mandate is to strengthen the capacity of Canadian universities, colleges, research hospitals, and non-profit research institutions to carry out world-class research and technology development that benefits Canadians. Since its creation in 1997, the CFI has committed \$3.8 billion in support of 5,585 projects at 128 research institutions in 64 municipalities across Canada.

### **Funding Formula**

The CFI normally funds up to 40 percent of a project's infrastructure costs which are invested in partnership with eligible institutions and their funding partners from the public, private, and voluntary sectors who provide the remainder.

### **Benefits of Supporting Research**

Support from the CFI enables institutions to set their own research priorities in response to areas of importance to Canada. This allows researchers to compete with the best from around the world, and helps to position Canada in the global, knowledge-based economy. CFI support is intended to:

- strengthen Canada's capacity for innovation;
- attract and retain highly skilled research personnel in Canada;
- stimulate the training of Highly Qualified Personnel through research;
- promote networking, collaboration, and multidisciplinary among researchers, institutions, and sectors;
- ensure the optimal use of research infrastructure within and among Canadian institutions.

The research enabled by CFI support is also creating the necessary conditions for sustainable, long-term economic growth, including the creation of spin-off ventures and the commercialization of discoveries, and supporting improvements to society, quality of life, health, the environment, and public policy.

**Knowledge Transfer Partnerships (<http://www.ktponline.org.uk>)**

Knowledge Transfer Partnerships (KTP) in the UK is among the world's leading initiatives for promoting the transfer of knowledge and skills from researchers to business. KTP is a Government-wide initiative administered by the Department of Trade and Industry and involves a number of other government departments and agencies including:

- Department for Environment, Food and Rural Affairs;
- Department of Health;
- European Social Fund (European Union);
- Scottish Executive;
- Welsh Assembly;
- Invest Northern Ireland; and
- Six of the UK research councils.

The aim of KTP is to strengthen the competitiveness and wealth creation of the UK by the stimulation of innovation in business through collaborative partnerships with UK universities and research organisations. At the heart of each KTP is one or more KTP 'associates' which are high-calibre graduates recruited to work in a particular business on a project that is central to its strategic development. A project may last from 12 to 36 months. The university partner provides its expertise and jointly supervises the project together with a representative from the company. The costs are part funded by Government with the balance being borne by the participating business. KTP provide around £100,000 funding for a typical two-year, single-associate programme, £21 000 of which is awarded for academic support of the project.

Since the scheme started in 1975, over 4,500 projects have received Government support. The total investment by the Government in KTP in 2003 was £25 million however the Lambert Review (2003) recommended that the KTP scheme be significantly strengthened. Accordingly, in the year 2004/05, £32 million was committed to KTP augmented by over £53 million from participating companies. As at 31<sup>st</sup> March 2005, the 858 active partnerships (958 associates) were distributed as follows according to company size:

Micro-businesses (<10 employees)	14%
Small enterprises (10-49 employees)	45%
Medium-sized enterprises (50-249 employees)	28%
Large enterprises (250 or more employees)	13%

The KTP hopes to expand to 1,100 active projects in 2006. The latest annual report on KTP shows that, on average, participating businesses experience an increase of £220,000 in annual profits before tax and the creation of three genuine new jobs from a single KTP project.

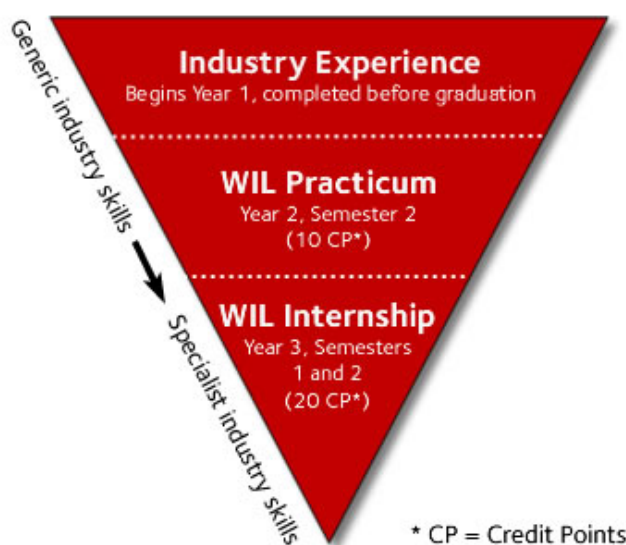
**Table – Standard Budget per Associate, 1 year at an SME Company (<250 employees)**

Standard Costs	A	B	C
	Maximum Budget £	<b>Business Contribution £ (40%)</b>	Grant Contribution £ (60%)
Contribution to Associate Salary	24,000	<b>9,600</b>	14,400
Academic and Clerical Support	10,500	<b>4,200</b>	6,300
Associate Development	1,750	<b>700</b>	1,050
Travel and Subsistence	2,250	<b>900</b>	1,350
Equipment	1,500	<b>600</b>	900
<b>Totals</b>	<b>40,000</b>	<b>16,000</b>	<b>24,000</b>
Overhead Contribution	-	-	9,522
Maximum Grant Support	-	-	<b>33,522</b>

## Work Integrated Learning in the Department of Tourism, Leisure, Hotel and Sport Management

All students studying Hotel, Tourism, Sport, Event or Leisure Management at Griffith University must complete at least one component of the Department's Work Integrated Learning (WIL) framework, before they can graduate. The framework aims to develop student skills gradually: from generic industry skills at the start of the degree, to more specialised project management skills at the completion of the program.

### Department Work Integrated Learning framework



#### Stage 1: Industry Experience

*Begins Year 1, completed before graduation*

This is the most basic form of industry experience, enabling students to work in their chosen field on a voluntary or paid basis. This experience exposes students to the industry, without directed learning outcomes or academic instruction.

#### Stage 2: Work Integrated Learning Practicum

*Year 2, Semester 2 - 10 Credit Point course*

The Work Integrated Learning (WIL) Practicum is a 10 credit point course which provides a structured, directed, and formally assessed industry component. The WIL Practicum allows students to experience planned and directed learning outcomes, in an industry-based learning environment. Industry is responsible for providing an environment that enables learning through observation and participation. The WIL Academic Convenor and the student are responsible for teaching and learning outcomes.

#### Stage 3: Work Integrated Learning Internship

*Year 3, Semesters 1 and 2 - 20 Credit Point course*

The Work Integrated Learning (WIL) Internship is a two-semester project-based course comprising a quarter of a year's workload, combining academic learning with an industry-supported learning environment. WIL Internships allow students to develop high-level negotiation and project management skills. To facilitate student-learning outcomes, WIL Internships are negotiated partnerships between the student, industry representatives and the WIL Academic Convenor.

## **Growing the Smart State PhD Funding Program<sup>22</sup>**

*The Growing the Smart State PhD Funding Program* is designed to support doctoral research at Queensland universities that can inform public policy development.

A total of 113 PhD students have been awarded grants under the five annual rounds of the Program since its inception in 2002.

The key objectives of the Program are to:

- make available broad ranging research outcomes to the Queensland Government and its agencies to assist policy development in areas of strategic importance;
- promote and enhance evidence based public policy development;
- support academic development of researchers and research capacity in Queensland;
- disseminate knowledge about the Queensland Government policy priority areas through the tertiary sector; and
- develop mutually beneficial relationships between Queensland tertiary institutions and students, and the Queensland Government.

The Program provides competitive grant funding of between \$1,000 and \$5,000 per year, for up to three years, to selected PhD students enrolled in Queensland universities on a full-time or part-time basis.

Funding is made available to support specified research costs incurred as part of the PhD research being undertaken and is not provided as a stipend.

As well as receiving funding, successful applicants are individually linked with a Queensland Government officer for mentoring and support.

### **What can the Grants be used for?**

The grants are provided exclusively to assist students with expenses related to their PhD research project and delivery of research project outcomes. Funds are not to be used for living expenses or to meet costs associated with conference attendance.

Research expenses may include those associated with:

- conducting experiments and research procedures;
- research analysis and enlisting research assistants;
- travelling to field sites or conducting field surveys;
- purchasing research or field equipment and supplies; and/or
- the purchase of some approved computer software or hardware.

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<sup>22</sup> Information retrieved on 28 April 2008 from: <http://www.premiers.qld.gov.au/policy/research/phdfund/>