

Developing research-led university alliances and the challenges for Australia

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In this presentation, I will cover three issues: I will outline the importance of research in the current global education landscape; I will discuss how Australia compares internationally in its ability to engage in cutting edge research; and finally I will describe an initiative at Monash University which is designed to reinforce our ability to engage in research in the current economic crisis.

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In the current global higher education landscape, research is driving prestige. Research is an important source of (i) the skills required to translate knowledge into practice, (ii) an enhanced ability to solve complex technological problems, and (iii) the ‘entry ticket’ to the world’s stock of knowledge, providing the ability to participate effectively in networks and absorb and exploit the resulting knowledge and skills. Additionally and importantly, research in its basic form underpins disciplinary advancement. Basic research makes available the expertise needed to address unexpected events when they occur.

Basic research becomes useful when addressing problems of global magnitude. Globalisation means that our economies and societies are becoming intimately linked. It also means that our global problems require global teams to resolve these problems – teams comprising groups from different places asking different questions which are relevant to place.

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In this context, international research collaboration is to be applauded. A promising sign is that most universities are committed to global collaboration – and are committed to producing quality global teams to respond to global problems. An indicator of increased global research collaboration is the significant rise in joint scholarly publications in the sciences in recent years. But of greater significance is the elevated median relative citation per paper for

multilateral authored papers, suggesting superior quality outcomes of global research teams.

More broadly, the number of publications indexed in the Science Citation Index (SCI) has increased exponentially since the 1980s, having a compound annual growth rate of 1.5% between 1980 and 1990, rising to 2.3% between 1990 and 2000, and climbing to 3.6% between 2000 and 2005.

Furthermore, researchers from non-Anglo-Saxon countries have been publishing increasingly in English language journals. Articles in English have grown from 86% of world publications in the 1980s to 98.7% in 2005.¹

These numbers indicate the presence of the global teams. These teams acknowledge that they cannot work in isolation and that the sum of their collaboration enhances the quality of their research.

Today I want to speak about how these global teams might fare in the face of the Global Financial Crisis (GFC). Since the turn of the 21st century we have witnessed a strong commitment by universities to invest in research. The importance of research was acknowledged, particularly for its ability to drive economies. I will now draw some of the most significant increases in research funding around the world, and reflect on how these might be affected by the global economic downturn. I will also suggest a way forward.

¹ Association of Universities and Colleges of Canada (2008), *Momentum: the 2008 report on university research and knowledge mobilization*. Ottawa.

International Developments

As many of you here today will be aware, countries in Asia and the subcontinent have embarked on ambitious projects in recent years, emerging as formidable education hubs.

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In 2005, China became the third largest R&D spender worldwide after the US and Japan. In January 2006, China's President Hu Jintao declared that 'the practice of the world's scientific and technological development shows that only with strong capacity of innovation, can a country win that initiative in the international competition.' That same month, China released a comprehensive fifteen year science and technology plan to position China as "an innovation-oriented society by 2020 and a world leader in S&T by 2050." The plan involves expanding basic research, the development of new disciplines and interdisciplinary areas, and strategic research to support major national priorities. It also involves quadrupling annual R&D spending from RMB 236 billion in 2005 to RMB 900 billion by 2020. China's 5-year strategic plan for 2006 – 2010 announced in April 2006 raised the target of developing S&T parks from 50 to 80 parks by 2010 in order to commercialise university research.

South Korea, Singapore and Malaysia are all seeking to become regional hubs of higher education and the financial support for the universities in those countries is increasing dramatically.

Meanwhile, India has committed to increasing its capacity. Currently there are only about 400 universities and 18,000 colleges to serve a population of 1.1 billion. Less than 12 percent of young people enter higher education. The government is aiming to raise the college-going rate to 21 percent by 2017. The

Indian Government intends to increase its higher-education budget by 21 percent, to \$2.79-billion to help expansion of the university system.

India is not only widening tertiary education participation but also strengthening its capacity for excellence in research and research training. In 2008, the Prime Minister of India, Manmohan Singh, announced plans to start 5 new Indian Institutes of Science Education and Research, 8 new Indian Institutes of Technology, 7 new Indian Institutes of Management, and 20 new Indian Institutes of Information Technology — roughly doubling the number of top-tier institutions in the country. He also wants to set up a total of 16 universities in states that don't have one, plus 14 “world class” universities, and almost 400 colleges.²

How will these countries fare in the face of economic downturn? While it is unclear whether or not India will maintain its targets, this is not necessarily the case for other international counterparts.

Early signs show that many countries continue to press ahead with research funding, even during the global recession. This is particularly noticeable for many countries that form part of traditional education hubs. In these hubs, many

² MSN News, “30 world class universities in India soon”, 29 March 2008.

Out of the eight IITs, first announced by Prime Minister Manmohan Singh in his Independence Day speech, one would be set up at Indore in Madhya Pradesh while Orissa, Gujarat and Punjab would get one each. The ministry had earlier announced IITs for Bihar, Rajasthan, Himachal Pradesh and Andhra Pradesh. Medak district near Hyderabad has been identified for Andhra Pradesh IIT. Of the seven new Indian Institutes of Management (IIMs), envisaged in the 11th Plan, one each would be set up in Tamil Nadu, Jammu and Kashmir, Jharkhand, Uttarakhand, Haryana and Chhattisgarh. An IIM for the North-East at Shillong was earlier announced and has been named as Rajiv Gandhi Indian Institute of Management.

The 16 Central universities would be set up in Bihar, Jharkhand, Orissa, Madhya Pradesh, Chhattisgarh, Punjab, Haryana, Himachal Pradesh, Uttarakhand, Jammu and Kashmir, Karnataka, Kerala, Tamil Nadu, Gujarat, Rajasthan and Goa. In three states, existing state universities would be taken over by the Central government and converted into Central universities. These are Dr Hari Singh Gaur University, Sagar (Madhya Pradesh), Guru Ghasidas University, Bilaspur (Chhattisgarh), and Goa University.

cities identified for 14 world class universities during the 11th Plan:

1 Maharashtra - Pune ;2 West Bengal – Kolkata;3 Tamil Nadu – Coimbatore;4 Karnataka – Mysore;5 Andhra Pradesh – Vishakapatnam; 6 Gujarat – Gandhinagar’;7 Rajasthan – Jaipur; 8 Bihar – Patna; 9 Madhya Pradesh – Bhopal; 10 Kerala – Kochi; 11 Punjab – Amritsar;12 Orissa – Bhubaneshwar;13 Uttar Pradesh - Greater Noida;14 North Eastern Region - Guwahati

governments are offering economic stimulus measures that include targeted investments in research.

For example in Europe:

Norway will increase capital in the Research and Innovation Fund by €685 million. The Norwegian Government will create over 200 new research positions and increase the funding for each new research position to €90,000 to cover more of the associated costs.

Of France's €26 billion economic stimulus package for 2009-10 some €731 million is to go towards the refurbishment of universities and research institutions.

Germany is investing €900 million in research and development commissioned by business. The Federal Government will be making available €450 million a year in 2009 and 2010 to medium-sized enterprises to help finance research projects. The Helmholtz Association will receive around €65 million from the German Government's first economic stimulus package to invest in expanding and developing critical research infrastructure.

These various economic stimulus measures come on top of earlier initiatives to strengthen research capability in the light of accelerating international competition. In 2000, the European Union launched the Lisbon Strategy, an initiative to make the EU the most competitive, knowledge-based economy in the world, largely through the creation of a European Research Area (ERA). A major element of ERA is the 7th Framework Program disbursing €50.5 billion, a 40% increase over FP 6. Another initiative is the establishment of the European Institute of Innovation and Technology (EIT), approved by the European

Parliament in March 2008, involving integrated public/private networks of universities, research organisations and business in Knowledge and Innovation Communities (KICs). In selecting the KICs early next year, the EIT will focus on sustainable energy, climate change and the information society.

In China:

China's massive 10 trillion yuan stimulus package over 2009-2011 includes major investments in science and technology such as "key research projects related to enlarging the domestic market", "scientific research for those technologies that are currently affecting the development of key industries", "the development of new hi-tech industries" (new energy, new materials, biotechnology and ICT), and platforms for sharing technological innovation and accelerating take-up by SMEs.

In the US:

President Obama's economic stimulus package as approved by the House and Senate in February 2009, provides additional funding of USD15.6 billion for higher education and research, including:

- \$10.4b for the National Institutes of Health, for research that focuses on specific scientific challenges, new research that expands the scope of ongoing projects, research on public health priorities such as influenza, tuberculosis and malaria, stem cell research, and funds for shared instrumentation, and capital research equipment.
- \$3b for the National Science Foundation, for research activities (\$2.5b) and major research instrumentation (\$300m) and modernisation of facilities (\$200m).

- \$1b for NASA including earth science and climate research (\$400m), aeronautics (\$150m) and space exploration (400m).
- \$1.6b for research in climate science, biofuels, high-energy physics, nuclear physics and fusion energy sciences
- \$600m for the National Institute of Science for research projects and capital works.

These initiatives come on top of the American Competitiveness Initiative, launched by President Bush in 2006, which emphasised the centrality of research to the country's competitiveness, particularly in terms of cutting-edge basic research performed primarily by universities. Priority was given to doubling funding for innovation-enabling fundamental research over ten years.

Is Investment in Research Sustainable?

While these initial signs might be promising, the ominous question is whether essential investment in research will be sustainable. With the collapse of the global financial system, we are faced with a different scenario. Along with many commentators, I would hazard to guess that the full burden of the collapse is yet to arrive. The ominous question in this environment is whether the level of investment of research is sustainable? Will global teams continue to be funded? Will research continue to receive the support it requires? As the GFC begins to take its full effect we are seeing trade barriers erected. How will this affect our potential to collaborate? Will it not, in effect, erect similar barriers to international research?

The point of my presentation today is to share some reflections about what the university community can do in response to these challenges. If one accepts the premise that international research collaboration generates better outcomes, then

it is incumbent on us to identify strategies by which we can push forward. The global problems which face all of us require that we collaborate rather than retreating in insular competition.

Lessons for Australia:

The importance of engaging in collaborative research to Australia cannot be overstated. For a relatively small-populated country like Australia, with a strong commodity-exporting sector, a large services economy based on SMEs, and lacking headquartered industrial corporates, it is necessary to make special efforts to link into the world's major knowledge advances. To sustain economic competitiveness, Australia must be able to generate new knowledge and understand and interpret new technology. To benefit from the public good of world knowledge we have to actively engage in cutting-edge research. Free riding on the rest of the world's research is not a realistic option – because the links between researchers are personal and they are based on informal trading in ideas, techniques, and devices. To access and make sense of basic research you have to be a contributing insider to the community of international researchers in a field. The capacity to understand and use the results of basic research performed elsewhere requires a considerable investment in institution, skills, equipment and networks.

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The last dozen years or so have been a tumultuous time for Australian universities, and hampered their ability to engage in cutting-edge research. The investment by the Australian Federal Government in supporting university education fell by about 30% per student in real terms between 1996 and 2004. This was not the result of a party-specific policy. The so-called indexation

system which delivers about one quarter of the true increase in costs through the Commonwealth Grants Scheme each year was introduced by the Keating Government in 1995. The Howard Government persisted with this and added additional cuts. The decrease in government funding has been only partly compensated for by an increase in student contributions through HECS and to some degree, fees from international students.

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The lack of investment in university education has hindered Australian universities' ability to engage in basic research. The trend in Australia has been that universities are doing a decreasing proportion of the nation's basic research compared to government, business and the non-profit sector. In 2006 – 07, basic research represented 22% of Australia's total research and development effort, down from 28% in 1992 – 93. Australian universities accounted for 57% of the nation's basic research, down from 59% in 1992 – 93. The Government share had risen to 20% while business accounted for 16%, and the non-profit sector 7%.

In the practical application of research, business expenditure on R&D (BERD) in Australia has risen consecutively for each of the past eight years to a record 57% of gross R&D expenditure (GERD) in 2006 – 07, with the main BERD increases in engineering, manufacturing and resources. The higher education R&D (HERD) share held up at around a quarter of GERD, indicating a considerable expansion of HERD over the past decade. The major decrease was in Government expenditure down to just 14% in 2006-07 from 32% in 1988-89. We can expect BERD to severely diminish in the new financial and economic conditions. The implications for HERD are unclear.

Expenditure on R&D by sector, Australia, selected years,(%)

Year	Business Expenditure (BERD)	Higher Education expenditure (HERD)	Government sector expenditure (GOVERD)	Non-profit sector expenditure	Gross Expenditure (GERD)
1988-89	42	25	32	1	100
1996-97	47	27	24	2	100
2006-07	57	26	14	3	100

[Source: Australian Bureau of Statistics, Cat. No.8104.0, 2008 and previous issues]

The good news for Australian universities is that a change in Government has brought a series of policy breakthroughs. One of the major election platforms of the Rudd Government was its commitment to an ‘Education Revolution.’ The Government subsequently commissioned large-scale reviews into the state of the tertiary education system, and similar reviews into funding requirements for research and innovation. The GFC has somewhat hampered this commitment. While recent announcements to fund the actual costs of research are encouraging; the Government is undertaking a pre-budget campaign to lower universities' expectations of a long-awaited funding boost next month. For example, our Finance Minister Lindsay Tanner recently warned that the financial crisis had "made it a lot harder" to deal with the priority issues of higher education and innovation "in a substantial way."

The Australian situation is complicated by local factors to do with the health of the Australian academic workforce. There has been an increasing flow of Australian academics to foreign universities and research institutions - a type of research carousel. This in many ways is a healthy part of our university system in a globalising world and international mobility between universities is a longstanding practice. The scale of this mobility out of Australia is currently at record levels. This is concerning because much of the movement *to* Australia appears transitory. Although in numerical terms, the out flow is more than

counterbalanced by an inflow of immigrant academics; there are many more academics coming to Australia under the new temporary migration categories than are arriving as permanent settlers. This indicates that much of the movement is to short term non tenured positions.³

Of related concern is our aging academic workforce. In Australia, we are at the edge of a precipice in terms of the future supply of researchers to replace the existing body and provide for an enlarged higher education sector and wider workforce requirements. Graham Hugo has identified the aging of the academic workforce as a major challenge to Australia's higher education. Today, Australian academics aged in their 40s and 50s outnumber those in their 20s and 30s by 31.1 per cent. There is a 'lost generation' of potential academics that would currently be in their 20s and 30s and an increase in the percentage of staff aged over 50. Between one-fifth and one-third of academic staff members will be lost to universities during the next decade.⁴

How can an Australian university remain truly engaged in this environment and make a meaningful contribution to international collaboration? More specifically, with our ability to engage in basic research under further threat from the GFC – how will our “national strategic reserve” survive?

Monash's position:

In its 50th year, Monash University is Australia's largest higher education institution with over 55,000 students – approximately six per cent of tertiary students nationally in 2006. Despite its size, Monash is highly research intensive, with approximately 80 per cent of academic staff active in research and over 3,600 higher degree by research (HDR) students in 2008. Monash has

³ Hugo, G 2005, 'Academia's own demographic time-bomb', Australian Universities Review, vol. 48, no. 1, pp. 16-23

⁴ Hugo, G 2005, 'Academia's own demographic time-bomb', Australian Universities Review, vol. 48, no. 1, pp. 16-23

also pursued a program of internationalisation on a scale greater than any other Australian higher education institution. Monash University operates full campuses in Malaysia and South Africa, in addition to its campuses in metropolitan and regional Victoria. The University also operates a centre in Prato, Italy, which serves as Monash's platform for research and educational activities in Europe and a joint research academy with IIT Bombay in India.

At Monash we feel we are well placed to comment on how to develop a long-term sustainable strategy for global engagement and international education. We are embracing new ways to create dynamic university alliances, that will be mutually beneficial to all those involved.

I will now explain some of the key features of our approach.

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The Global Partnership Framework:

At Monash we have introduced a new mechanism which recognises that knowledge, and the means by which it is acquired, are borderless. We want to promote sustainable research and education partnerships based on this premise, and promote them with a layered approach. Our **Global Partnership Framework** is the cornerstone of this idea. Once fully established, the Framework will see Monash execute comprehensive university-wide international engagement with selected institutions on a bilateral, multilateral and thematic basis.

There are three other partners in the Framework: Warwick University (UK), Arizona State University (US), and Sichuan University (China). Together we are four universities, on four continents with a combined capacity of over 200,000 students, 3,000 professors and a US\$620 m pa research budget.

These institutions were selected because they are:

- like-minded, possess complementary attributes, internationally focused;
- not directly competitive;
- ‘hungry’ to be number one on some relevant scale
- possess a combination of strategies driven both from ‘top-down’ (central) and ‘bottom-up’ (faculty)
- looking for comprehensive (rather than program-specific) international partnerships
 - in research, education and institutional policy and practice
 - in multidimensional structures - bilateral, multilateral and thematic
- looking for ‘win-win’ (rather than asymmetrical) outcomes and shared investment and risks (rather than asymmetrical profit-making)

The Partnerships will involve a range of activities in research, education and management collaborations.

These include:

Research: thematic research, bi-lateral or multilateral research, dual award PhDs, research fellowships and exchanges, university-industry links;

Education: student exchanges, joint teaching, dual degrees, e-learning, virtual seminars, joint internships, volunteering.

Management: focus on institutional policy and practice such as benchmarking, diverse (best) practices, staff exchanges.

Advancing this type of partnership does not preclude pursuing other potentially salient collaborations with other institutions, which may be more narrowly focused for example in a particular research area or degree program.

The partnerships are not competitive – we are strongly focused on working in a partnership with reciprocal benefits. Our aim is to build on existing links, strategically applying our institutional weight to ensure that university leaders, researchers, educators and professional staff can develop the best possible set of productive links. An underlying assumption is that we agree our international engagement must include institution-to-institution links, and therefore be greater than the derivative of a range of academic links.

The sheer weight of this Partnership Framework is evidence of its potential. The partnership will create a global research and education platform which takes advantage of our combined momentum. It will be flexible and responsive enough to take advantage of new opportunities; to share information and adopt ‘diverse practices’ that contribute to performance improvement; and to create an environment (not excluding the funding environment) that supports sustainable and long term collaborations. All of this will translate into a more international experience for the combined student and staff community. Our students, will receive a global experience, have a global network of academic links, and be used to the idea of thinking and working in an international setting.

At the heart of the Global Partnership Framework, is the idea that internationalisation is central to our success as a research intensive university. Internationalisation guides our choices, and structure our planning to find ways to secure its worth. As an international university, we believe we can give our students unique and transformative opportunities which are relevant to the world in which they live. We are implementing internationalisation in such a way that doesn't compromise the two traditional modes of university achievement – research and excellence. Rather, our approach seeks to advance research and excellence, by advancing them first and foremost in an international way. Here international cooperation is treated as integral to research rather than as an optional extra. International cooperation works as a strategic and effective multilateral mechanism for linking together and exploiting synergies between existing research programs in different nations.

Monash recognises the need to remain engaged in the current economic climate, and develop new ways in which to do so. In this new and challenging education landscape, research capacity is not primarily about institutional marketing and league tables. It is about national intelligence and global effectiveness and it has become the main global game in the sector. As Monash's Vice Chancellor Professor Richard Larkins recently noted, the important message that is that no institutions are more important to the future of Australia than our universities. Universities educate the leaders of the future, the innovators and the creators. They perform the research that will allow us to compete through innovation, technology and quality and the research that will allow us to mitigate and adapt to climate change, fresh water shortage, soil degradation and other environmental problems. They reach out internationally and develop the cultural bridges and understanding necessary for our changing social climate.

If we understand this importance, and the changed economic circumstances which we face, then we must acknowledge that solutions to this economic climate are found in greater collaboration, and not less. The current economic downturn is but one of the problems of global magnitude, which by nature require a global response. Embedding ourselves within the global higher education landscape through developing comprehensive, research alliances will prepare us to provide answers to this and other crises in the most effective way. While the apparent dangers of global economic integration may lead many to question the value of international collaboration, the irony for universities is that international integration provides both the remedy and way forward. This should lie at the heart of our efforts at international collaboration, and strengthen our resolve to find better, smarter ways to engage with each other.