Moving beyond university rankings: developing a world class university system in Australia

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This paper examines why the development of a world class university system represents a rational, even inevitable, policy approach for Australia in response to world university rankings. It assembles evidence questioning the value of policies which direct undue emphasis on the concentration of resources and the development of elite universities, especially in smaller nations. Several recent policy initiatives have enhanced Australia's ability to maintain a strong university system and this has meaningful implications for the international promotion of Australian higher education. The 'system' approach necessitates that Australia continue to pay close attention to world university rankings but develop more sophisticated means of classifying and benchmarking universities to ensure the required diversity of institutional missions to achieve all that is expected of the system.

Introduction

On 12 December 2008, the report of the *Review of Australian Higher Education* (Bradley Report) was forwarded to the Deputy Prime Minister and Minister for Education, Employment & Workplace Relations, and Minister for Social Inclusion, the Honourable Julia Gillard. The 271-page report contained not a single mention of world university rankings and scant reference to the notions of research concentration and development of elite universities. It instead exhorted Australia, as a nation that grossed $14.2 billion from the 'export' of educational services in 2007–08, to develop a world-class university system:

> The reputation of Australia as a quality provider of international education depends on it being able to provide a clear and unequivocal statement about its intention to maintain a world-class university system.(Bradley *et al.*,2008, p. 124)

Similar sentiments were expressed in the Review of the National Innovation System report, *VenturousAustralia*, released in September 2008:

> Rather than debating whether Australia can support two or three 'world-class' universities, the focus should switch to establishing a hundred or more world-class research facilities and research groups across the whole university system. Domestic and international networking should be promoted to ensure that the benefits of specialisation and concentration of research activity are spread across the whole of the system.(Cutler, 2008, p. 70, and Annex 6, p. 9)

These conclusions were not entirely unexpected given statements made by the relevant Minister shortly after the election of the new Commonwealth

Government. In February 2008, Minister Gillard announced:

> We want the system to be world-class so wherever students are in this country, whatever institution they're at, they're getting a world class education (Gillard, 2008).

This is a shift in the philosophy of how resources should be distributed within Australian higher education; a shift from policies favouring concentration to promotion of quality and excellence throughout the system. Why would Australia choose this direction when it clearly has the financial resources to develop a world leading university?

The answer is partly provided in the Bradley Report (Bradley *et al.*, p. 87) which states:

> Australia has been a world leader in international education. It has also been extremely successful in developing education as an important export industry and Australia's universities have been central to the development of this industry.

Few nations view education as an export commodity in quite the same way as Australia. In 2007-08 Australia's education services exports were reported as being valued at $14.2 billion (ABS, 2008) increasing to more than $15 billion in 2009, placing education as the number one service export and third overall to coal and iron ore.

This places Australia as the nation with the greatest reliance on international students to balance the higher education budget. International students now comprise 19.7 per cent of all tertiary education enrolments, well ahead of the OECD average of 7.3 per cent. The average university in Australia now derives 15 per cent of its revenue from international student fees, ranging from Charles Darwin University (3 per cent) to Central Queensland University (44 per cent). All 39 universities are exposed to the global higher education market creating a situation whereby Australia is highly dependent on its good standing in the international market and the sustainability of that market in times of economic downturn.

It is hardly surprising therefore that accreditation, quality assurance and a public accountability framework featured prominently in the Bradley Review. This was reaffirmed by the Vice-Chancellor of the Australian National University, Professor Ian Chubb, commenting on the need for more stringent university accreditation requirements: 'It is important for Australia that the term 'university' means something. And it means validating claims beyond self belief based on self-assertion' (Chubb, 2008). This position is also supported by leading international commentators, most notably Philip Altbach, who in February 2008 warned that the most active participants in the international higher education race could well face a 'sub-prime style crash' if improved regulation and quality assurance are not adopted (Altbach, 2008).

With high levels of exposure to the global education market it is vital that Australia maintains a strong higher education system rather than place its reputational hopes on developing three or four prestige institutions to 'serve as beacons for the export industry' as argued by some commentators (Slattery, 2009).

It would however be selling Australia short to conclude that it is all about money. Global engagement is recognised as having many dimensions including: economic contribution; preparing Australian students for a global workforce; meeting skills shortages within Australia; international knowledge exchange and scholarly collaboration; and the achievement of foreign policy goals with neighbouring countries (Strategy Policy and Research in Education Limited, 2009).

While this seems logical enough in hindsight, it took years of debate and analysis to arrive at this point of realisation. Up to the eve of the Government's decision on the Bradley Report persistent lobbying was occurring urging restructuring of higher education in Australia to create greater diversity, concentrate research funding, and even create a tiered system of higher education (Group of Eight, 2008).

The preferred Australian approach also runs contrary to an apparent international trend to concentrate excellence, possibly reflecting Australia's strong egalitarian traditions combined with the recent change in the political landscape. The Bradley Report signals a rejection of the influence of university rankings as a driver of public policy, making Australia possibly the first nation to explicitly do so. This is not to suggest that Australia should turn its back on the rankings phenomenon altogether. With 17 of its 39 universities represented in the top 500 of the Shanghai Jiao Tong University (SJTU) Academic Ranking of World Universities 2009 (Shanghai Ranking Consultancy, 2009), Australia stands to gain more by monitoring the rankings to ensure that quality continues to run deep within its university system and that the world is aware of this high standing.

This analysis however begins with world university rankings and their influence on public debate within Australia since the emergence in 2003 of the SJTU Aca-

demic Ranking of World Universities and assembles evidence in support of a system approach.

What are the international ranking systems telling us about university systems?

World university rankings focus attention on the leading universities and support the theory that concentration of resources to develop world-leading universities is essential for a nation to participate effectively in the global knowledge economy. Previous research has highlighted the potential for rankings to be used constructively by governments to 'stimulate a culture of quality' and by institutions 'for strategic planning and quality improvement purposes' (Salmi & Saroyan, 2007). Others assert that rankings should not be used to deliver policy messages on educational issues and that 'while indicators and league tables are enough to start a discussion on higher education issues, they are not sufficient to conclude it' (Saisana & D'Hombres, 2008).

With this in mind, precisely what are the international university rankings telling us? Not much, but they do reveal something about the static nature of university systems and the long-term commitment required by governments and societies for individual universities to fulfil their potential.

Key 'system-wide' messages from SJTU Academic Ranking of World Universities are:

- Of the world's nearly 10,000 universities, research performance is concentrated in the top 500 and is virtually undetectable (on that index) beyond 2,500.
- There is a band of around 200 world-class research-intensive institutions however within this there is a 'super-league' of approximately 25 world-leading institutions.
- These 25 world leaders are distinguished by large budgets, large endowments, age, excellent staff to student ratios, and most importantly, access to large pools of highly developed human capital (staff and students).
- There are very few 'movers' on the SJTU index. The biggest non-US movers in the Top 100 (since 2003) are the result of mergers and strategic alliances such as the University of Manchester (gained 49 places), Copenhagen (21 places), Paris XI (24 places), and Paris VI (UPMC) (21 places).
- Access to the top 25, for the near future, is beyond most nations. For example, Harvard with 187 'Highly Cited' researchers (Hi-Cis) almost matches Canada (as a nation) with 190. (Note that, at the time of writing, Harvard has grown by 16 Hi-Cis during the past 18 months, double the total number of Hi-Cis in Ireland and two fewer than New Zealand).
- Universities from the smaller nations can however compete well at the 'field' level: Swiss Federal Institute of Technology – ETH Zurich – 9th in natural sciences and mathematics; Sweden's Karolinska Institute – 8th in clinical medicine and pharmacy, 15th in life and agricultural sciences; Australian National University – 35th in natural sciences and mathematics, 42nd in life and agricultural sciences.
- The top global academic talent is highly concentrated. Alumni from 198 universities have gone on to win Nobel Prizes but at the time of award, these were working in just 136 universities. Most of the world's 6,950 Highly Cited researchers are concentrated in 450 or so universities.

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Regrettably, many excellent universities are not placed in the top 500 listings and continue to grapple with the one-size-fits-all approach of rankings. The University of Maribor in Slovenia, the University of Cairo in Egypt, the University of Iceland, and the University of Mekarere in Uganda are four examples of institutions which have a strong nation building role, play a niche role in research, and yet are absent from the SJTU rankings. Rankings devalue the role of these 'niche' players in the higher education ecosystem and distort the policy signals in many nations.

On the upside, rankings deliver a brutal message. They have raised the awareness levels of the global position of our nations and institutions. Very few vice-chancellors, rectors and presidents are unaware of the positioning of their university in the international domain and many take an acute interest in performance measures such as Thomson Reuters indexed articles and the attractiveness of their university to Highly Cited researchers, international staff and students.

Rankings can also be used as a powerful institutional benchmarking tool. Even the SJTU rankings began life as an attempt to benchmark institutional performance (Liu, 2009). The fact that the SJTU is now ranked in the top 250 in the world (after placing in the 401-450 band in the original 2003 ranking) and top 50 in the world for publications output (having increased six-fold) speaks volumes of that university's commitment to the process it instigated almost 10 years ago, before the rankings were published.

On the downside, rankings risk fuelling a culture of university management by instant gratification resulting in short term strategies to lift apparent performance. They are one dimensional and usually designed from the top down, with indicators based on the measurable characteristics of leading universities. Measures used in the tables are 'largely determined by the data available, not necessarily by clear definitions of quality' (HEFCE, 2008). 'World class' becomes synonymous with 'Western' which in itself means an emphasis on big-budget scientific research. Thus, what is measured by the world university rankings is the degree to which universities conform to those major US institutions that are large, wealthy and usually have broad discipline coverage. This results in universities in both developed and developing nations trying to 'emulate the West', rather than 'develop their own unique character' (Birnbaum, 2007).

Governments are keenly looking for strategies to lift their flagship universities into the rankings with the favoured approaches being the concentration of financial and human resources and accumulation of critical mass through mergers. Rankings however are a zero sum game and, at best, such strategies will only allow universities to hold their place given the prevalence of nations adopting similar initiatives.

Concentration of resources – the favoured strategy of large nations

According to the *World List of Universities and Other Institutions of Higher Education* there are 9,760 university level institutions and 8,000 non-university level institutions of higher education (International Association of Universities, 2006). The SJTU top 500 therefore comprises the top five per cent of world universities and the top three per cent of all higher education institutions.

There is no doubt that rankings have led to undue policy emphasis on the development of world-class universities which usually equates to the top two per cent (top 200). Universities further down the order are responding by conforming to the gold standard set by the leaders, as one would expect. However, universities placed even at number 500 have little in common with the world leaders. The strategies used by the leading institutions are inappropriate to inform the direction of 98 per cent of world universities and yet these universities continue to attract a majority of policy attention and often provide 'best practice' cases for the university sector worldwide.

This emphasis has supported the emergence of programmes of a growing number of so-called nation-building programs designed to achieve institutional research excellence through concentration of resources. Some of these include:

- China 985 Project (Yao *et al.*, 2008).
- Germany Excellence Initiative.
- Brain Korea 21 Program.
- Japan Top 30 Centres of Excellence for 21st Century plan.
- Taiwan Development Plan for University Research Excellence.

These policies of research excellence centre on improved governance, institutional autonomy, mergers, sectoral segmentation and, without exception, concentration of funding. In the case of China, the concentration occurs in 34 universities out of more than 1,700 universities and higher education institutions. The German initiative focuses additional investment of US$2.3 billion on 10 universities out of 70 universities and universities of technology and 167 *Fachhochschulen*.

Are strategies of concentration working? If they are, then the results are not yet apparent on the SJTU rankings. By observing the distribution of institutions on the SJTU index according to articles indexed in the Web of Science in 2003 and in 2009 the results are illuminating. Harvard serves as the benchmark in both years scoring a maximum of 100 points. Nearly every institution below rank 175 on the SJTU index is producing more Web of Science indexed articles relative to Harvard now than in 2003. Surprisingly, 93 of those ranked 175 and above are producing fewer Web of Science indexed articles relative to Harvard now than in 2003 (42 of these are in the top 100). The evidence suggests that major movement on the index is occurring within the ranks from 175-500 where conformity to the 'gold standard' set by Harvard is now more sought-after than before the emergence of rankings.

The same analysis performed for the Highly Cited researcher indicator on the Shanghai Jiao Tong University index provides stronger evidence of the impact on behaviour of the rankings. Harvard again sets the world benchmark for this indicator scoring 100 points in both 2003 and 2009.

In 2003, 334 institutions on the SJTU rankings employed at least one Highly Cited researcher. By 2009 this had increased to 422 ranked institutions employing a Highly Cited researcher. This indicates that almost 90 additional 'middle-ranked' institutions have acquired Highly Cited researchers since 2003. This is a logical consequence of the SJTU rankings given the existence of a 'Hi-Ci' on the staff of almost any medium-sized research-led university virtually guarantees placement in the SJTU top 500. It is also the most efficient means for a medium-ranked university to improve its ranking on the Shanghai Jiao Tong index. The 'additional' Highly Cited researchers were drawn from three sources: growth in the pool of Thomson Hi-Cis; recruitment or joint appointment of Hi-Cis from non-university organisations; and leakage of Hi-Cis from top 50 universities (approximately half of the top 50 have lower scores now than five years ago).

These changes to the distribution of universities on the Shanghai Jiao Tong index indicate that real change is occurring from rank 175 to 500 and that strategies of excellence are not yet resulting in major improvements in the upper echelon (i.e. top 100) as determined by the rankings.

Developing world leading universities – not an option for small nations

Several nations have expressed aspirations to develop universities which are placed in the world top 20. Analysis by QS (Sowter, 2008) of the Times HE-QS World University Rankings provides further insights into leading universities showing that they are well established (i.e. old); small or medium sized by world standards; are extremely well resourced; and are highly selective in their recruitment of both staff and students. Sowter's estimates align with those reported by Usher (2006) which state that a world leading university is at least a US$1.5 to 2 billion enterprise.

Small and developing nations are therefore confronted by almost insurmountable challenges in the quest to develop world-leading universities including the availability of human capital within their nation and the inability to attract leading researchers of the highest order from overseas. World-class universities are able to select the best students and attract the most qualified professors and researchers and even wealthy universities in small nations struggle to attract sufficient talent in comparison with the top 20 universities.

Table 1: Selected small nations: Highly Cited researchers (as at November, 2009) and Nobel Laureates (1901-2009) *Includes Peace Prize, excludes organisations (e.g. Médecins Sans Frontières, Belgium)*

Nation	*Highly Cited researchers*	*Nobel Prize winners*
Austria	18	21
Australia	112	11
Belgium	39	9
Denmark	31	14
Finland	18	3
Hungary	7	12
Ireland	8	9
Israel	49	8
The Netherlands	100	18
New Zealand	18	3
Norway	14	10
Singapore	2	0
Sweden	63	28
Switzerland	115	25

Source: Thomson ISI (Highly Cited researchers), Wikipedia (Nobel Laureates)

Harvard University at no. 1 on the SJTU ranking currently employs 187 highly cited researchers while the University of Tokyo at no. 20 employs 33. The institution ranked at no. 5, Massachusetts Institute of Technology states on its website that '72 current or former members of the MIT community have won the Nobel Prize' while John Hopkins (no. 19) reveals that 32 of its current or former staff and students have received the Prize. Contrast this with Table 1 showing the number of highly cited researchers and Nobel laureates in selected small developed nations and one can determine the strategic challenge confronting governments, science and education ministers from small nations with top 20 aspirations.

Table 1 also shows that only six of the 14 leading small nations have sufficient numbers of Highly Cited researchers employed in their entire nation (universities and other research institutions) to challenge the University of Tokyo at number 20 on the SJTU list. Only Sweden, Switzerland and Austria have developed

enough Nobel laureates to come close to challenging John Hopkins University at no. 19. Even an amalgamation of leading universities in each of the 14 nations to form one single global contender would only see the 'international' university systems of Sweden, Switzerland, the Netherlands, Australia, Denmark and Austria enter the top 20 (Sheil, 2007).

There are several possible explanations of the inability of small nations to attract the necessary human capital to develop top 20 elite research universities. Follow-up areas for further study might be geography and perceived isolation, national research orientation, access to international research networks, institutional budget arrangements, and access to external research funding sources.

Exploratory analysis suggests that size does matter (population and GDP) for small and developing nations when seeking to attract the best academic talent and that there is a clustering effect of talent within disciplines. The size factor works against the emergence of global research universities of the highest calibre but strengthens the argument in favour of developing areas of national focus.

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Size does matter when attracting Highly Cited researchers

There are approximately 6,950 Highly Cited researchers in the world, as defined by Thomson Scientific – these are the top 1per cent of citation 'superstars' worldwide. In preparing this paper, an analysis of Hi-Ci performance in small nations has led to three conclusions:

1. There is a positive correlation between the number of Hi-Ci researchers and the gross domestic product of that nation.
2. On this basis small nations are competitive in producing, attracting and retaining highly cited researchers.
3. A high degree of concentration of highly cited researchers exists in small nations.

It is worth noting that Highly Cited researchers are found in 20 of Australia's 39 universities – corresponding to midpoint between the number of Australian universities positioned on the SJTU rankings (17) and the Times HE-QS rankings (23). This provides further evidence in support of Australia's policy direction to support a world-class university sector.

Examples which illustrate the third point include:

- Of Switzerland's 115 Hi-Cis (1.8 per cent of world Hi-Cis), 19 of these are in physics which is 6.2 per cent of world Hi-Cis in the field.
- Of Israel's 47 Hi-Cis, 42 per cent are in computer science and mathematics.
- Ireland has eight Hi-Cis, six of whom are in agricultural sciences.
- Nearly half of New Zealand's Hi-Cis are in pharmacology.

Similar concentrations of highly cited researchers are found in other small nations such as Belgium (microbiology), Finland (ecology and environment), Sweden (neuroscience and agricultural sciences), Norway (ecology and environment and plant and animal sciences) and Australia (plant and animal sciences and agricultural sciences). While this indicates that highly cited scientists are more likely to be attracted by the presence of others in their field, it should be pointed out that several small nations display more balanced spreads of Hi-Cis, such as the Netherlands and Denmark. This evidence highlights the point that most nations, especially smaller ones, have a far better chance of achieving top 10 status in a targeted disciplinary area than of creating a world-leading university.

Beyond rankings – university systems, classifications and benchmarking

Two major university systems rankings emerged in 2008 – the QS SAFE National System Strength Rankings and the Lisbon Council University Systems Ranking (Ederer et.al., 2008). The QS SAFE rankings rely on existing results for individual institutions to evaluate 40 national higher education systems. The Lisbon Council exercise examined and ranked 17 OECD nations based on six criteria: inclusiveness; access; effectiveness; attractiveness; age range; and responsiveness. This ranking is unique in that it attempts to ascertain how national systems are 'coping with the economic and social challenges of the 21st century knowledge-based society.' The two rankings produce divergent results, which is hardly surprising given the

choice of indicators. Like institutional rankings, the systems rankings have defaulted to the one-size-fits-all approach.

Higher education researchers in Australia, notably Marginson (2008), have proposed that comparisons can be rendered more compatible with mission diversity by using a system of classification similar to that being developed in the European Union. While there is no perfect means of assessing the relative performance of university systems, better benchmarking, better profiling and trend analysis provide one way of understanding and breaking away from the one-dimensional vice of world university rankings. This would allow for the emergence of much more nuanced national and institutional strategies, provision of better information to stakeholders and appreciation of the system-wide dimensions.

While we are all aware of what the gold standard is, there is a distinct lack of understanding of best practice and strategies being employed at all tiers within our respective university systems. How do we define excellence in a university that is only 10, 25 or 50 years old for example? What is the yardstick for excellence?

It might be that universities formed in the period of higher education expansion during the late 1950s and 1960s might be more interested in what successful strategies are being adopted by others in that band such as Macquarie (Australia), Umeå (Sweden), Tromsö (Norway), Southern Denmark (Denmark), Simon Fraser (Canada), Ben Gurion (Israel), and East Anglia and Sussex (UK). They might also be interested in 'breakthrough' strategies of universities such as Warwick that have achieved beyond expectations over time.

This solution entails better systems of university classification and with it better profiling and benchmarking across systems, using relative indicators, encompassing institutions at all points within the system – not just the flagships. Profiling will create a more sophisticated understanding of the range of available approaches available nationally and institutionally. Then we can begin to address some interesting strategic dilemmas.

For example, what differentiated structures and organisational arrangements, missions, and supporting strategies are required at various points within our university systems? What expectations should be placed on institutions at various stages of development in their research performance, learning experiences and outcomes, community engagement activity, commercialisation and internationalisation? What investment is required to produce 'step change' and lift universities from all tiers to the next stage of development? What are the optimal levels and mixes of expenditure (government and private), regulation and educational provision needed to ensure that each institution meets its unique mission?

Policy makers might also consider programmes to encourage leading national universities to become members of global partnerships of elite, research intensive universities. These groups include IARU (International Association of Research Universities), Universitas 21, Worldwide Universities Network, and LERU (League of European Research Universities), and ensure that national programmes exist to enable universities at all tiers to extend their international collaborations and benchmarking activity.

Australia – moving in the right direction

Over the past two years, the Australian Government has laid the groundwork for sweeping changes to Australian higher education, which will allow for system-wide revitalisation. The key initiatives for distributing the benefits across the system include:

- Establishment of an $11 billion Education Investment Fund with dividends from 2009.
- Distribution to all universities of $1 billion Better Universities Renewal Fund in 2008 and 2009.
- Establishment of 1,000 Fellowships for recruitment and retention of early to mid-career researchers.
- Doubling of Australian Postgraduate Scholarships from 4,800 to 9,600 by 2012.
- Major new funding in the form of a Sustainable Research Excellence initiative to improve support for the indirect costs of research.
- The Excellence in Research for Australia (ERA) initiative, using a combination of metrics and peer review, to fund research excellence wherever it is found, and to identify Australia's national capability in 157 Fields of Research, based on world benchmarks.

Tightening of university accreditation requirements will ensure that the Minister's promise is fulfilled – a world-class education wherever a student is enrolled. The defining feature of these initiatives is that they are directed to the entire sector and that there is no longer any explicit strategy of developing elite, flagship institutions to serve as a beacon for the entire system.

Conclusion

There is no question that world university rankings have delivered the brutal truth to governments and university planners. While these have drawn criticisms of their method, excellent universities welcome the opportunity to benchmark with world leaders and if rankings become too 'neutral' they might fail to continue delivering the brutal truth.

The choice for governments is to be a servant to the vagaries of university rankings or have the confidence to set their own agenda and move beyond rankings. Focusing on world class systems is one alternative – there might be others.

The policies and programmes now in place in Australia will result in better infrastructure across the system and will improve Australia's overall teaching and research performance levels. We can be quite certain that while Australia will not develop a top 20 SJTU contender any time soon, it will continue to perform well as a world class university system protecting its international reputation and attractiveness as a destination of choice for international students and researchers and as an efficient supplier of an educated nation and a skilled workforce.

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