

Review of Research Policy and Funding Arrangements: IRU submission

The terms of reference for the Review of Research Policy and Funding Arrangements set out a twofold focus.

The first is to consider the overall system architecture of Government support for research and its use. The overall structure has not been reconsidered since the creation of the research block grants in 2001 although the incremental changes to elements of the system have significantly altered its balance.

The second is to ensure the structure encourages the take up of research by end users, particularly those able to use research for commercial ends.

The IRU supports the need for the Review as an opportunity to restate the importance of universities' research capability as the essential basis for universities to undertake fundamental research and use that to meet industry and other research end user needs. The drift in Government funding over the past decade leaves universities struggling to provide the research base needed to support external grants and end user needs. This needs to be resolved, in combination with creating a comprehensive excellence assessment framework that addresses the breadth of research outcomes. The resulting system should be simpler but primarily it needs to be effective.

In this submission we consider:

- the key outcomes required from Australia's research system and the major elements needed to achieve those outcomes;
- options to improve the structure of support against three headings:
 - a. research targeting fundamental research outputs, the basis for an effective research system,
 - b. research meeting end users' needs. This draws on the outcomes of fundamental research, feeding back to it, to raise its outcomes, improving overall economic and social outcomes, and
 - c. research training, to provide the future capability in universities, other research organisations and in industry to produce research and use it effectively; and
- the specific issues in assessing the research system and elements to support it which the Government has asked the Review to consider.

Overall the IRU emphasises:

- strengthening the value of research for end users must build on, not diminish, Australia's strong fundamental research capability;
- the research block grants need overhaul and expansion to underpin university research supporting both fundamental research and that supporting industry and other end user needs;
- industry needs incentives to invest in university research to achieve a major increase in industry driven research;
- research and research training must be undertaken across Australia to drive the innovation dividend required to underpin Australia's future prosperity;
- the importance of predictability in Government funding year to year as funding allocations respond to changes in institutional achievement.

IRU recommends the following initiatives to the Review.

1. Structure the research block grants around three themes of support for fundamental research, support for end user driven research and support for research training.
2. That the quantum of funds supporting university research capability should be increased to provide:
 - a. 50 cents in the dollar of national competitive grants;
 - b. 33 cents in the dollar of end user investment; and
 - c. support for all capable, interested, research student candidates, whether Australian or international.
3. Reconstitute the ARC Linkages program as a rolling application and assessment program, with the Government committing to support all highly suitable proposals.
4. Creation of targeted programs to stimulate specific industry related research and research training such as:
 - a. a national industry research training scheme, supporting research projects embedded in industry; and
 - b. State and regionally based initiatives to encourage researcher links with specific businesses, for example the Fraunhofer model.
5. Develop a comprehensive excellence assessment framework through the ARC developing a judgement-based assessment of the value of research for end users to operate in three yearly alternations with ERA.
6. Support for targeting the research and development tax concession at research through universities and other research agencies.

21 September 2015

1. Achieving key outcomes from Australia’s research system

The structure of Government investment in research

Chart One shows the change in the structure of Government support for research since 2001 when the research block grants were created. It shows:

- the considerable growth in Government programs investing in specific research projects and centres through the ARC and NHRMC,
- a balancing increase in Research Infrastructure Block Grant and Sustainable Research Excellence, which formally offset the institutional cost of supporting those targeted grants, and
- no growth, other than annual indexation, in the Research Training Scheme and the Institutional Grant Scheme-Joint Research Engagement program, which were once dominant programs.

The change in the balance of funding emphasises the national competitive grants and comparatively diminishes support for other research activity, including for research students. It has put great pressure on the capacity of universities to support their research.

Table One shows the 2015 return to universities from the research outputs used to drive the research block grants. It highlights that income from a national competitive grant (38 cents in block grants per dollar of income) drives more research block grant funding than the same income from an industry funder (23 cents per dollar).

Further, as shown in Chart Two, the return from research income and publications has reduced steadily because the outputs have grown much faster than research block grants. The exception is the return from research students because research student numbers have grown slowly. Full details are in Attachment One.

Table One: Research Block Grants earned by research outputs, 2015

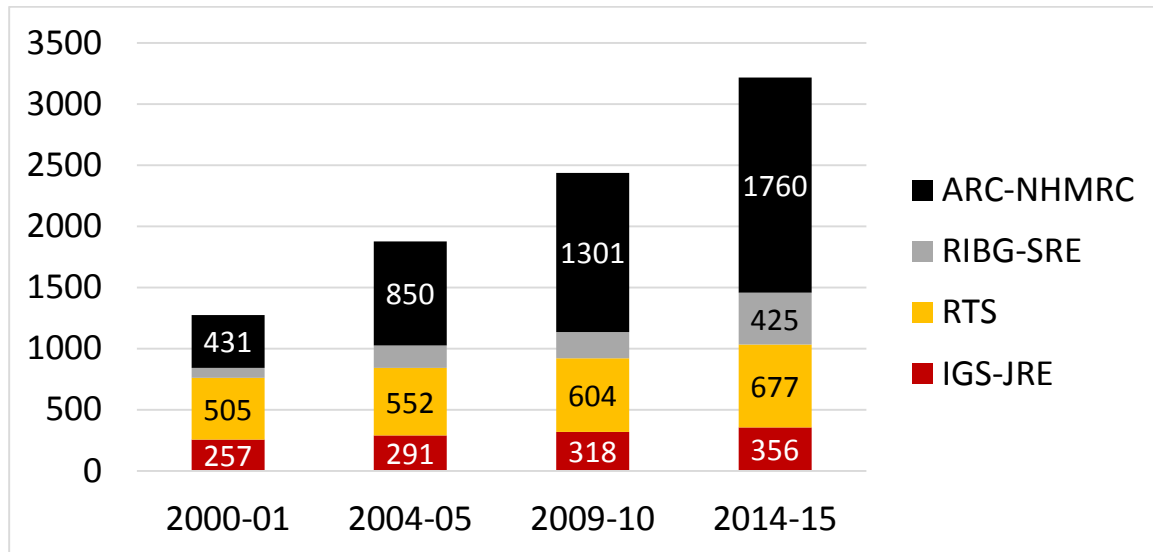
National competitive grants - per \$	\$0.38	Research student completion - PhD high cost	\$77,057
Other research income - per \$	\$0.23	Research student completion - PhD low cost	\$43,581
		Research student completion - masters high cost	\$38,528
		Research student completion - masters low cost	\$21,791
\$ per publication point	\$2,105	Research student enrolment -high cost	\$5,808
		Research student enrolment -low cost	\$2,472

The use of research block grants

The research block grants are distributed based on university performance against a suite of metrics. Universities are free to use most of the funds to pursue their research ambitions, while recognising the importance of generating the research outputs needed to maintain the university’s block grant allocations.

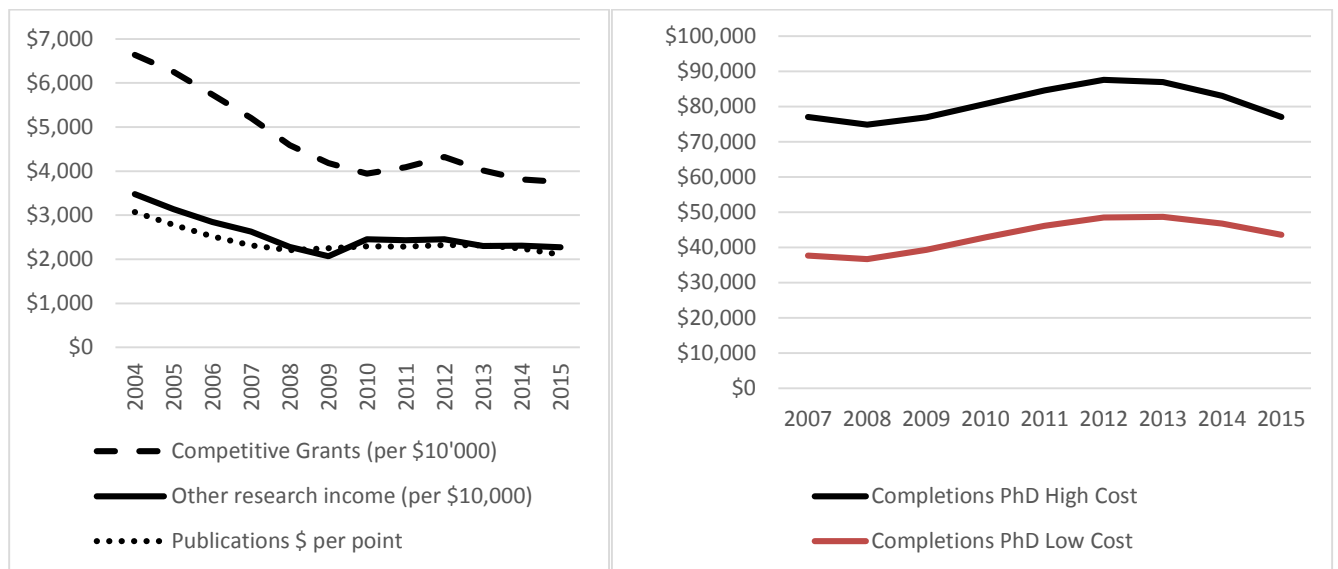
The prime use of the funds is to drive university research capability, supporting infrastructure such as laboratories, research equipment and information resources. Researchers rely on these facilities and resources to do their research, including research for which they win grants. Universities also use the resources to invest in longer-term research capability such as establishing researchers in new areas and in early career researchers.

Chart One: Change in balance of Research Block Grants to Competitive Grants (\$m)



Sources: Science and Innovation Tables 2009-10 and Portfolio Budget Statements 2015 (Education and Training and Health)

Chart Two: Research Block Grants earned by research outputs, 2004 to 2015



Source: Division of Research and Innovation, James Cook University based on data on from the Higher Education Research Data Collection and Research Block Grant allocations.

The formal designation of Research Infrastructure Block Grants and Sustainable Research Excellence as infrastructure support for competitive grants ignores the reality that such resources are used more broadly to underpin research capability. In the initial research block grants structure, the Institutional Grant Scheme provided an explicit source to support research infrastructure generally. Its transformation into the Joint Research Engagement program from 2010 has not notably changed use of the funds but made clearer that research infrastructure supports all research including that for end users.

This is also true for research training where the RTS is but one important component, with significant use of research students in research projects with external funding.

Future funding

Government funding through the research block grants thus serves to underwrite essential investments in a university's research capability. Through the funding drivers the Government can influence universities to promote growth in research outputs, altering the relative focus on some aspects of research against others.

The mix of supporting needed infrastructure and encouraging some activity over others works well where universities have some flexibility in where to invest. The growing pressure to support essential infrastructure, notably the impact of the growth in competitive grants, constrains the capacity to simply tweak current programs, notably JRE, to achieve a large increase in end user driven research.

Expanding the amount of good research targeting the issues relevant to end users requires additional research infrastructure. Hence, to drive up university involvement in research for end users requires additional investment in research capability.

A structure for the future

Renewal of the research block grants can provide the basis for a clearer, simpler, set of programs that:

- support universities to provide effectively the needed support for their researchers and develop institutional research capability, and
- ensure effective incentives for universities to strengthen their support for end user driven research, interacting with the strong fundamental research base.

To do this IRU supports the development of a new research block grants framework that targets three focal points:

1. support for fundamental research outputs, both research directly funded from national competitive grants or supported through university resources;
2. support for research driven by end users, to increase the level of interaction; and
3. support for research training, providing the future capacity to support both 1 and 2 above.

The three overlap extensively in using universities' research infrastructure and supports. The intent of the division is to ensure each is specifically a target, balancing the formal incentives. They will then work in combination with other factors, particularly an effective system to assess research excellence that captures all three areas.

Section 2 below considers how best to structure each of the three parts.

Contextual factors

- **Incentives to drive demand**

The Review is essentially targeted at ways to improve the supply of research including in support of end users, notably industry.

In *Industry Driven Research* the IRU argued the need for major additional incentives for industry and business to seek out research that can improve their operations and commercial outcomes as more important than reworking the supply side programs.

The approach would have a fiscal impact through funding more businesses that invest in research of relevance to their success. The outcome should be a significant return on the investment through the results from/of the industry driven research – the overall aim.

Hence IRU argues for an industry research incentive program as an extension to the Research and Development tax incentive. Targeting research that industry commissions through universities and other research agencies ensures that the Government support targets legitimate research and recognises the reality that most researches work within those research bodies.

- **End users of research include more than industry and business**

Current programs usually conflate support for research relevant to Government and non-profit agencies with research supporting commercial outcomes. Both are important but there are different drivers for non-industry research user organisations.

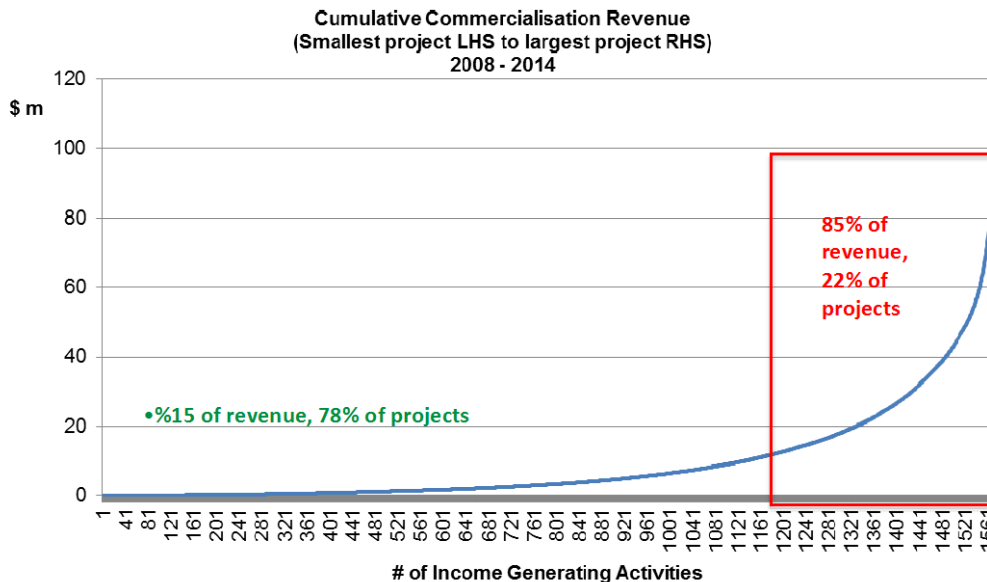
The research that underpins action by Government agencies and by non-profit bodies is of significance to advancing Australia's economic and social wellbeing. We need to ensure that the breadth of end users remains in focus, while considering options that particularly encourage greater industry take up.

- **Businesses, regions and stimulating better commercial outcomes**

Universities should be stimulators of outcomes for businesses, looking to assist a wide set of businesses from across the country. To do so requires interaction with many businesses, and not becoming too focused at those with the most funds to invest or where the return is especially high only.

Chart Three shows the distribution of the financial value from interactions with businesses for one IRU member. It demonstrates that emphasis on the revenue value only would focus universities at a few interactions of high value and encourage them to neglect other opportunities. However, for overall long term economic impact, assisting a wide range of businesses to improve the opportunities for success is likely to be better and consistent with the reality that Australia's challenge is to make numerous small to medium enterprises more successful in a world stage.

Chart Three: Value from interaction with business by project, 2008 to 2014



Office of the Vice Chancellor

- **An international focus**

Australia is part of an international research and innovation world. If we look only at Australian research and Australian end users we will miss the complex interplay covered by:

- Australian research interacting with international research;
- Australian research supporting international business ;
- Australian business being supported by international research; and
- Australian business interacting with international business.

A realistic approach to the future needs to consider the desirable balance of these four (or more) and how to promote each.

We should also consider the relative importance of Asia with Government (of both sides) arguing that future prosperity requires effectively entangling Australia in Asia. The examples thus should include more Asian cases and the analysis of the international system should consider whether there is an Asian subset worth attention.

2. Improving the structure of support

The structure of the research block grants should be built around the three main purposes of support for fundamental research, support for end user driven research and support for research training, with direct funding from grants and investment from industry and other end users.

The threefold approach would encourage universities to attend to each, taking account of the distinct funding drivers, even though use of the funds would likely be pooled since all three objectives require access to effective research infrastructure and systems. An effective balance of incentives is crucial to universities being effective in meeting the breadth of expectations.

A continued focus on excellence of outcomes should be encouraged through a comprehensive excellence assessment framework that includes a judgement-based assessment of the value of research for end users.

a. Research targeting fundamental research outputs

Support for fundamental research outputs is provided through the RIBG and SRE. The approach of funding associated with success in the prime competitive grant schemes should continue with two key changes:

- a single scheme, driven by national competitive grant success; and
- clarity that the funds are to support university fundamental research capability broadly

plus a commitment to set the quantum of funding at the long standing target of 50 cents per dollar of national competitive grants.

As shown in Section 1 universities use the research block grants to support their research missions, which encompasses, but extends beyond, the projects supported in a given year from the competitive grant schemes. It follows that the funding for this infrastructure should explicitly be targeted at the full use. The use of competitive grants to drive the allocation ensures a focus at excellent research capable of winning grants.

Having two programs with the same purpose in RIBG and SRE is complicated. There should be a single stream of funding. IRU supports use of Category One income, that from national competitive grants, to drive this funding. The additional elements used to allocate the SRE add nothing meaningful to the final outcome but can tend to introduce retrospective measures.

The inclusion of ERA as a driver, used now for SRE, does not enhance the significance which its outcomes hold. The reputational value from ERA is major, while the SRE funding is so close in allocation to that for RIBG. It is better for ERA to operate as a major reputational driver that is one of the many other factors influencing how universities direct their research, without complicating it through adding a volume element to its qualitative assessment.

In other countries the Research Agencies allocating grants provide a supplement to cover the institutional support costs of research. IRU does not support such a change in Australia. It would largely achieve the same outcome but could be more variable (tied to grants won in a year against a two year average) and over emphasises support for those grants as distinct from providing research infrastructure that supports researchers both when they do and do not have a grant.

The quantum of funding for this element should match the long standing estimate that the direct research expenses met by grants require underpinning research infrastructure at a rate of 50%.

b. Research driven by end users

Research Block Grants

The transformation of the Institutional Grant Scheme into the Joint Research Engagement scheme showed that amendments to the allocation formula alone will not necessarily drive major change. The focus on income from Categories 2 to 4 altered how much each university receives but not how they used the funds.

To encourage universities to focus more at responding to end users, particularly if those end users have greater incentives to look for research to support their operations, requires an increase to the JRE to expand the research capacity of universities to meet the hoped for expansion of work with industry and other end users.

The current ratio of the JRE to the category 2-4 research income streams is approximately 1:6. To find the balance between industry meeting the full cost of the research they use and overcoming under use of research capability by industry, IRU proposes that the revamped block grant provide \$1 to every \$3 of non-competitive grant research income.

Improving the ARC's support for end user driven research

The IRU is wary of targeting changes in the arrangements of the competitive grant councils which are crucial to Australia's successful fundamental research output. However two changes would improve research outcomes drawing in the end users.

- **Making Linkage program a rolling program**

The ARC has recently pulled back to one Linkage round a year. The change may be more efficient for the Council, and indeed for universities, but it undermines the intent of the program to support joint projects between universities and end users. It means that the external party has to fit their needs to an annual time frame, and means a project of value that is not funded cannot be resubmitted with improvements for a further year thus reducing the probability of a potential industry Linkage partner remaining on board.

To encourage greater take up of Linkage opportunities the IRU supports introduction of a rolling Linkages program that puts the emphasis on a proposal demonstrating that it meets the threshold for funding allowing approval to follow. This would mean industry and other partners would know the requirements expected for funding and have a speedier confirmation or rejection.

The approach would be less predictable for the amount of funding that would be committed. The Government could commit to meet additional commitments over current allocations, as a small targeted investment in expanding the level of industry driven research.

A similar approach should be considered for the NHMRC's Development Grants scheme.

- **Inclusion of industry perspectives on committees**

The IRU members are positive about experiences to date where industry and other external members are included in processes to evaluate proposals. This is an excellent way of generating buy-in and indirectly highlighting to potential external users the benefits of accessing research being generated in Australia.

The Industry Growth Centres may be one source of suitable people, particularly to gain input from smaller businesses which are less visible.

Specific support for working with industry

The industry led Industry Growth Centres are based on similar models being applied in the US (National Manufacturing Institutes) and in the UK (Catapult Initiatives). The IRU is keen to engage with the Centres as they work to assist businesses engage with research of relevance to them.

One model that could be applied to the Australian context is the 'Fraunhofer model' in Germany. The *Fraunhofer Gesellschaft* has more than 80 research institutes across Germany thus ensuring geographical spread rather than a major-city centric model. A specific trait of this model is that more than 70% of the Fraunhofer society's research revenue is derived from contracts with industry and from publicly financed research projects. Around 30% is contributed by the German federal government and by the state governments in the form of base funding.

c. Research training

The third stream is to support the future research capability of universities, research agencies and the broad suite of positions across industry and Government that requires highly capable, thoughtful and imaginative occupants.

There should be support for all capable, interested, research student candidates, whether Australian or international.

In its submission to the ACOLA review¹, the IRU made the case for a flexible research training system through enhancements to ensure that research students gain the broad skills and capabilities needed for future employment.

Research training is a broad based investment to strengthen the capability for research and innovation so it permeates across Australia. It is not an academic Olympics to find the best few researchers only, and ignore the larger group with research capacity. The expansion in completion of undergraduate degrees over the past twenty years creates a long term base of people who could gain from a research degree over coming decades.

In addition, IRU members emphasise the importance of a research training system that enables increased enrolments and completions for students from underrepresented groups such as Aboriginal and Torres Strait Islander (ATSI) students. One mechanism to consider is incentives within the funding system that weight for such students, providing both an incentive to support them and resources to provide additional support where needed.

The twofold structure of support for research training programs

Government supports research training through:

- the Research Training Scheme to support the costs for universities of Australian research students;
- the International Postgraduate Research Student scheme, to support costs for universities of international research students; and
- Australian Postgraduate Awards, scholarships for full time research students.

The discussion paper explores whether these would be more effective if combined while there have been arguments for greater concentration of support for research students with the general effect

¹

http://www.iru.edu.au/media/55506/iru%20submission_acola%20review%20research%20training_sep%202015.pdf

that funding would target fewer students, investing more into those individuals, at the expense of undermining national research training capability.

- **Supporting university costs**

The current RTS and IPRS funding model works well in allowing universities to build HDR load and completions independently from the allocation of APAs, balancing students with the strongest academic claims and full time commitment with the broader array of research students. Hence the arrangements could be simpler through combining the RTS and IPRS to make a general research training support scheme.

Such a change would retain a broadly accessible system to support research degrees open to suitable students from Australia and around the world with living scholarships targeting leading research candidates, those most needing support and those most crucial to Government aims for strengthening research capability in target areas.

The differences between Australian students and international ones becomes much less meaningful at the postgraduate research level where individuals are potentially entering a world academic workforce in which many people hold positions in different countries over a career. Australian researchers will usually go elsewhere at some point while Australian universities recruit many international staff.

- **Supporting research students**

The APAs provide the base source to support research students' living costs where the student is primarily focused at the research project and is not otherwise employed. These are supplemented through additional amounts where considered necessary by universities and also from business.

IRU is interested to explore the potential for universities to vary the amount of the APA scholarship but does not support opening scholarships to students when they are part time. The intent is to support leading research candidates to focus their efforts full time at their research project.

Stimulating research training linked with industry

IRU members, as shown in their submissions to the ACOLA review, have responded to the need to ensure that research students gain the necessary breadth to pursue a variety of employment options post completion. This should be a standard part of the future research degree.

IRU members participate in a number of commendable models to widen the scope of research training with a focus on future non-academic employment opportunities. Examples are the *Advancing Western Australian Research Education (AWARE)* in which Murdoch participates and the Queensland government's *PhD Employment Experience Program* (in which Griffith and University of Queensland participated). The latter has now been transformed into the *PhD Industry Experience Program* and extended to all Queensland universities.

The willingness for State and local level initiatives to support this interaction should be developed, placing some onus on State and regional organisations to stimulate economic opportunities.

Beyond that is the potential to increase the number of research degrees undertaken from an industry base for some significant periods, with active industry support. There are a number of schemes to promote this.

Excellence and research training

Universities are well aware of the importance of targeting their research resources at their priority research areas to support and strengthen established research interests and to lead the development of new areas. Research students are crucial to this, with their emphasis on opening up new issues and their potential to be the future research leaders.

Access to research training across all parts of Australia is important to reducing the dependence on south eastern Australia and to develop the long term potential for northern Australia. Australia's research system is weighted to the south east, which allocations based on past achievement tend to re-enforce.

The suggestion that research training be limited to areas in a university that sit within a broad ERA rating of three or more is one example of a backward focus that would contain future prosperity. We would nevertheless expect a reasonable correlation with external markers of quality such as ERA but not a complete match.

Universities need to develop new areas, which may not have the high ratings yet. Individual students and supervisors may not match the assessment of others around them, nor be limited by not having a large mass of similarly interested students and staff. General ratings such as ERA do not consider research training as such and miss the local level detail.

The IRU data supports this. IRU members have looked at the 2014 cohort of students given Australian Postgraduate Awards to match the field of research with the ERA ratings for those fields. There is a strong correlation, with more than 80% of students aligned to research fields with a rating of world class or better (3 or more) – see Table Two.

On the proposal put, universities in selecting research students for 2016 would be bound by their outcomes from a judgment made in 2012 based on research outputs from 2005 to 2010, many of which derive from research undertaken even earlier. It is a strange way to select researchers who should be the groundbreakers of 2026 and research leaders of 2036.

Universities accordingly should be trusted to enrol research students, taking account of the student's capabilities, interests and the capacity of the university to support them pursue their research to a positive end.

Table Two: Alignment of ERA with excellence in research training

University	Number of APAs	APAs in ERA 3 + discipline	% in ERA 3+ discipline
Charles Darwin	16	9	56%
Flinders	49	45	92%
Griffith	75	60	80%
James Cook	45	34	76%
La Trobe	55	47	85%
Murdoch	38	35	92%
Total	278	230	83%
IRU average	46	38	80%

3. Other issues

Measuring excellence: the value of research for end users

Through Excellence for Research Australia, currently Australia has a measure which, on its own, is half a research excellence measure. We need to create a comprehensive excellence assessment framework through the ARC developing a judgement-based assessment of the value of research for end users to operate in three yearly alternations with ERA.

One of the Terms of Reference of this review is “improving the assessment of the research system such as improved metrics on engagement and knowledge transfer with industry, research outcomes, and impact.”

Industry driven research has less standing in university culture than research that achieves great recognition amongst other researchers. Altering those priorities, without diminishing the importance of fundamental research, will not be easy.

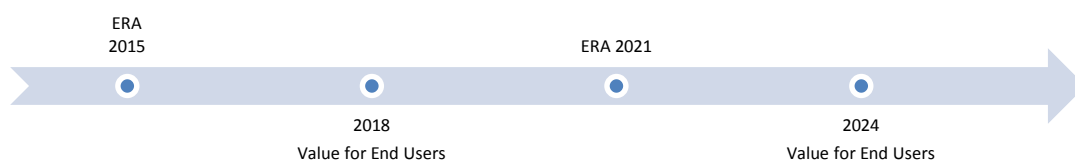
The incentives for individual researchers are critical to stimulating a change in the balance of researcher focus. A significant factor holding back universities’ capacity to extend research activity to improve support for industry driven research is the emphasis on income from national competitive grants, publication output and citations and the way in which they underpin the Excellence in Research for Australia (ERA) assessment and most international ranking systems.

ERA’s reinforcement of traditional assessments of standing has been major. To balance its impact a parallel exercise focused on a considered assessment of the real impact of a university’s research will help change the importance given by universities to collaboration with industry. We should measure the excellence of industry driven research to go in parallel with the excellence of investigator driven research.

The useful work of the Australian Academy of Technological Sciences and Engineering in developing its Research Engagement Australia (REA) proposal follows the work of the ATN and Go8 to trial collection of evidence about the trail from research to effective use. The IRU considers some of the metrics proposed for REA could have a useful role in an effective scheme but that it has crucial weaknesses built into its design that limit its value as a comprehensive option.

The IRU proposal has three main elements:

- Panel based judgements of the value of university research in support of external users
- Judgements based on data sets agreed to be of relevance
- alternative assessment of the value for end users with ERA on two overlapping six year cycles. The ARC would be responsible for both.



Fundamental to the IRU proposal is judgement by knowledgeable peers. It is necessary for two reasons. First, a judgement by competent people is more likely to reflect real differences in achievement giving the process much greater credibility. Second, the data available for the task needs interpretation and protections against data manipulation. The panel judgement brings to bear minds capable of dismissing manufactured evidence and seeing through to the real value of the activity.

The full IRU proposal is available at <http://www.iru.edu.au/policy.aspx>

The IP system

Recent steps from the government such as the IP toolkit and the upcoming Source IP website are steps in the right direction.

Ensuring predictability in funding allocations

One crucial factor for all organisations including universities is the importance of predictability of funding. While funding will invariably depend on trends of performance, the standard average calculation should be a for a two year period. This would allow for averaging and other stability measures to kick in and reduce the exposure to large annual fluctuations.

Attachment: Research Block Grant generated by performance indices - year of RBG awarded, 2004 to 2015

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Research income - per \$10,000												
Cat 1: National Competitive Grants	\$6,638	\$6,250	\$5,735	\$5,204	\$4,586	\$4,181	\$3,945	\$4,091	\$4,319	\$4,013	\$3,812	\$3,757
Cat 2: Other Government revenue	\$3,476	\$3,134	\$2,848	\$2,626	\$2,280	\$2,069	\$2,451	\$2,431	\$2,454	\$2,303	\$2,306	\$2,273
Cat 3: other end user research	\$3,476	\$3,134	\$2,848	\$2,626	\$2,280	\$2,069	\$2,451	\$2,431	\$2,454	\$2,303	\$2,306	\$2,273
Cat 4: CRCs	\$3,476	\$3,134	\$2,848	\$2,626	\$2,280	\$2,069	\$2,451	\$2,431	\$2,454	\$2,303	\$2,306	\$2,273
Publications												
\$ per publication point	\$3,075	\$2,784	\$2,522	\$2,316	\$2,207	\$2,254	\$2,298	\$2,289	\$2,321	\$2,319	\$2,242	\$2,105
HDR Domestic load												
High cost			\$5,574	\$5,665	\$5,686	\$5,770	\$5,962	\$6,019	\$6,036	\$5,699	\$5,812	\$5,808
Low cost			\$2,372	\$2,411	\$2,419	\$2,455	\$2,537	\$2,561	\$2,568	\$2,425	\$2,473	\$2,472
HDR Completions												
Masters High Cost				\$38,535	\$37,457	\$38,465	\$40,378	\$42,301	\$43,782	\$43,480	\$41,546	\$38,528
Masters Low Cost				\$18,866	\$18,341	\$19,671	\$21,427	\$23,054	\$24,257	\$24,337	\$23,414	\$21,791
PhD High Cost				\$77,071	\$74,913	\$76,930	\$80,756	\$84,603	\$87,564	\$86,960	\$83,093	\$77,057
PhD Low Cost				\$37,732	\$36,682	\$39,341	\$42,855	\$46,108	\$48,514	\$48,675	\$46,828	\$43,581

Source: Division of Research and Innovation, James Cook University based on data on from the Higher Education Research Data Collection and Research Block Grant allocations