

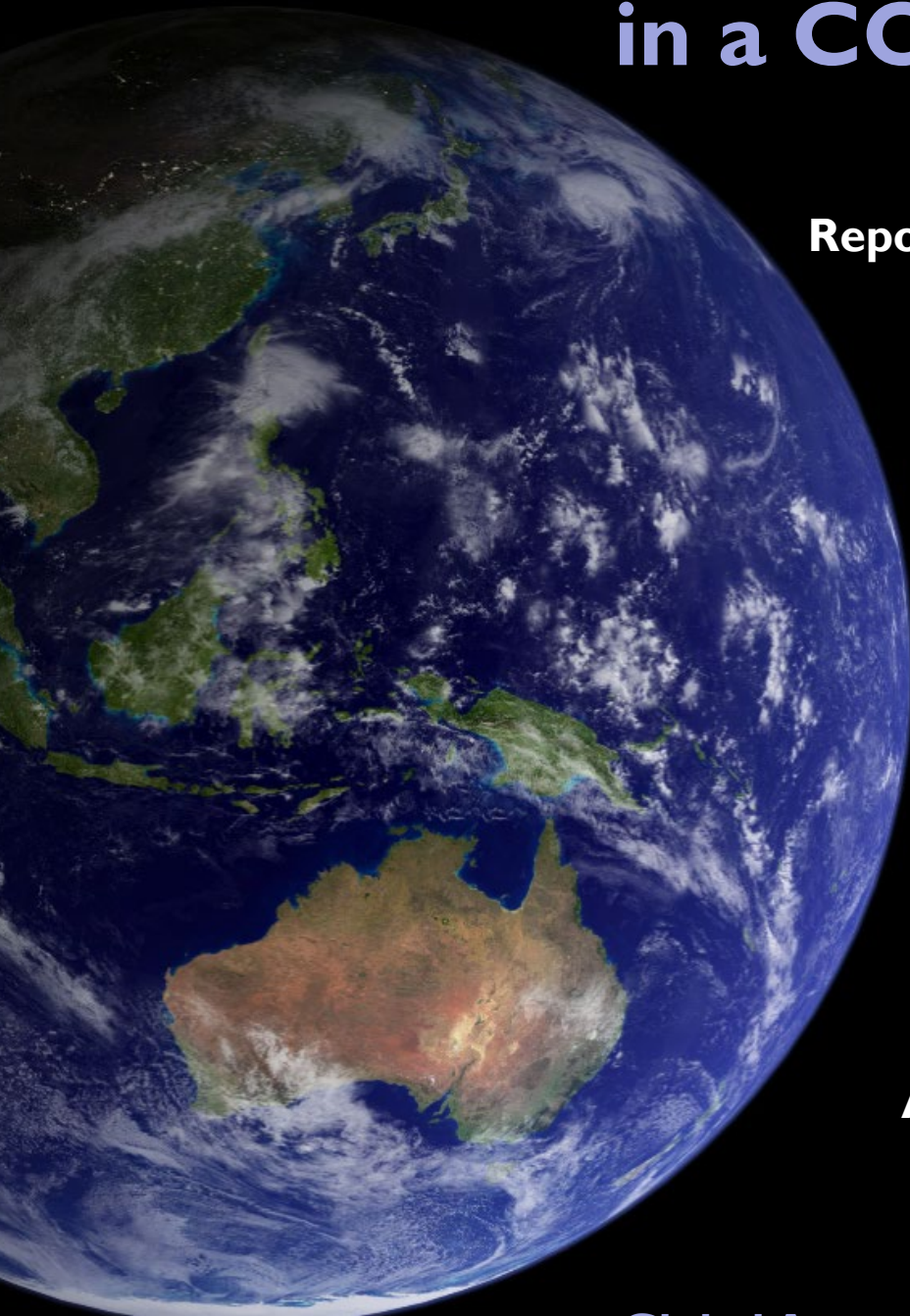
**GAP & IIER-A National Resilience Project**

# **Protecting Australia's Sovereign Research Capability in a COVID World**

**Report of the Higher Education  
& Research Workshop**

**August 2020**

**Global Access Partners  
Institute for Integrated Economic Research Australia**



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# **PROTECTING AUSTRALIA'S SOVEREIGN RESEARCH CAPABILITY IN A COVID WORLD**

## **Report of the Higher Education/Research Workshop of the Global Access Partners/Institute for Integrated Economic Research National Resilience Project**

“The university sector is not the sole architect of the issues in its teaching functions and its focus on research. The structure and behaviours of the universities have been conditioned by the ‘market’ design limitations, regulatory restrictions, and funding and institutional incentives imposed on them by successive Australian Governments. Universities, much like other economic agents, respond to the incentives that they face...”

Productivity Commission, *Shifting the Dial*, 2017

### **PART ONE: THE PROBLEM TO BE SOLVED**

#### **1. Introduction**

- 1.1 The COVID-19 pandemic has exposed the extent to which Australia’s sovereign research capability is vulnerable to a significant downturn in demand for higher education from international students, putting at risk Australia’s hard-won international reputation for high-quality research and the substantial benefits that it produces.
- 1.2 Australian university expenditure on research reached an all-time high of \$12.2 billion in 2018. The outlay represented 37.4% of the total university expenditure at \$32.5 billion. In a recent article it was reported that \$6.2 billion (50.7%) of the research and development (R&D) expenditure of \$12.2 billion was sourced from university discretionary funds.<sup>1</sup> The total operating revenues for all Australian universities in 2018 were \$33.7 billion. Of this the non-government component was \$15.4 billion (46%) of which international student fee revenue amounts to \$8.84 billion or 57%. It is this component of revenue that has largely been lost a result of the COVID-19 pandemic.
- 1.3 However, it is not as if the impact of a pandemic on this risk could not have been anticipated. Pandemics, in particular those that could affect our higher education market among students from Asia, have been a well-recognised possibility for some time. The question is why have governments and university councils not addressed this risk adequately? To quote a character from “The Big Short”: “People hate to think about bad things happening, so they always underestimate their likelihood.”
- 1.4 The impact of a pandemic on our research sovereignty is a “black elephant”, a cross between “a black swan” — an unlikely, unexpected event with enormous ramifications — and the “elephant in the room” — a looming disaster that is visible to everyone, yet no one wants to address because the costs of doing so are perceived as too high. But that approach, which has led governments to encourage universities to rely on the continuation of the international revenue stream to underpin our university-based research effort, has now been revealed as wishful thinking at best.

- 1.5 Proposals announced by the Government so far, in its Job-Ready reform package, will not address the problem. Commonwealth Supported Places (CSPs) will now support teaching costs only, while giving universities greater flexibility to use this funding to determine their own domestic teaching profile. However, the package may exacerbate problems in the research sector unless a new approach to supporting university research is devised and implemented that involves a new approach to identifying which research should be done, by whom, and to what extent.
- 1.6 Unless decisive action is taken, it is estimated that more than \$7 billion in university research funding and up to 4,600 researcher jobs will be lost over the next five years.<sup>2</sup> At a time when increased national resilience, capability and self-sufficiency have become paramount national priorities, such a loss would be tragic, and hamper our long-term prospects for economic recovery and reduction in public debt. It would also undermine the contribution our research effort has made to international collaboration on a range of global problems, to “soft diplomacy” in the Asia-Pacific region, and to industry partnerships both here and overseas.
- 1.7 Some universities are better placed than others to ride out the storm, but it is highly unlikely that the research sector will “snap back” to its pre-COVID state. The federal government, expecting a significant increase in domestic demand in coming years – not only due to the fact that increased demand is usually correlated strongly with economic recession, but also because of the “baby bonus” demographic impact that was due to hit the sector about now in any case – is seeking to fund additional places through a package of recently announced reforms including realignment of student contributions.
- 1.8 The financial fallout of COVID is likely to see increased pressure for consolidation within the tertiary education sector. The government had urged the universities on in the pursuit of international students as one of our largest export markets. The pre-COVID “rivers of gold” may have encouraged some universities – now vulnerable - to take their eye off the need to manage risk and keep costs under control planning instead for major expenditure on the assumption that the money would keep flowing.
- 1.9 The government now faces a choice as to whether and how it provides any encouragement to moves to merge institutions, or “prop up” and “patch up” an already balkanised and inefficient system for funding research, or use its leverage to introduce broader reform to the research function of universities. Such a reform package would also need to address issues with the relationship between university research and industry, involve industry much earlier and more than is currently the case, and include measures to deepen our expertise in areas beyond our traditional areas of strength in the physical, chemical, earth sciences and biological and medical.
- 1.10 However, solutions must be based on an accurate understanding of the problem to be solved. How is it that we came to be in this situation? And what exactly is “this situation”? What are its symptoms, its underlying causes, its effects, its epidemiology? (See **Attachment 1: “What is broken?”**)

1.11 The problem can be broken down in several distinct but interrelated issues for the purpose of analysis: funding; incentives for universities and researchers; the research workforce; and engagement with industry.

## **2. Funding**

2.1 The current circumstances faced by Australia's research sector capability, in particular that which is developed and delivered through public universities, has been affected by the way governments have used tax-payer funds to support the sector. Public funding impacts can result from the interaction between three aspects: quantum; structure; and channels.

### *Quantum*

2.2 At the most basic level, if universities make plans based on the expected revenue stream coming from government, and if that public funding changes such that the level of public funding they were expecting declines, universities are faced with a choice of either amending their expenditure plans (not doing things they were planning to do, or doing them more cheaply), or sourcing additional revenue, or a combination of both.

2.3 Changes to the public funding of universities over the last three decades created financial pressure on universities around the turn of the century.<sup>3</sup> At the same time, international student revenues were growing quickly. This growth continued even after public funding per student and for research began increasing between 2004 and 2009. There was a temporary hiatus in this growth in the early years of the demand-driven system for domestic students, which opened another source of cross-subsidising research activity, before surging again to a level that "vastly outstripped cuts" to base and research funding from government in recent years.

2.4 So arguably, rather than international student revenue filling a hole left by public funding losses, this revenue stream changed purpose over time, from funding research "needs" to funding research "wants", resulting in extraordinary growth in research output, at sometimes at the expense of the quality of that research.<sup>4</sup> This is the result of successive policies from Government as well as institutional behaviours - the Research Quantum in the 1990s paid universities per publication; the Higher Education Research Data Collection effectively carried this over until recently. The introduction of the Excellence in Research Australia (ERA) was designed as a corrective to this i.e. to focus on the quality not quantity of publication. However, the ERA has arguably lost its efficacy in this respect over time (more on this below).

### *Structure*

2.5 Changes to the way research funding is distributed has also had important impacts on university behaviour (further discussion on this is below, under "Incentives"), in particular the shift in balance of funding away from block grants to universities to competitive grants for isolated research projects and individual researchers.

2.6 In the 1990s, less than 30 per cent of Commonwealth research funding was delivered via competitive grants. It is now just under 50 per cent. The Research Block Grants (RBG) - once around 70 per cent but now just over 50 per cent of public funding for research - total around \$1.8 billion annually or almost one in every five dollars the Australian Government invested in

innovation. Next to the R&D tax concessions, it is the biggest lever Australia has at its disposal to influence the innovation ecosystem.

- 2.7 Theoretically they provide universities with flexibility in how they spend that funding. They can use it to fully fund research in whatever areas they choose. “Fully funded” here refers to the situation when all the costs associated with the research task are covered, including facilities and salaries of the academic research staff, or that portion of the salaries of teaching and research staff that is not covered by student fees.
- 2.8 However, despite minor reform in the 2015 National Innovation and Science Agenda (NISA), the RBG system is largely passive. It is apportioned to the nation's universities based on their recent past performance in attracting funds from other competitive funding schemes (the Australian Research Council (ARC) and National Health and Medical Research Council (NHMRC) in particular), the aim being to pay for the indirect costs of research not paid for through those schemes. So, when a university wins a competitive grant such as from the ARC, they later become eligible for a portion of the Block Grant system.
- 2.9 These two components together *in theory* pay the total cost of the research, but they don't. This problem has grown over time. For example, between 2000 and 2013, the amount of funding available through competitive grants grew by 110%, but the RBG have grown by only 19%. Universities have been left with a deficit they fund from other income, increasingly made up of international student income. The recent full capitalisation of the Medical Research Future Fund (MRFF) and the announcement that it will be Category 1 funding for the purposes of RBG eligibility, along with the increased weighting given to industry impact and engagement for the RBG, is further watering down the capacity of the RBG to support the full funding of research projects awarded through ARC and NHMRC.
- 2.10 The shift from block grants to project-based grants has been driven by a desire from government to see bigger impact from the tax-payer dollars they invest in research in terms of solving “real world problems”. The change arguably encourages universities away from “vanity” research toward projects that represent government priorities, especially in research that is likely to deliver greater economic prosperity. Impact assessment has now become a major part of the research policy lexicon, and in the global game of university rankings (see below).

### *Channels*

- 2.11 As discussed above, the balance of public funding for research conducted in the university sector has shifted over time towards competitive grants. The bulk of this funding is delivered through the ARC through its Linkage and Discovery grants, and the NHMRC, which distribute annually \$800m and \$840m respectively. The Commonwealth Scientific and Industrial Research Organisation (CSIRO) is funded by a combination of Commonwealth Government funding (around \$1 billion annually) and revenue from other funding partners on specific projects. Cooperative Research Centres (CRC) are supposed to fund theoretically industry-led research partnerships, so use public funds to “crowd in” as opposed to “crowd out” private investment for projects that otherwise might not get supported with private sector initiative alone.

- 2.12 The MRFF is likely to have significant impact on the research landscape. Now fully capitalised, it will be allocating similar amounts to the ARC and the NHMRC, with government having a stronger hand in the outcomes. The recently announced proposal of a \$48 million fund to support the research capability of regional universities appears to increase the balkanisation and politicisation of the research funding system. The current system, with its prioritisation of pseudo-market mechanisms, is based on new public management theories that were in fashion in the 1990s but have since been left behind.
- 2.13 The key question that arises when assessing this funding landscape and variety of different channels that offer competitive grants, and the behaviour it elicits from the various players and stakeholders, is whether these arrangements are fit for purpose. Which in turn begs the question: what is the overarching purpose for which these arrangements might or might not be fit? What is the overarching strategy, when it comes to developing a vibrant and impactful research sector in Australia? Is system resilience and the development of a “sovereign research capability” a key feature of the strategy? If not, why not? How would the system, such as it is, need to change to support research sovereignty?

### **3. Incentives**

- 3.1 The quantum, structure and channels of public research funding affect the behaviour of decision-makers in the university sector. The research dollars that universities are chasing are awarded on the basis of individual projects, put together on the initiative of an individual researcher who has managed, often through an internal competitive process, to win the support of the institution for their application to the ARC or the NHMRC.
- 3.2 The winning of a research grant is not only an opportunity to contribute to the overall national interest and the common good – which ought to be the main motivation – but also contributes to the research profile and reputation of the institution. This has become increasingly important over the last fifteen years as the result of the advent of the global university rankings. These rankings privilege research over teaching quality, with the irony that their measure of research quality is essentially a quantitative measure based on citations in peer-reviewed journals. Some rankings also look at the proportion of international students attending the university to assess the extent of the institution’s internationalisation. Thus, there is a double imperative for attracting overseas students.
- 3.3 Where an institution is ranked in these global scales has an important impact on status, which is crucial when it comes to attracting cashed-up international students and the research-funding revenue they bring with them. The research output then contributes further to the global status, creating a “hamster wheel” effect, such that universities must keep running faster and faster to chase international students to maintain their ranking. This explains, in part, why universities continue to chase public research dollars, even though they do not cover the full cost, and the system puts a price on success in the various grant-winning competitions that attach to the multitude of funding pools.
- 3.4 This can have the effect of universities adopting a scatter-gun approach to winning research grants, as opposed to a more focussed strategy that plays to their strengths and specialities. It can encourage a form of institutional dilettantism when it comes to research grant

applications – going fishing for as many research applications as possible and hoping to hook something, anything, as long it can be added to the list of research projects won, and contribute to the standing of the university. This is inherently inefficient and wasteful.

- 3.5 This in turn encourages atomisation within the university, with each faculty or school pursuing its own agenda without reference to an overarching research strategy. The university as an overarching entity faces weak incentives to specialise and build a reputation in a particular area of expertise or knowledge, as this would be akin to putting all, or most, of your research status eggs in one or two baskets. This is compounded by the diminishing share of institutional RBG to enact institutional strategies. This failure to develop deep institutional expertise at scale has insidious consequences when it comes to engagement with industry (more on this topic below).
- 3.6 Another aspect of how the incentives encourage sub-optimal activity is the traditional division of labour within the university, where academics both teach and research, which means that the way teaching is organised by disciplines into faculties and schools drives the way research is organised (see below for more detail on the research workforce). This goes against the grain of contemporary research practice that increasingly relies on collaboration across disciplines, and even across institutions. This disjunction is reinforced by the structure of university revenues: for teaching, revenue is linked to student numbers, but for research, revenue is linked to past research performance.
- 3.7 All this mitigates against institutional specialisation and role differentiation in research. Funding and regulatory incentives act as centripetal forces for conformity or standardisation of university business models such that, in general, most universities are doing a little bit of everything, but few are doing a lot of one thing. This of course is an over-generalisation, and there are examples where universities are the exception, developing a reputation for depth and quality in a limited number of fields.

#### **4. The research workforce**

- 4.1 The incentives faced by individual academics mirror those of their employing institutions. The premium placed by universities on research rankings means academics hoping for tenure or promotion face the imperative to “publish or perish”. This can lead to a focus on taking one’s research findings “from the bench to the bookshelf” rather than from the “bench to the boardroom” (see “Engagement” below). While these should not be seen as mutually exclusive, in terms of the incentives facing most researchers vis-à-vis the career pathway within a rankings-driven institution, currently publication trumps translation and impact for many. This can then skew the nature of the research that is undertaken at the bench itself, with the primary consideration being “Will this get published?” as opposed to “Will this get picked up by a partner and make a difference in the real world?”<sup>5</sup> Notwithstanding this dynamic, according to the ABS 60% of all university research is “applied” or “experimental development”.
- 4.2 Partly low levels of research translation is because we don’t compare well with other countries in employing researchers outside the publicly funded sector or in using that public funding to build up our homegrown research workforce, both of which are crucial to the task



of self-sufficiency and resilience. The incentives seem to encourage recruitment of researchers rather than to investing time and effort in training them up from the domestic talent pool. Around 40 per cent of our university researchers are international students.

- 4.3 According the 2016 Census, 50 per cent of the employed doctorate holders were working in tertiary education and research. Of the rest, around half were working in the public or non-profit sector and around half were in the private sector, spread across 290 industries. In the private sector, banking/finance and mining/oil/energy are the main employers of PhD holders, followed by the pharmaceutical and medical industry.
- 4.4 Around 40 per cent of all PhDs in Australia are employed in publicly funded institutions (either higher education providers, the ARC, NHMRC, CSIRO, CRCs and other industry-specific public sector research agencies and institutes). A further 20 per cent are employed in hospitals and medical services.
- 4.5 In the US, PhD graduates in the STEM disciplines (science, technology, engineering and mathematics) tend to work in industry, while humanities and arts PhD graduates are more likely to stay in academia. This trend is replicated in Australia, where 52 per cent of engineering,, 46 per cent of computer science, and 35 per cent of mathematics PhDs are employed outside academia and publicly funded research whereas only 23 per cent of anthropology and sociology PhDs are employed outside academia.<sup>6</sup>
- 4.6 The financial incentives for universities mean that they have been screwing down on teaching costs as much as possible so as to be able to direct more of their Commonwealth Supported Places (CSP) income to cross-subsidising the specialist research effort, as well as attracting more students (e.g. marketing budgets have increased considerably). This had the effect of creating a “gig-economy” for teaching academics, with a growing proportion being engaged as sessionals on short-term contracts. It was recently reported that one of Australia’s most prestigious research universities employs 73 per cent of its additional teaching-only academic staff as casuals. For researchers this is also a problem, with many living from grant to grant, without ongoing employment.
- 4.7 This creates enormous uncertainty and mitigates against the benefits for both teaching and research of employing academics who can do both. It will be interesting to see to what extent the Job Ready reform package, with its intent to ensure all CSP income is used for teaching, will lead to improvements in this area.
- 4.8 The staff profile in universities has changed dramatically over the past decade. Between 2009 and 2018 teaching-only staff increased by 90%, teaching-and-research staff by only 3%, and research only staff by 15%. As a proportion teaching-and-research staff decreased from 52% in 2009 to 43% in 2018.
- 4.9 This raises the contested issue of the “teaching-research nexus”. Much of the rationale for universities’ joint role in research and teaching functions rests on the premise that a university’s research function improves the quality of its teaching. Some claim that access to world-class researchers makes students more engaged, develops their critical thinking, aids their research skills and keeps them up to date with the latest research findings. However, the changing nature of the academic workforce – whereby the proportion of staff employed to do

both teaching and research is declining – indicates that the nexus is increasingly “more honoured in the breach than the observance” by universities themselves.

- 4.10 Furthermore, there is no compelling reason why these skills and attributes cannot be nurtured by non-research academics and teachers. For instance, researchers do not have an exclusive capacity to keep up to date with the latest research findings.
- 4.11 In line with this, the Productivity Commission, in its 2017 *Shifting the Dial* reports, cites various empirical studies in Australia and elsewhere that have found little evidence to support a positive relationship between teaching outcomes and research capabilities.
- 4.12 There are, however, strong grounds for asserting that students undertaking research degrees (such as a doctorate) or postgraduate coursework degrees benefit more from close proximity to seasoned researchers than undergraduate coursework students. This is largely due to the stronger research focus of these courses and their smaller class.
- 4.13 Notwithstanding the absence of a correlation between research rankings and ratings for teaching quality, the teaching-research nexus has underpinned several aspects of the existing university regulatory and funding regime. For example, the 2019 review of Higher Education Provider Category Standards cited it as the reason for the continuation of the requirement that all universities conduct research as well as teaching. This has implications for how funding incentives to promote national research resilience and sovereignty should be structured in the future.

## **5. Engagement with Industry**

- 5.1 When it comes to engagement with the publicly funded research sector, industry will be encouraged to invest time and resources in countries that demonstrate a reasonable degree of long-term stability and incentive in their innovation and industry policy settings. Industry looks for long-term research partners with deep expertise and scale, and who are outcome-driven as opposed to output-driven, that is, driven to deliver real impact.
- 5.2 However, this is not to suggest that industry is unwilling to support longer-term research that has an uncertain return on investment, that is, “pure” or “discovery” research. On the contrary, industry understands that the kind of deep expertise they may be seeking is often developed through such research.
- 5.3 It is interesting to note that, despite tax incentives for investment in research and development, over the last decade this has declined by more than 30% as a percentage of GDP. Much of this decline is driven by the mining cycle and changing sector mix.<sup>7</sup> However, another possible reason that collaboration is less common than it should be may have to do with other aspects of the system which dis-incentivise industry involvement. In particular, industry needs to be given more and earlier influence in the decisions as to which applied research gets publicly funded and how this funding is designed so as to “crowd in” private sector resources.
- 5.4 The accepted wisdom dominant amongst economists that industry policy is to be eschewed as a classic “government failure” trap may be contributing to this. However, the Commonwealth’s recent changes to undergraduate course fees were announced with the

specific intent to direct student choices towards courses likely to lead to jobs in industries with predicted employment growth, (though it is not clear on what robust workforce needs analysis these predictions have been made). This would suggest the government may be ready to revisit the key issue of how to encourage investment and effort more effectively into research that is likely to have high impact in these job-generating industries. (Ironically, as Larkins has demonstrated, the package may end up incentivising universities to increase enrolments in the courses the government considers of less value.)

- 5.5 This could, if done well, lead to the development of a research support strategy that is more closely aligned to the national Science and Research Priorities. There is a vast array of programs that are *intended* to do just that, including the competitive research grants programs. However, as discussed above, these programs are having *unintended* consequences through the way they present universities, industry and researchers with mixed messages and incentives, leading to misalignment of purposes and dissipation of effort. It will be essential that industry is given a place at the table when government is devising a new strategy to support research.
- 5.6 In addressing this problem, however, it will important not to devalue the role of “pure” research which is also purpose-driven, the purpose being the expansion of our knowledge and understanding of the world. Discovery of new knowledge often precedes questions about how that knowledge can be applied to solve real world problems. Engagement with and support from industry on this kind of research should also be a focus on any new research strategy.

## **PART TWO: POTENTIAL WAYS FORWARD**

### **1. Introduction**

- 1.1 How should Australia address the problem of the potential \$7.23 billion hole over the next five years in our publicly funding for university-based research? Four options present themselves:
- We do \$7.23b worth less of research
  - Government makes up the shortfall;
  - Industry funds more research;
  - A combination of all of the above, involving not only an increase in public funding for research to universities, but also some form of publicly funded incentive to “crowd-in” or underwrite private sector investment in research; and a recognition that we have be more efficient and effective.
- 1.2 Whatever quantum of funding is available – and it must be recognised that the recovery of Australia’s national resilience and sovereignty in respect of our research capability will be taking place within a vastly more constrained fiscal environment - the solutions to be adopted will need to deliver bigger bang for the buck. This means that we will need a much more tightly curated system for allocating research funding. The days of letting “a thousand

flowers bloom” are no longer affordable. As Jennifer Westacott, CEO of the Business Council of Australia, stated on 13 August:

*The challenge we all face is getting this conversation unlocked from its historical stranglehold of picking winners. We can go around and around in circles having an argument about this but the reality is that there are a couple of things we do have to pick... We can't choose one thousand things – we really do have to narrow it down to about 10... Then we need to get the policy settings right to encourage the investment, collaboration and incentives... This will drive commercialisation. We will need to take stock and decide what the competitive reality of focusing on our areas of strength and comparative advantages really means.<sup>8</sup>*

- 1.3 What goes for the country, goes for the university sector itself: what is Australia's, and indeed each university's, comparative advantage? How can policy settings incentivise a laser-like focus on this question?
- 1.4 To be successful, the system must be at the service of an overarching and long-term **national research and innovation strategy**, something which the country lacks and has done for some time due to the fact that priorities and funding mechanisms change whenever there is a machinery of government change or a new set of ministers.
- 1.5 We've tried and failed on this before. Various efforts have run into the sand. The former chief scientist, Professor Ian Chubb, tried to elevate a focus on priorities, but this did not get built into the funding system, nor did it admit of our breadth of research, largely excluding humanities and social sciences (HASS). There needs to be much better consultation with industry as a whole, not just particular sectors, in the development of any strategy that looks to rebuild our research sector in the service of the economy, jobs and society.
- 1.6 Such a strategy would have five core features or operational principles:
  - (a) Government in consultation with industry and research sectors would determine the high-level priorities for public funding of research to address the problems we face as a nation. Professor Marianna Mazzucato, in her 2018 report to the European Commission, advocated the development of a “mission-oriented” research and innovation strategy. Drawing on the lessons of the Apollo space program, she advocates the identification of a limited number of “missions” to which research and innovation should be directed:

*Missions must be bold, activating innovation across sectors, across actors and across disciplines. They must also enable bottom-up solutions and experimentation...Missions provide a massive opportunity to increase the impact of European research and innovation, grasp the public imagination and make real progress on complex challenges.<sup>9</sup>*

What would distinguish the priorities under such a strategy is that these priorities would be **highly specific**. They cannot be so broad that they essentially allow every conceivable field of research to be characterised as somehow linked, however tenuously, to a national priority. The hallmark of the strategy would be the fact that

many fields of research are not included as priorities. Governments would need to be prepared for the special interest lobbying from those sectors whose fields are not included.

An example of emerging leadership in this area is the CSIRO's "Team Australia" Missions Program, announced on 12 August.<sup>10</sup>

- (b) The strategy would be implemented in such a way as to improve the incentives for universities to specialise and concentrate their research effort and to collaborate with other institutions and industry to build nationwide depth of expertise in the priority areas. This means the policies and processes used to implement the strategy would have to address the underlying reason why Australian universities have become so dependent upon, and chased so desperately, international student enrolments. It would have to address the problem created by university rankings whereby "sharing the glory" with other institutions with whom one could collaborate is less attractive than "going it alone". It would need to encourage a "Team Australia" approach, similar to that envisaged by the US Academies of Science in their advocacy of "convergence" as a key idea underpinning a research and innovation strategy:

*Convergence—the coming together of insights and approaches from originally distinct fields—will make fundamental contributions in our drive to provide creative solutions to the most difficult problems facing us as a society. This convergence provides power to think beyond usual paradigms and to approach issues informed by many perspectives instead of few...The potential for innovation and successful problem solving becomes greater when we are able to harness the knowledge bases, skill sets, and diversity of experience of individuals in an environment that fosters dialogue and respectful participation by all team members.<sup>11</sup>*

- (c) As outlined in Part One, it is the need to cross-subsidise research that has led to the problem. So the strategy would have to include a commitment to fully funding the costs of research projects and programs that are publicly funded and ensuring the allocated funding is fully acquitted against the proposal and not partially siphoned off for other purposes.

However, it must be acknowledged that there is a more than thirty years history of unsuccessful advocacy, via a plethora of reports, for this, and governments have not listened. But this time it's different. As Jennifer Westacott has stated:

*Now we are in a state of disruption and disintermediation. Government just a taking a holding position doesn't cut the mustard anymore. We do have to have more purposeful interventions by government.*

The next thirty years will not be like the last thirty years. A new approach is needed. However, universities need to recognise that one of the reasons governments have been reticent to fully fund research is likely to have been concerns about transparency and rigour in the cost base. If government and industry are to contribute to full funding, confidence and trust in the partnership needs to be built into costings up front, not just something that is achieved through acquittals after money is spent and the research goals have been met, or not, as the case may be.

- (d) It would further include a commitment to funding each successful program for a minimum of five years and being much more rigorous in assessing whether projects should receive ongoing funding past this initial period. The current system uses the allocation of project-based funding as a proxy measure for accountability, but projects run for short terms, are not connected strategically, and have built up large inefficiencies. As outlined above, the ability of institutions to enact strategic research programs is hamstrung by this. Therefore, the move to program-based (not project based) funding should be accompanied by a return to larger proportions of funding going to institutions in support of their strategies, reinforcing the focus on specialisation and convergence (point 'b' above).

At the same time, this implies moving to longer term accountability processes, less like 'granting' processes and more like ERA processes, institutional compacts and the development of other long-term accountability mechanisms that do not rely on the allocation of individual projects grants in lieu of proper program evaluation. This would move research funding more closely towards other government expenditure programs which follow ANAO guidelines, and less as an exception off to the side, guaranteed by peer review alone.

- (e) Related to this (longevity of funding), the national research and innovation strategy would need to be characterised by a greater degree of expert, independent and transparent decision-making than exists currently. Ministers would have a role in setting overall priorities but would not be involved in "signing off" on or announcing individual grants. The projects that have the best alignment with the national priorities and the best prospects of significant impact would be the ones that are funded, and communication about successful projects would be the responsibility of the independent body responsible for deciding which grants should be funded. This was essentially the philosophy behind the Cooperative Research Centre program that has survived since 1990s. Its operational principles need to be extended to the system as a whole.

## 2. Proposals

2.1 The following proposals are consistent with the principles and goals set out above.

A: Combine all Australian Government research funding (other than CSIRO and other publicly funded research agencies) into two pools and allocate grants among specialised Research Institutes that are aligned to national research and innovation missions and who compete on behalf of teams of university and industry-based researchers

2.2 This option would combine funding from the NHMRC and the MRFF into a single "health and medical" research pool worth around \$2 billion annually (based on NHMRC expenditure of \$900m and MRFF earnings of \$1.1b), and all other existing public funding sources into another funding pool including all funding from the ARC and the vast array of other minor pots of public funding pots that exist for research, worth around \$1.3 billion annually (based on \$800m from ARC and around \$500m from other sources). (See Proposal B below for a new approach to Block Research Grants, currently worth \$1.8b annually).

- 2.3 The key difference from the current arrangements is not simply the pooling of existing funds, but the process for allocating and administering the grants that would promote transparent, independent and expert decision-making, and importantly would achieve efficient grant administration. These roles would be separated. (See **Attachment 2: A new approach to research grant allocation and management**).
- 2.4 Cooperative Research Centres (CRCs) and Regional and Rural Development Centres (RDCs), which bring industry funding and expertise to the table, would be reconstituted as specialised Research Institutes (not to be confused with the various health and medical research institutes) aligned to the national missions identified through the national research and innovation strategy that would compete for funding from these pools on behalf of research teams. Additional specialised Research Institutes may need to be started up depending on the number of national missions.
- 2.5 These Research Institutes would have strong industry involvement and build expertise and relationships with the researchers in their domain/discipline/industry and be responsible for the initial assessment of all grant applications relevant to their area. They would decide which ones they would advocate for in the second phase of assessment. In determining which applications to support, the Institutes would take account of ERA rankings, and would have to provide additional justification for any application it chose to support that did not come from a university that was ranked 4 or 5 in the relevant field. More broadly, however, a funding system that looks at the qualitative merits of new proposals is to be preferred to one that focusses on past performance only.
- 2.6 These specialised Research Institutes would then compete against other institutes all vying for a portion of funding from the two national funding pools. That is, the Research Institutes would act as the agents and advocates for those research proposals within their domain they deemed most likely to be successful. No grant applications could be made direct from a research team without first being assessed and endorsed by the relevant Research Institute, and research teams could only apply through one Research Institute.
- 2.7 A new grants allocation body, the National Research and Innovation Commission (NRIC), would be established to run the process of determining which Institute-endorsed applications should be awarded a grant. Once the grant had been approved by the NRIC, the funds would flow back to the researchers through the Institute, which would also be responsible for administering those grants, monitoring and evaluating progress and deciding whether to support subsequent applications for ongoing funding. Initial grants would be for a minimum of five years.
- 2.8 The Research Institutes would also act as brokers/negotiators between the researchers and the funding bodies. The default position would be that each project would be fully funded (thus there would be no need under this model for the RBGs), however industry contributions to the overall cost of projects could improve the likelihood of funding as well as free up public funding for additional projects. **This could result in more of the burden of research funding being borne by the private sector, and more of the research workforce being employed by industry.**

- 2.9 This is similar to what happens in industry in the product-development process, with projects having to meet certain criteria to pass through stage-gates for initial and then on-going funding. Both the Research Institutes, and the two funding decision-making bodies, would be required to include experts from the relevant industries on their panels.
- 2.10 This is kind of approach that is adopted in other countries that have impressive and world-leading research. This option would replicate the model for allocating grants that is adopted by the National Institutes of Health (NIH) in the United States, for example.
- 2.11 In contrast to the existing NHMRC limits on the number of researchers that can be part of a consortium, no such limits would apply under this new approach. This would encourage greater cross-institutional collaboration.
- 2.12 The national pools would be covered by trusts, similar to the NHMRC, to prevent it from being converted, at some later stage, by government to other purposes, such as was the experience with the Education Investment Fund.
- 2.13 The major barrier to this approach would be the unwillingness of line agency ministers to give up ownership and responsibility of the siloed funding pools they currently control, notwithstanding that this would be in the national interest by, among other advantages, reducing the need for researchers to waste time applying to multiple bodies for small amounts of money.

#### B: Repurpose funding from Research Block Grants

- 2.14 A complement to the approach outlined above would involve retaining the RBG (i.e., not roll it into the non-health pool) but re-purposing it. Given the above approach involves fully funding successful research projects, the increasing its quantum from some of the savings from changes to the Commonwealth Grants Scheme. RBG funding would be allocated to universities for the purposes of additional “own-purpose” or “high-risk” research projects.
- 2.15 This funding could not be used to offset the cost of projects funded through the NRIC, but would be available to support a university’s own research initiatives that either haven’t been successful through the application process or were not submitted through that process in the first place. Universities would be required to fully acquit and account for the use of these funds. It would allow universities to invest in more innovative initiatives and up-and-coming researchers. Given the likely strong focus on applied research projects that would be funded through the implementation of Proposal A above, it would be expected that universities would most likely use their BRG to fund pure discovery research.
- 2.16 **Attachment 3** sets out diagrammatically how this would differ from current arrangements.

#### C: Identify which research disciplines will be funded through particular universities

- 2.17 The first option set out above – reducing the number of channels through which competitive research grants are funded – has the aim of focussing universities’ minds on what areas of research they should concentrate on in order to win fully-funded, long-term funding. Over time this would lead to greater diversification in the sector and different universities perceived where they had the competitive advantage and decided to invest their effort into winning funding in a smaller number of areas.



- 2.18 However, an alternative approach would be for the government, through its compacts, to indicate which universities will receive research funding for which disciplines and industries. This would act to signal a long-term commitment to those institutions, allowing them to build expertise as well as partnerships with other universities and industry. They would be government-sponsored centres of excellence for research in particular areas. Outside these areas, they would receive no direct research funding, however they would not be prevented from entering partnerships with other institutions who would be the lead institution in other areas.
- 2.19 This approach would be somewhat akin to what is already happening in the way state governments enter into direct research partnerships with particular universities in particular areas or on particular projects. However, it is likely to be a very lengthy and politicised process.
- 2.20 Any decision to go down this track, with a more directive and interventionist approach, would need to be done against a clearly articulated long-term strategy, and with planning that takes account of the various transition issues that would inevitably arise as the research workforce realigned itself according to which universities were designated as the lead institutions in particular fields. It would also have to incorporate lessons from systems that have been fully based on this approach – such as the French system of research agencies – which have been cited as too rigid and lacking dynamism.

## **CONCLUSION**

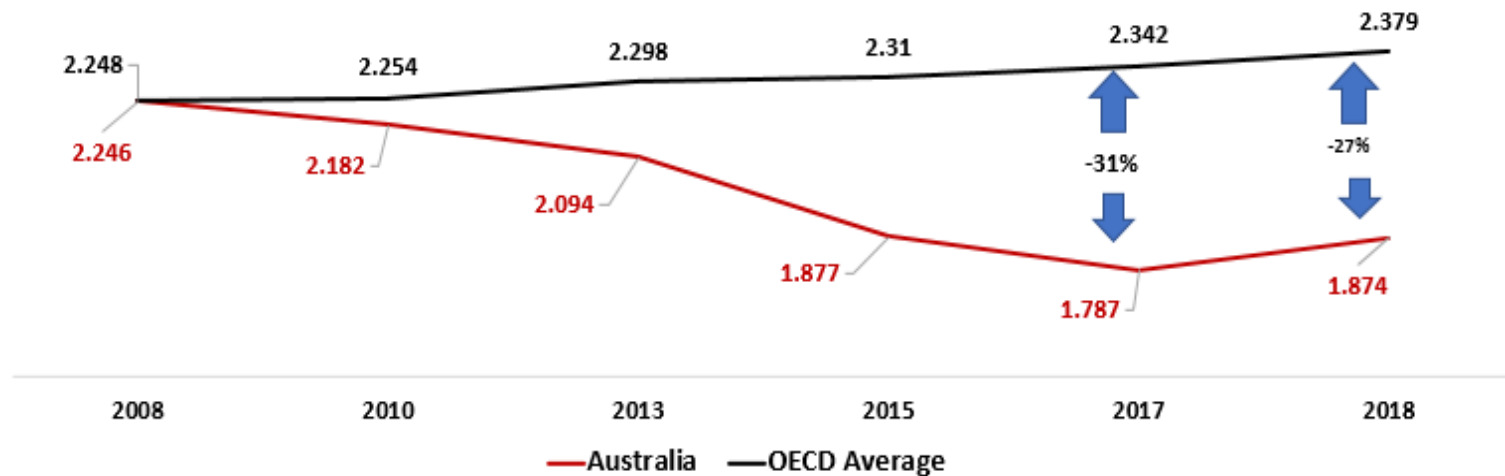
- 2.21 The future of Australia’s world-class university research sector is now precarious due to the loss of international student revenue and will take many years to recover. Our response to this needs to take account of this new reality.
- 2.22 Whatever level of public funding is available into the future, it must not only be allocated but also managed far more effectively, efficiently, transparently, with a long-term strategic outlook and on the basis of independent expertise, than is currently the case. We need a system that is much more tightly coordinated and curated, that incentivises industry and university partnerships and specialisation to address a relatively small number of specific missions and is not constantly subject to change due to short-term political and sectional interest.
- 2.23 This paper has attempted to identify a range of structural problems with the current system which have less visible in the era of ever-growing international student revenues. Just as Australia once lived “off the sheep’s back”, our university research sector has been living off international students. They are gone now and they won’t be back anytime soon. The need to address these structural issues is now urgent.

## ENDNOTES

- 1 Larkins, F. (2020) <https://melbourne-cshe.unimelb.edu.au/lh-martin-institute/fellow-voices/strong-research-performances>
- 2 Larkins, F. & Marshman, I. (2020) <https://campusmorningmail.com.au/news/research-funding-crisis-imminent-and-enormous/>
- 3 Norton, A. (2020) <https://andrewnorton.net.au/2020/06/01/why-did-universities-become-reliant-on-international-students-part-1-government-funding-cuts/>
- 4 Butler, Linda. (2003). Explaining Australia's increased share of ISI publications - The effects of a funding formula based on publication counts. *Research Policy*. 32. 143-155. 10.1016/S0048-7333(02)00007-0.
- 5 Müller, R. & De Rijcke, S. (2017). Thinking with indicators. Exploring the Epistemic Impacts of Academic Performance Indicators in the Life Sciences. *Research Evaluation*. doi: 10.1093/reseval/rvx023.
- 6 [https://amsi.org.au/wp-content/uploads/2019/04/advancing\\_australias\\_knowledge\\_economy.pdf](https://amsi.org.au/wp-content/uploads/2019/04/advancing_australias_knowledge_economy.pdf)
- 7 <https://www.industry.gov.au/sites/default/files/2020-02/australian-business-investment-in-innovation-levels-trends-and-drivers.pdf>
- 8 Westacott, J. (2020) [https://www.bca.com.au/ge\\_employee\\_townhall](https://www.bca.com.au/ge_employee_townhall)
- 9 Mazzucato, M. (2018) [https://ec.europa.eu/info/sites/info/files/mazzucato\\_report\\_2018.pdf](https://ec.europa.eu/info/sites/info/files/mazzucato_report_2018.pdf)
- 10 <https://www.csiro.au/en/Showcase/Challenges-missions>
- 11 National Academies of Science, Engineering and Medicine (2014). *Convergence Facilitating Transdisciplinary Integration of Life Sciences, Physical Sciences, Engineering, and Beyond*

## What is Broken? – Our R&D Performance

### R&D as Percent GDP



**Australia's R&D Performance as a % GDP has declined by 27% relative to the OECD average between 2008 and 2018**

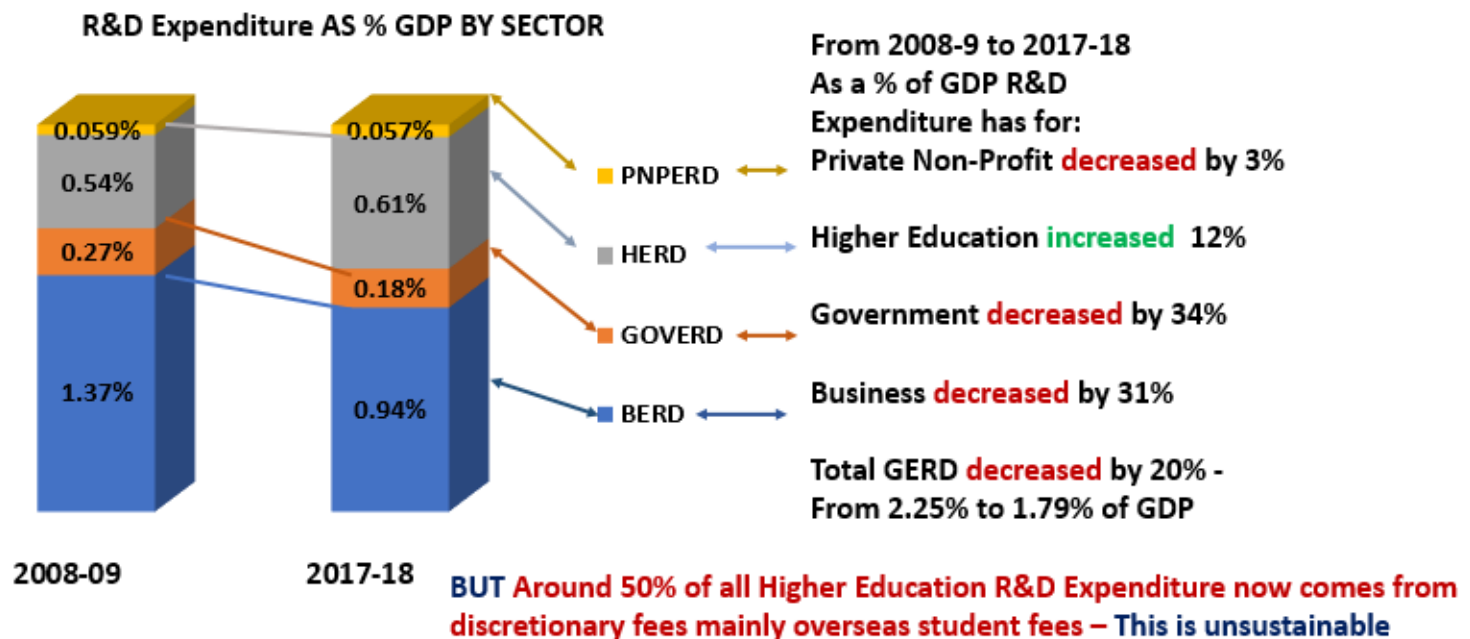
**If Australia had maintained the 2008 performance level \$8.5 billion extra (26%) would have been invested in R&D in 2018 above the present \$33 billion**

27/08/2020

F P. Larkins Research Australia Roundtable <sup>1</sup>

# Where does the Problem Lie? – (Not with the Universities)

## Trends in Australia's R&D Performance as % GDP



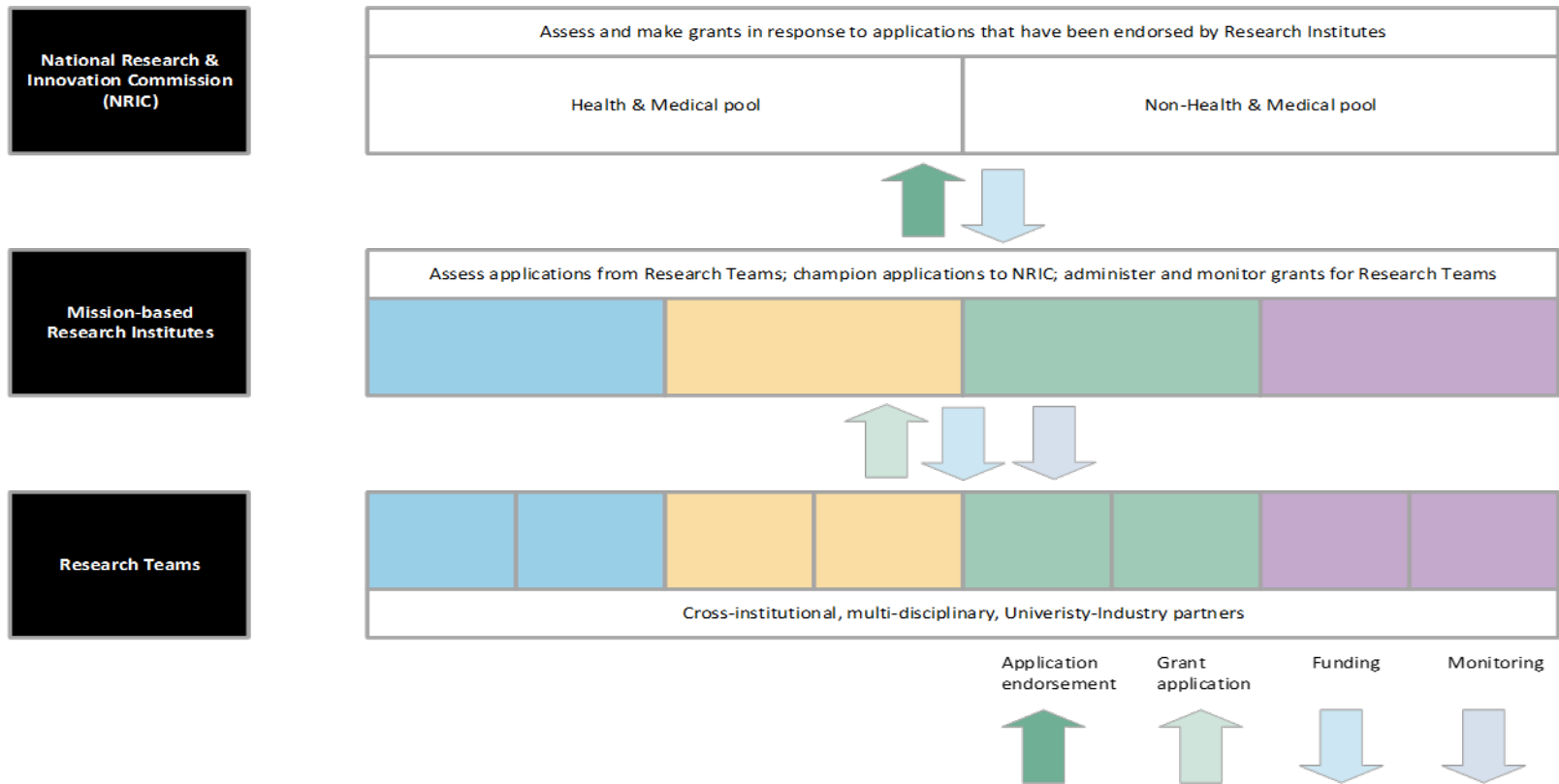
27/08/2020

F P. Larkins Research Australia Roundtable

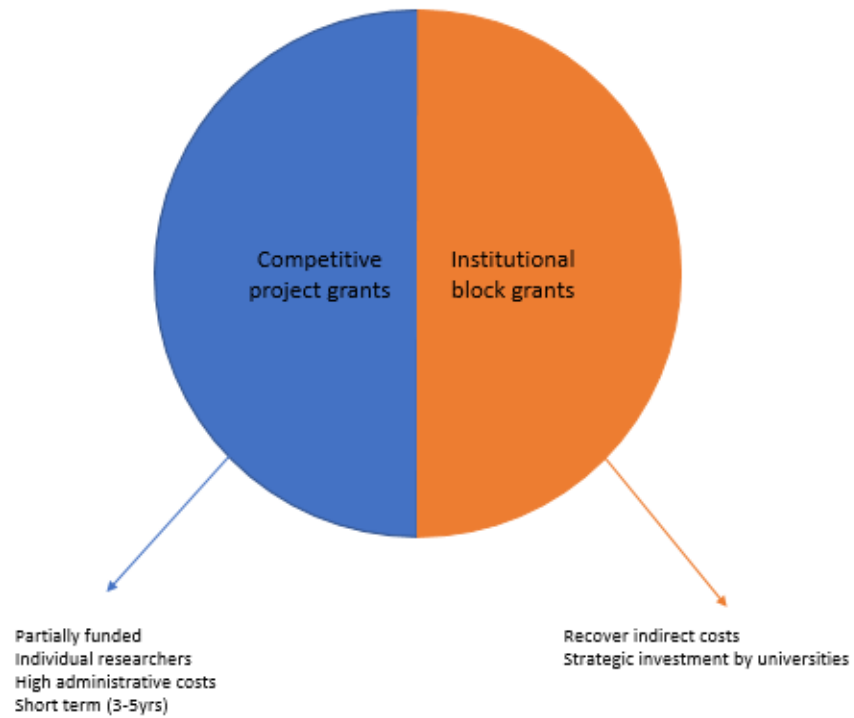
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## ATTACHMENT 2 – A NEW APPROACH TO GRANT ALLOCATION AND MANAGEMENT

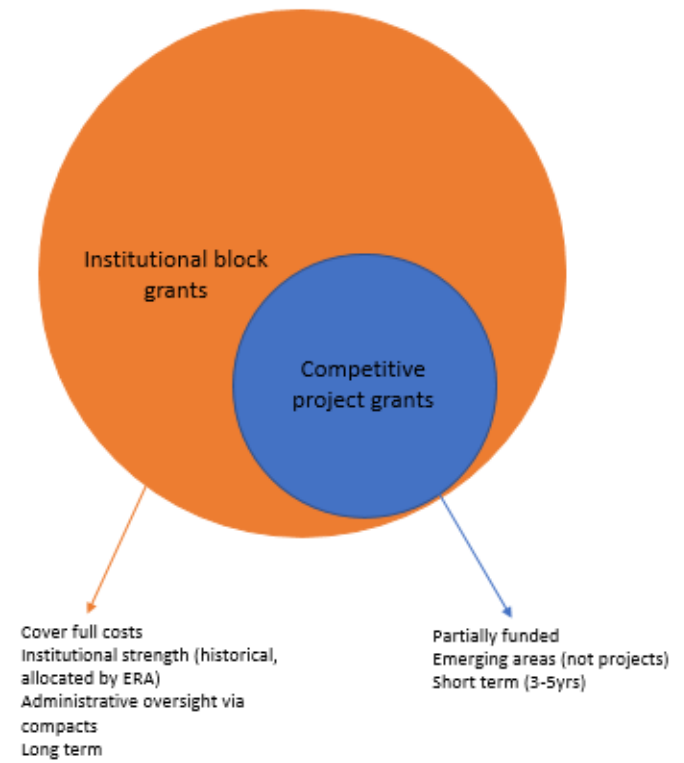
A new model for competitive research grant application, allocation and administration



Current funding mode (in theory)



Possible funding mode (in theory)



## ATTACHMENT 4 - WORKSHOP PARTICIPANTS AND DISCLAIMER

This report represents a broad consensus reached by participants over the course of three two-hour workshops held in June, July and August 2020. The workshops were part of an overarching program of work - involving similar discussions involving a wide cross-section of participants from multiple industry sectors - on national resilience in light of COVID-19. This project is being jointly sponsored by Global Access Partners (GAP) and the Institute for Integrated Economic Research.

The workshops followed the principles of the GAP 'Second Track' process – an innovative process of group collaboration which encourages positive thinking, deep long-term engagement, and a personal interest in achieving practical results.

Meetings were held under the Chatham House rule of non-attribution to inspire a frank and constructive exchange of ideas. Accordingly, there was a diverse range of views expressed by the individuals involved in the workshops and not every participant agrees with every statement or recommendation in full. The workshops were an initiative of GAP and IIER, and their existence, process and results do not claim or imply any form of endorsement from any of the individual workshop participants or their organisation of employment or affiliation.

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**Mark Bazzucco, CSIRO**

**John Blackburn AO, Institute for Integrated Economic Research**

**Tim Cahill, Research Strategies Australia**

**David de Carvalho (Workshop Chair), former First Assistant Secretary, Higher Education, Australian Government (2011-2013)**

**Stephen Hayes MBE, Gravity Group and GAP**

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**Mark Hutchinson, University of Adelaide**

**Frank Larkins, University of Melbourne**

**Tamara Martin , University of NSW**

**Tony Peacock, Cooperative Research Centre Association**

**Jan Tennent, ConnectBio**

**Matt Wenham, ex-Australian Academy of Technology and Engineering**