



Australian Government

Chief Scientist

PROFESSOR IAN CHUBB AC

**Universities Australia
Annual Higher Education Conference 2015**

RATIONED RESOURCES REQUIRE SENSIBLE CHOICES

**National Convention Centre
Canberra ACT**

12 MARCH 2015

******* CHECK AGAINST DELIVERY *******

Today I want to talk about how we use one of our seriously rationed resources: public funding for research - and for science. And I want to talk about the role of universities.

While we might think differently when we gaze longingly into the misty and rose-tinted rear view mirror, I want to start by suggesting to you that there was **never** a golden age for the funding of research.

If I'm wrong, it must have been a long time ago. But it must have been good, and I wish I'd been there because we always hear how much better it was than the present.

I suppose that there might have been a time when we could, would, and probably even did, expect that the acquisition of a PhD or an academic job **implicitly** meant that we had an entitlement to public funding to support us for whatever research we wanted to do at whatever pace we chose - for the simple reason that it satisfied our curiosity - along with that of our network of peers. We might have labelled it academic freedom.

But if such an age existed for research funding, it is hard to find; it must have been at its most golden well before my time.

While my era might have been a bit easier than the present one, and while many of us might have got what we called a tenured position after one post-doc, I cannot remember anything other than barely adequate research funding. I do remember having to write multiple grant applications to get enough money to do what we wanted to do - because no single source or no single grant ever provided enough. How different is that from now? Not much, I suggest.

I can't remember the success rates of grant applications at that time, but I do remember the agonising of the committee of

peers when, after face-to-face interviews of all applicants, we had to grade NHMRC grants out of 6 when we speculated that the cut-off for funding would be, say, 5.3. Apart from the interviews, what is really different today? The success rates might be lower, but that is really a matter of degree, not an absolute.

One option is to shrug and say 'life wasn't meant to be easy'. We could even conclude that it is better if the number of successful grants in this highly competitive game is small - it's about standards after all. But we can't take that too far; imagine the politics of a success rate of 1 in 8, or 10, or 15! Imagine the naivety of again asking a government for more money because we could spend more - just to be disappointed again.

Our collective imagination probably does stretch that far. So our way of handling the matter is to fund more applicants, even if that means barely 1 in 5 succeed, and then fund about 65% or 75% of the required budget. And surely we miss some good ones.

There are numerous risks to this approach. A talent drain is one; inadequate support for the coming generation is another; a steady erosion of researcher morale is another... and the list goes on.

All are important and worthy of a serious discussion in their own right.

But today I want to discuss another possible risk - the risk that our processes could leave gaps in our (science) research base that will be to our medium to long term cost as a nation; but how would we know? We have no systematic approach to ensuring that matters of critical interest to us as a nation are being addressed by our researchers, and we have no way of

knowing whether they are funded adequately or if they are funded at all. We do after all, support R&D in something like 14 federal portfolios across 45 programs with a value greater than \$10 million without a cohering policy or coordinating strategy.

I suggest to you that we have to change. Much of the world is changing, indeed much of the world already has changed and is well ahead of us. We must change, too. We must learn from what others are doing. We must develop a strategy and we must set priorities... and we must do so while ensuring that we don't sacrifice important principles for pragmatism.

Before I start on the research priorities, let me say that I do subscribe to the notion of academic freedom - not the mythical golden age version of 'give us our entitlement and nick off' - but a freedom that allows (even requires) researchers to follow the leads and the evidence without external interference or subtle or unsubtle pressure to arrive at a particular conclusion. I also support a view that **not all** the research we support should be what we do to suit what our researchers think is important. The people out there paying taxes to support us have a right to expect that they will get some benefit from what we do – that we will respond to society's needs.

So it might be no surprise to you that I do agree with Derek Bok, the former President of Harvard University, who wrote in 1990: *It is of the utmost importance, then, that universities preserve abundant opportunities...for professors and students to engage in intellectual inquiry for its own sake... It would be a pity, however, if an insistence on pure learning and research were to drive out all concern for practical issues. Not only does society need the university's help to solve many of its problems; such problems can also help scholars to discern the more basic questions and to acquire practical experience that*

*casts new light on familiar issues... One would suppose, therefore, that the true mission of universities would be to nurture a healthy balance between applied intellectual pursuits and the search for truth and meaning for their own sake.*¹

Of course there has to be a balance – but discovering new knowledge and paying due attention to the nation’s needs are both legitimate functions of the universities in a ‘clever country’.

In the US, which is certainly the leading producer of research output and outcomes in the world, the federal government encourages research across the spectrum. And it does so within a policy context of research priorities.

The latest list of R&D priorities was released in July 2014.² The Memorandum for the Heads of Executive Departments and Agencies includes the comment that *federal government funding for research and development is essential to address societal needs... (and includes the obligation to support)... the fundamental curiosity-driven inquiry that has been a hallmark of the American research enterprise and a powerful driver of unexpected new technology.*

So in **their** rationed system they ensure that their support covers fundamental research driven by curiosity; fundamental research with a purpose – that is research designed to *discover* the knowledge that we need to solve the problems we can identify; and research designed to *use* knowledge (hopefully) to solve problems.

But the point is that all are essential. One should not have a superior status over the other.

¹ Derek Bok, *Universities and the Future of America* 1990 Duke University Press Page 9.

² <http://www.whitehouse.gov/sites/default/files/microsites/ostp/m-14-11.pdf>.

So, yes, we need a balance, and yes, that balance needs to be a healthy blend of pure learning alongside the hunt for solutions to problems that our communities face on a day-to-day basis.

The US document I referred to earlier goes on to list R&D priorities. It encourages clearly defined goals, and support for high-risk, high-return research. It lists eight priority areas, not projects but areas.

The Research Councils in the UK recognise that novel, multidisciplinary approaches are needed to solve many, if not all, of the big research challenges over the next 10-20 years.³

They coordinate research in six priority areas.

And the European Union's Horizon 2020 program takes a challenge-based approach to bring together resources and knowledge across different fields, technologies and disciplines.⁴

Their funding focuses on seven challenges with more specific research identified to support them.

New Zealand takes a similar approach to Horizon 2020.

Their eleven national challenges aim to align and focus research on large and complex issues faced by New Zealand and encourage scientists from different institutions and across disciplines to collaborate on common goals.⁵

Although these examples use different ways of identifying priorities, they all acknowledge that doing research to address the big challenges that communities face is of critical importance.

³ <http://www.rcuk.ac.uk/research/xrcprogrammes/>.

⁴ <http://ec.europa.eu/programmes/horizon2020/en/h2020-section/societal-challenges>.

⁵ <http://www.msi.govt.nz/update-me/major-projects/national-science-challenges/>.

And they all identify priority areas and then target funding at specific goals within those areas.

We could and should be doing the same.

So I have proposed science and research priorities. And the eight broad areas of research have been published.

- Food
- Soil & Water
- Transport
- Cybersecurity
- Energy & Resources
- Manufacturing
- Environmental Change
- Health

We are now at the next stage.

Over the last week or so, I have been working – with researchers, industry and business representatives and officials - to identify the practical research challenges to target our research effort, and a proportion of our research funding, in those priority areas.

The questions we used to guide the discussion were:

- What should the field look like in 2025?
- What are the big challenges science and research will need to address?
- What are Australia's advantages in this priority area?
- What are Australia's unique needs in this priority area?
- What research capability does Australia have in this priority area?
- What are the key industries in this priority area?
- What are the industries with the greatest growth potential?

We asked working groups to identify the two or three most important challenges in their priority area. The (edited) fruits of their labours will be on my website next week. I invite your constructive comments should you wish to make them - I only ask you to sign them and provide your address.

The next steps?

Next month, I will take the research challenges to the Commonwealth Science Council and finalise them. After that, if the process goes according to plan, departments and agencies will get a letter advising that a proportion of their R&D budget should be used to support the priority areas that are relevant to their mission.

We will use existing data to identify our present capacity and capabilities, get a fix on what we will need, and identify the gaps.

That way we can determine Australia's capacity, capability, scale and focus of investment.

That way we can make sure that our rationed resource and our own processes don't combine to leave gaps that we will come to regret.

Let me finish with a little more from Derek Bok: *In sum, the quality of our university research remains a monument to our civilization and a potent force for long-term progress everywhere. ... (But) ...the question is not whether universities need to concern themselves with society's problems but whether they are discharging this responsibility as well as they should.*

A fair question then, still a fair question today.

Our sector has to be willing to explain its value. We/you have to take the time to engage with the whole community not just those who pass through the gates. We/you have to help build a vision for Australia and help to get the pieces (the means) to fit together to deliver that vision (the ends). The ends should be something great: certainly something bigger than how we now seem to be portrayed – an economy first and foremost, albeit one with beaches.

It means that perhaps above all, we simply must remember that we are one of the means to an end: we exist because of what we do or can do for our communities - even if we are allowed to enjoy it while we do it.

Thank you.