



Australian Government

Chief Scientist

PROFESSOR IAN CHUBB AC

**OPENING ADDRESS TO THE AUSTRALIAN SCIENCE
INDUSTRY EXCHANGE (ASiX)**

25 minute speech and 5 minutes Q&A

BANGING THE TABLE FOR SCIENCE

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

8:45AM – 9:15AM

20 AUGUST, 2014

**RYDGES, BELL CITY
PRESTON**

Before I begin I wish to make a confession. I intend to repeat here something I have said elsewhere.

Science is important and we should have a plan to support it.

I give you this warning because I find myself accused of late of the crime of consistency.

Last week I gave the Jack Beale Oration at the University of New South Wales.

John Ross of The Australian reported:

It was a mutual love-in of under-appreciated A-listers last night at UNSW, where chief scientist Ian Chubb waxed lyrical for the hundredth time about the need for a national science strategy.¹

Stephen Matchett at Campus Morning Mail:

Chief Scientist Ian Chubb last night made his 700th speech on why Australia needs a science strategy.²

James Riley at Business Spectator was at least sympathetic:

*For more than a year, Prof Chubb has been banging the table. What a demoralising existence for a person of science.*³

I would like to reassure all these gentleman that I have no intention of being a martyr to the cause. I **will** speak when I have something to say.

¹ <http://www.theaustralian.com.au/higher-education/its-all-bluff-and-bluster/story-e6frgcjx-1227023907529>

² <http://campusmorningmail.com.au/> (August 15 edition)

³ <http://www.businessspectator.com.au/article/2014/8/15/technology/australias-chief-scientist-rightfully-cranky>

It so happens that I think there is something important here to discuss: *our future*.

As I have said, I want an Australia that is more than just what is left after the economic trimmings work their way through society's digestive system. I want an Australia in which our economy is organised to support our aspiration and not to limit it.

Presuming that *she'll be right* because it most often has been is no longer an option.

Because we **do** know that nations all around the world are resetting their economies.

We **know** that new technologies are pushing smart companies to the lead.

We know that new skills **are** required for workers at all levels as economies change.

And we know that collaboration between science and business, and between business and educators, is critical to the industries of the future.

So countries **at all levels of development** are focusing on how to encourage these partnerships, in the interests of building new jobs and creating wealth.

We too need to recognise that it is the knowledge that science will offer, and the **sensible** application of that knowledge to agreed goals, that will build a stronger Australia.

Of course, we are accustomed to hearing that Australia punches above its weight – so *she'll be right* will suffice.

It **is** clear that our best are very good. Australia ranks 10th in the world for the number of researchers in the global top 1% [by the number of highly cited papers].

The fact remains, our **average** (field weighted) citation rates place us below many of the nations we would aspire to match.

We are also notoriously poor at realising the value of our science and our science-trained people.

- Our patenting rates are poor; and the linkages between researchers and business among the worst in the OECD.⁴
- Less than one in three Australian researchers work in industry; half the OECD average of 60 per cent⁵ and substantially less than the US, where some two in three researchers are in the business sector.⁶
- Just 1.5 per cent of Australian companies developed new to the world innovations in the latest year for which statistics are available, compared to between 10 to 40 per cent in other OECD countries.⁷
- Looking into schools, we sit in the middle of the pack for primary and secondary students' performance in science and mathematics literacy.⁸

⁴ See Australian Council of Learned Academies (2014), *The role of science, research and technology in lifting Australian productivity*, Canberra; available: <http://www.acola.org.au/index.php/projects/securing-australia-s-future/project-4>; and

Department of Industry (2013), *Australian Innovation System Report - 2013*, Commonwealth of Australia, Canberra; available: <http://www.industry.gov.au/science/policy/AustralianInnovationSystemReport/AISR2013/wp-content/uploads/2013/11/AIS-Innovation-Systems-Report-2013-v3.pdf>.

⁵ OECD, Research and Development Statistics Database, www.oecd.org/sti/rds.

⁶ Scientific and Cultural Organization Institute for Statistics (2013) United Nations Educational, UIS.STAT., UNESCO Institute for Statistics, Quebec.

⁷ Department of Innovation (2011), *Science and Research Australian Innovation System Report – 2011*, Commonwealth of Australia, Canberra; available:

<http://www.industry.gov.au/science/policy/AustralianInnovationSystemReport/AISR2011/index.html>.

⁸ OECD (2012), PISA 2012 Database; snapshot available: <http://www.oecd.org/pisa/keyfindings/PISA-2012-results-snapshot-Volume-I-ENG.pdf>.

I do not deny that there **are** stand-out performers in teaching, in research **and** in industry. There are also numerous longstanding and highly productive collaborations between universities and firms.

But the point is that these are *outliers*. And if we are, as we claim to be, an economy in transition, outliers will not be enough.

Science must move from the margins to the centre.

And all our experience suggests it will not happen unless we decide that it should, and work to bring it about.

Australia is now the only OECD country that does not have a contemporary national science and technology, or innovation strategy.

As I said last week, our science investment and policies are too heavily dependent on so-called ‘terminating program’ grants, funding offsets and sporadic commitments to infrastructure.

We know have also suffered from a lack of coordination. As each agency, department or university independently makes its necessary budget adjustments, our national science profile is what’s left over.

Hence our shared frustration.

In a few weeks’ time I will present to Government a suggested approach to fill the breach. I invite you to contact my office for details of the launch, which will take place in conjunction with a Symposium in Parliament House to mark our Smart Science project.⁹

⁹ Papers in the Smart Science series can be accessed at <http://www.chiefscientist.gov.au/2014/02/australia-2025-smart-science/>.

For the first time, we would have a comprehensive national approach to science, science investment and science's place in the economy.

I have identified four fields for action: **competitiveness**, or innovation; **education**; **research** and **international engagement**.

Here, I want to focus on some ideas that emerge for better industry and research collaboration.

I have drawn particularly on two models with track records of success overseas: the Technology Strategy Board of the United Kingdom; and the Small Business Innovation Research programme of the United States.

i) The Technology Strategy Board

The TSB is the UK's innovation agency and the primary channel for accelerating business-led innovation. Its mandate is based on the principle of *'Concept to Commercialisation'*.

TSB focuses its effort by analysing markets, research capabilities and government priorities. It then develops a roadmap of the requirements to success.

The key aspect of this approach is the collaboration of government, researchers and industry – first to recognise potentially commercial research, discoveries and inventions; then to build models that **work** in bringing them to market.

It also operates at the scale to match its ambition. In total, since 2007, the TSB and its partners have invested over £2.5bn (or

\$4.5bn). It claims a return to the economy of £7 for every £1 invested.¹⁰

Dr Neil Bentley, the Deputy Director-General of Confederation of British Industry (CBI) said of the TSB: *“[it] provides a critical link in the innovation chain, helping business in the development stages where research ideas can be taken through to products and services that can be commercialised.”*¹¹

Some of the questions the TSB considers in allocating its resources include:

- Are potential global markets predicted to be worth billions of pounds per year?
- Does the UK have world-leading research capability in the area?
- Does UK business have the ability to exploit the technology and make use of investment to embed activity in the UK?ⁱ

I note suggestions from the IMF in recent months that the UK economy will “*easily*” be the fastest growing advanced economy in 2014.¹² I put it to you there might be value in a science-industry plan.

ii) **Small Business Innovation Research:**

Turning now to the land of free enterprise, where we find the largest source of venture capital in the world: the Government of the United States of America.

¹⁰ UK Government Department of Business, Innovation and Skills (2013). *Technology Strategy Board Triennial Review*.

¹¹ Technology Strategy Board (2011). *Concept to Commercialisation, A strategy for business innovation, 2011-2015*. Available:

<https://www.innovateuk.org/documents/1524978/2138994/Concept+to+Commercialisation+-+A+Strategy+for+Business+Innovation+2011-2015/f9debf80-dd43-4284-be56-a11a3dda25a8>

¹² See <http://www.bbc.com/news/business-26935148> and IMF (2014). *World Economic Outlook*. Available: <http://www.imf.org/external/pubs/ft/weo/2014/01/>.

Between 20 to 25 per cent of all funds for early-stage technology development in the US come from the federal government. The SBIR programme makes up 85 per cent of this government spend.

SBIR was established in 1982 to maximise the economic returns on publicly funded research.¹³

Each year, federal agencies with external R&D budgets in excess of US\$100 million are required to set aside 2.8 per cent of the available funds for SBIR schemes.

Small and medium sized firms – often start-ups or university spin-offs - can then submit project proposals for needs identified by the agencies, in the context of the explicit research priorities of the US government – such as ‘band-aids that don’t stick to wounds.’

It allows the start-ups to grow, and the federal agencies to do a better job at a lower cost to the taxpayer.

For every day the SBIR has operated, seven patents have been granted to participants.

The programme has supported 15,000 firms, channelled US\$21 billion to priority research goals, and harnessed the skills of some 400,000 scientists and engineers.

So how does Australia, on cruise control, compare to those countries who step on the pedal? Not well.¹⁴

The **number of US patents issued per dollar spent on R&D** is nearly **four** times greater in both the US and UK than Australia.

¹³ See <http://www.sbir.gov/about/about-sbir>.

¹⁴ See Department of Industry, Innovation, Science, Research and Tertiary Education (2012). *The National Survey of Research Commercialisation 2010 and 2011*.

The **number of startup companies founded per dollar spent on R&D** in the US is nearly **four** times greater than in Australia; and in the UK, it's over **nine** times that of Australia.

It's not surprising that countries with a strategy and infrastructure to bring to market what they invent or discover are better at doing just that.

If we want to make any progress towards our aspirations for Australia in the global economy, we need to do the same.

It is not enough to do this in a fitful way – plucking good ideas from here and there, acting on short-term whims with short-term goals.

If we are to operate at the national scale required, our actions need to be part of a broader Strategy; one which is aligned *to clearly articulated national goals*; focused on *priority areas* where we have comparative advantage or critical need and *scaled appropriately* to achieve far-reaching and enduring change.

And if this requires us to bang the table – then we should.

Thank you.
