



Australian Government

Chief Scientist

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

Ambassador, ladies and gentleman and particularly students and teachers

I would like to get the qualifiers up-front.

I am about to make some general comments. And to avoid the usual “he doesn’t understand that we / I do...(whatever)...” let me say that I DO know that there are some excellent examples of innovation and collaboration between Australian researchers and businesses; and between Australian researchers and overseas businesses and researchers.

I do not understate the importance of those links and the outcomes that come from them. These must continue and grow.

What my remarks are aimed at is the relative lack of scale we have here.

On a global scale we are relatively small; and we don’t sit cheek by jowl with neighbouring countries with well embedded and highly sophisticated scientific cultures. Like, say, Canada or Switzerland.

Our financial support is rationed. Obviously we could fund more than we do (whether it would be good or not is another matter) but we don’t have the resources to allocate. Nor do we fully understand where we spend the money now - so spread across multiple portfolios is our support now.

My remarks today are general but my efforts beyond here are really aimed at ensuring that we have:

- Alignment – of at least some of our resources to issues that directly reflect Australian needs or where we have a particular advantage;
- Focus – to stop spreading our scarce resources too thinly;
- Scale – build and support effort on a scale to make a difference.

We need to engage internationally – to earn a place at the international table where ideas and know-how are traded; and we must contribute ideas and know-how to the trade; and to learn about better ways of doing things. We must not be supplicants hoping for crumbs to fall from the table. We must be confident traders: in our ability; in our capacity; in our contribution.

WHY?

Well we know that our past and present economic base will change. We can't rely heavily on resources to get us through; we have to make our way by working better and smarter.

And for us that means some alignment and certainly focus and scale in our STEM – to develop it and to use it as we never have before.

And we know that we have to collaborate – talent, skills, priorities, infrastructure, global issues.

In this context, I should say that approximately 50% of Australia's STEM research publications over the period 2003-

2012 included at least one foreign author; the U.S. is our biggest partner with more than a quarter of Australian co-authored STEM papers published with U.S. researchers. I should add here, too, that some 60% of our researchers are in our universities and some 30% in business. The U.S. is close to the mirror image!

Anyway, I finish the digression and ask: WHY? Why must we get more serious about STEM?

We know that science and innovation are recognised internationally as the key for boosting productivity, creating more and better jobs, enhancing competitiveness and growing an economy.ⁱ

It is estimated, for example, that scientific and technological advances have produced roughly half of all US economic growth in the last 50 years.ⁱⁱ

In Australia, 65 per cent of economic growth per capita from 1964 to 2005 can be ascribed to improvements in our use of capital and labour – made possible in large part by STEM.ⁱⁱⁱ

Evidence from the Organisation for Economic Cooperation and Development (OECD)^{iv} shows that:

- Increases in research and development (R&D) substantially boost per capita growth.
- Publicly-funded R&D has a high rate of return, as well as directly driving economy-wide productivity growth.
- Private R&D delivers high returns to individual firms, flowing on to workers and communities.

STEM skills are critical to the management and success of R&D projects as well as even the day to day operations of competitive firms.^v

They are the lifeblood of emerging knowledge-based industries – such as biotechnology, information and communications technology (ICT) and advanced manufacturing – and provide competitive advantage to established industries – such as agriculture, resources and healthcare.

Strong performance in STEM is particularly critical to our education sector, not just because it is now Australia's fourth largest export industry but because it is a way to a better future.^{vi vii} Creativity, curiosity, learning, knowledge and innovation have together treated us kindly.

Let me remind you that human beings as we are now, we *Homo sapiens*, have never been satisfied with the status quo. This drive to find a better way has guided us for the past 40,000 years.

And both scientific principles and their creative application have enabled *homo sapiens* to survive while other species have perished.

That same creativity, inherent in our very existence, remains central to our very survival. Our ancestor found ways to survive challenges. Ours are as great, and we must meet them too.

So it is highly likely the demand for STEM will only continue to grow as we compete in the emerging global economy.

As I said at the beginning, collaboration is important to us. The U.S. link is one of the most important to a relatively small nation such as ours.

That link could be bigger and stronger. We face shared challenges that do not recognise borders and which require shared solutions.

We can't do it alone. Nor would we want to. We do better when we work together. And then, maybe only then. The world will be a better place.

ⁱ Directorate-General for Research and Innovation European Commission, *The Grand Challenge: The Design and Societal Impact of Horizon 2020*. 2012, European Commission: Brussels.

ⁱⁱ prepared for the U.S. Department of Labor Jobs for the Future, Employment and Training Administration, *The STEM Workforce Challenge: The Role of the Public Workforce System In a National Solution for a Competitive Science, Technology, Engineering and Mathematics (STEM) Workforce*. 2007.

ⁱⁱⁱ Productivity Commission, *Public Support for Science and Innovation*. 2007, Commonwealth of Australia. p. xxxi.

^{iv} Directorate-General for Research and Innovation European Commission, *The Grand Challenge: The Design and Societal Impact of Horizon 2020*. 2012, European Commission: Brussels.

^v Business Council of Australia, *Action Plan for Enduring Prosperity*. 2013.

^{vi} Australian Bureau of Statistics, *International Trade in Services by Country, by State and by Detailed Services Category, Financial Year, 2012-13*. 2013.

^{vii} Department of Foreign Affairs and Trade, *Composition of Trade 2012-13*. 2013.