



Australian Government

OFFICE OF THE
CHIEF SCIENTIST

A background image of a map of Australia, showing state boundaries and names like 'AUSTRALIA', 'SOUTH AUSTRALIA', 'NEW SOUTH WALES', 'Perth', and 'Sydney'.

The Case for An Australian Science & Technology Strategy

PMSEIC APRIL 2013

PURPOSE OF THIS PAPER

To present a case for a science and technology strategy based on its critical role in building a strong, prosperous future for our nation and its place in the world.

“In a world where our future is not assured there’s nothing automatic about a strong and prosperous future for our nation.”¹

We will get the future we earn.

Science² will be at the core of the means by which we earn that future: as we meet, manage or mitigate the impacts of any challenges as they arise.

BACKGROUND

The Australian scientific enterprise must prepare Australia and Australians for the unpredictable challenges of the future. Our citizens must be scientifically and technologically informed. Amongst them, there will be scientists and technologists whose careers will be built around the need to understand the very nature of things then to apply that understanding to solutions.

Science enriches our lives. Through science we seek answers to fundamental questions about the origin and future of life itself, about our planet and about the universe. And the applications of scientific knowledge impact on all our lives, every day.

Research and innovation underpin our capacity to shape our future.

WHY HAVE A NATIONAL SCIENCE AND TECHNOLOGY STRATEGY?

Most developed nations with strong R&D systems have taken steps to enable a whole-of-government approach to their investment; a science policy and a strategy to focus and coordinate their array of research programs (see attached for a review of international science and innovation systems and individual country briefs).

Australia does not have a Science and Technology Strategy (the Strategy) to provide a coherent framework for science and technology related policies and programs.

In 2012-13, the Australian government will invest close to \$9 billion in science, research and innovation through a suite of programs across multiple departments and agencies. A total of 79 science, research and innovation programs will be funded through the 2012-13 Budget, with administration of these programs distributed across 14 portfolios³, each operating under its own policy framework.

An overarching Science and Technology Strategy will harness Australia's research, innovation, higher education, vocational education and training, and infrastructure relevant to science and technology – the scientific enterprise.

It will encourage interdisciplinary and cross-sectoral responses to the national and global challenges facing society that no single agency or nation (or discipline) can address by itself.

It will articulate a stable, long-term and comprehensive vision for Australian science and technology, across sectors, disciplines and the full spectrum from basic to applied research. It will encourage investment in R&D from the business community. It will encourage Australian researchers and research organisations to collaborate across sectors and with our international partners.

Finally, the Strategy will propose a series of actions to build on existing policy or to develop new policy.

WHAT WILL IT INCLUDE?

The Strategy will aim to achieve the following key outcomes:

1. A STEADY STREAM OF NEW IDEAS

Advancements in science and technology rely on a steady stream of new ideas.

Since 1946, Australia has been a contributor to the bank of knowledge; prior to 1946, Australia was essentially dependent on others providing the knowledge we needed. It worked sometimes.

When we became a contributor, Australia's position changed. We both added knowledge to the bank and we developed the talents and skills to make use of the understanding that grew from research done elsewhere. We became active participants in international scientific endeavours and we learnt that science on its own is lonely – it needs a context and a social licence. Research in the humanities and social sciences contributes to the understanding of the context.

Basic research provides us with understanding; knowing about the very nature of things. It is the important means by which we replenish the knowledge bank as we draw on it to drive innovation.

To build excellence in basic research, the Strategy will guide sustained and strategic investment to support:

- A diverse portfolio of fundamental research that is high-calibre, creative and ground-breaking.
- Research in the humanities and social sciences.
- A stable funding stream for long term national and international projects.
- The development of a research workforce via our education and training systems.
- High-quality and nationally-networked research infrastructure as guided by the framework in the National Research Investment Plan.

2. GLOBALLY COMPETITIVE AUSTRALIAN INDUSTRIES

A strong, dynamic and sustainable basic research enterprise provides the foundation for new products, processes, and sometimes new industries in addition to playing a critical role in driving innovation and economic productivity.⁴

The Australian innovation strategy Powering Ideas places science in the context of a national innovation system and recognises the correlation between innovation and productivity.⁵

To foster a greater role for business in the Australian innovation system the Strategy will advise on:

- New and reinforced links across publicly funded science and industry to catalyse innovation, particularly in areas of research strength and/or commercial potential.
- The sharing of knowledge through two-way staff mobility between business and academia.
- Reviewing the structure of undergraduate and postgraduate training to broaden the employment prospects of graduates.
- Exploring creative public-private partnerships to bridge the “valley of death” in the research commercialisation pathway, where appropriate.

3. AN INTERDISCIPLINARY AND COORDINATED CAPACITY TO TACKLE SOCIETAL CHALLENGES

As a nation, indeed as a planet, we face challenges such as protecting our environment, maintaining the health and wellbeing of our citizens, sustaining our food and water resources, securing our place in a changing world and lifting productivity and economic growth⁶. These complex and cross-disciplinary problems require a collaborative approach to developing solutions.

The Obama Administration states that “solutions require partnerships across federal agencies; branches and levels of government; public, private, and philanthropic sectors; and nations.”⁷

The Strategy will identify:

- Common purpose and direction across the breadth of government programs to address societal challenges.
- Alignment of research in public sector agencies with societal challenges.
- Alignment of education and training programs to meet societal needs.

4. SCIENCE LITERACY EMBEDDED IN AUSTRALIAN SOCIETY

Science informs our decisions as a society, as corporations, as consumers and as citizens.

To fully grasp the complexity of challenges facing society, individuals need at least an insight into how science works.

Equally, there is a need for the government and publicly-funded research agencies to clearly communicate complex science issues with national policy implications. The government is reliant on scientific evidence for many of its core functions.⁸

The Strategy will highlight and support science literacy and engagement within Australian society by:

- Promoting inquiry-based learning and the teaching of critical thinking, the scientific method and scientific uncertainty in schools and universities.
- Supporting the training and professional development of science and mathematics teachers.
- Supporting research on inspiring and innovative techniques for teaching mathematics and science.
- Encouraging communication between scientists, the public and policymakers.

5. AN INTERNATIONALLY INFLUENTIAL AUSTRALIAN SCIENCE ENTERPRISE

International collaboration and networks are essential to address shared global challenges. It is in our national interest to be an active participant in research aimed at addressing these common problems and establishing ourselves as a nation of influence.

Maintaining productive relationships with established, high performing nations is as important as nurturing relationships with emerging science nations, particularly in Asia.

The Strategy will frame objectives to increase worldwide engagement in science and technology by:

- Maintaining and strengthening research relationships with high-performing nations that enhance our performance.
- Nurturing long-term research relationships with emerging science nations, particularly in our region.
- Collaborating with nations that have complementary research priorities and common challenges.

WHAT ARE THE NEXT STEPS?

Following a targeted consultation process in May and June 2013, the Office of the Chief Scientist will deliver a draft strategy to the next PMSEIC meeting.

REFERENCES

¹ Transcript of the Prime Minister's Press Conference, Mon 25 March 2013

² Science is broadly defined here to include natural and physical sciences, medical science and engineering.

³ Australian Government Science, Research and Innovation Budget Tables (2012-13)

⁴ The OECD Innovation Strategy: Getting a Head Start on Tomorrow (2010), Organisation for Economic Cooperation and Development, Directorate for Science, Technology and Industry.

⁵ Innovation and Productivity (2010), Australian Business Foundation, abfoundation.com.au, and The OECD Innovation Strategy: Getting a head start on tomorrow (2010), OECD.

⁶ PMSEIC 25 Paper, December 2012, Setting Strategic Research Priorities, <http://www.chiefscientist.gov.au/2013/02/setting-strategic-research-priorities/>

⁷ Policy for Science, Technology, & Innovation in the Obama Administration: A Mid Course Update (2011), John Holdren address to the American Association for the Advancement of Science.

⁸ APS 200: The Place of Science in Policy Development in the Public Service.