



Setting Strategic Research Priorities

PMSEIC, DECEMBER 2012

At the 24th PMSEIC meeting, held on 9 July 2012, it was agreed that the Chief Scientist would bring to the next meeting advice on the process for setting national research priorities. This advice follows.

INTRODUCTION

Setting priorities for public research funding is an important and ambitious undertaking for the Government. It is a direction that needs to be taken, but taken with considerable care.

Any process should focus attention on priorities and ensure that they are funded adequately. Research that is less focussed, but which leads us to continue our quest to know more about our world, must also be supported. Such work is the bedrock of our civilisation and, of course, of innovation.

In 1996, twenty leaders of some of the most prominent corporations in the United States sent an open letter to the then President (Clinton). It stated:

... History has shown that it is federally-sponsored research that provides the truly "patient" capital needed to carry out basic research and create an environment for the inspired risk-taking that is essential to technological discovery. We maintain that the federal government is, and must remain, the primary steward of our national trust in university research¹.

But equally:

...Only a very few intellects in every generation have the capacity to do original work of pure research and scholarship. To them great honour is due; they represent the finest flowering of civilisation. But it would be silly and precious to insist that work of this kind is the only proper pursuit for all or even a large fraction of our huge professoriate...Yet how could faculties possibly expect to go on receiving such (substantial) support from the nation's taxpayers without making efforts to respond to society's needs².

The challenges confronting our society: social, cultural and economic, and even its very sustainability, loom large. Understanding the challenges, their nature, and the means to confront them will depend on researchers...*it is*... the *social critics, philosophers, and the purest of scientists who have left the most enduring mark on our civilisation*².

It is for this reason that we need a careful blend of policies in Australia. On the one hand, we need the 'patient capital' to encourage curiosity, *to listen to the conversation in which human beings forever seek to understand themselves*³ – to know more today than we did yesterday about all manner of topics. On the other hand, we need to be sure that some proportion of the public investment in research is prioritised towards the societal challenges that confront us as a nation, right now.

THE INTERNATIONAL PICTURE

To assess the relevance, value and applicability of setting national research priorities, the Office of the Chief Scientist reviewed international priority setting procedures and the Chief Scientist consulted with government scientific advisers in the United States, United Kingdom, European Union and New Zealand.

The following common attributes emerged:

- > Many countries identify priorities to guide public research funding.
- Several countries that we collaborate with most frequently, such as the US, UK, and other countries within the EU, begin with identifying high level societal challenges, and then select funding priorities within those challenges (Appendix 1).
- > All have mechanisms to ensure that curiosity-driven research is also supported.
- > All acknowledge that research leading to innovation is of critical importance.
- > The means by which challenges and research priorities are identified and adopted varies, but not greatly.

The process proposed for Australia is based on these findings.

THE PROPOSED PROCESS



Step 1. Societal Challenges

In line with what is happening around the world, we recommend that Government articulates the five societal challenges as the most important facing Australia and its place in the world.

- Living in a Changing Environment
- > Promoting Population Health and Wellbeing
- Managing Our Food and Water Assets
- > Securing Australia's Place in a Changing World
- Lifting Productivity and Economic Growth

The societal challenges will be implemented using the National Research Investment Plan (the Plan) principles of enabling capabilities and research capacities (see Appendix 2).

Step 2. Research Priorities

Expert working groups, comprising government officials and researchers, are established and recommend no more than three research priorities within each challenge; the most important now of all the important possibilities. The Australian Research Committee (ARCom) endorses these research priorities.

Step 3. Capability and Capacity Mapping

ARCom undertakes a capability and capacity mapping process to ascertain the Australian research community's existing capabilities and current funding level within the research priorities, as well as identifying potential gaps in capacity.

Step 4. Funding Priorities

ARCom will identify no more than three funding priorities, within each research priority, where the government needs to be assured that there is an adequate investment in research effort.

Step 5. A letter to departments and agencies

The process would conclude with a letter to government agencies and departments, every two years, highlighting the priorities and encouraging a proportion of their budget to be allocated to the funding priorities that fall within their particular mission (see Appendix 3 for a sample letter). In the US, the letter of advice is sent to agencies and departments by the Director of the Office of Management and Budget and the Director of the Office of Science and Technology Policy within the White House.



SIGNIFICANCE

Identifying the five most important societal challenges facing Australia provides an overarching framework for prioritising a proportion of the Government's research expenditure for the immediate national interest.

The regular setting of research priorities, under each challenge, and the identification of funding priorities within them, will deliver a measurable shift in the profile of research support. This shift will direct a sufficient proportion of funding to address those components of the societal challenges identified as currently significant and tractable.

The remaining funding, directed to visionary research which adds to our stock of intellectual capital and delivers unpredictable outcomes over the long term, is our nation's investment in the future.

The priority setting process described for Australia allows for direct researcher engagement as well as funding leverage through government-to-government collaboration in international research programmes; particularly those in the USA, UK and EU from which we have the most to gain as a nation.

APPENDIX 1:

COMPARISON OF PROPOSED AUSTRALIAN SOCIETAL CHALLENGES WITH INTERNATIONAL EXAMPLES

AUSTRALIA (proposed)	USA ⁴	EU⁵	UK ⁶
Living in a Changing Environment	Understanding, adapting to, and mitigating the impacts of global climate change	Climate change and resource efficiency	Living with environmental change
Promoting Population Health and Wellbeing	Defeating the most dangerous diseases and achieving better health outcomes for all while reducing health care costs	Health and demographic change	Lifelong health and wellbeing
Managing Our Food and Water Assets	Managing the competing demands on land, fresh water, and the oceans for the production of food, fibre, biofuels, and ecosystem services based on sustainability and biodiversity	Food security and sustainable agriculture	Global food security
Securing Australia's Place in a Changing World	Developing the technologies to protect our troops, citizens, and national interests	Inclusive, innovative, and secure societies	Global uncertainties
Lifting Productivity and Economic Growth	Promoting sustainable economic growth and job creation	Clean and efficient energy	Energy

Addressing the societal challenges will require input from across the full spectrum of research disciplines, including the physical and life sciences, engineering, information and communications technology and the humanities and social sciences. Additionally, inter-disciplinary collaboration across the research sector will be essential.

- Living in a Changing Environment
- > Promoting Population Health and Wellbeing
- Managing Our Food and Water Assets
- Securing Australia's Place in a Changing World
- Lifting Productivity and Economic Growth

FOLLOWING NATIONAL RESEARCH INVESTMENT PLAN PRINCIPLES

Enabling capabilities

The National Research Investment Plan advises that enabling capability is required in five key domains: physical, natural, human, technology, and information. These domains have been identified as underpinning vital areas of public and private sector research. The domains are highly interdependent in the way they enable individual fields of research.

Capacity for research

Several fundamental elements combine to provide the research capacity upon which the enabling capability depends. These fundamental elements of the Plan are:

- Publicly funded research: includes basic and applied research capability within Commonwealth, State and Territory agencies, universities and private non-profit institutes.
- Research workforce: includes the training of researchers and research support staff, and the creation of attractive career pathways in research.
- Research infrastructure: includes the provision of local, national and landmark infrastructure.
- > Domestic and international collaboration: includes the development of enduring collaborative relationships among research sectors, end-users and international researchers.
- > Business research: includes basic and applied research capability within the business sector.

APPENDIX 3: SAMPLE LETTER TO DEPARTMENTS, RESEARCH AGENCIES AND FUNDING BODIES

MEMORANDUM TO THE HEADS OF DEPARTMENTS, RESEARCH AGENCIES AND FUNDING BODIES.

FROM: XX

SUBJECT: Research Priorities for the 20XX-YY Budget

The world is increasingly dependent on new knowledge to confront the challenges faced by humanity as a whole. With research and innovation, there is hope that these challenges can be managed; without them there is not.

Research investment will consolidate Australia's place in the world through developing new knowledge, fostering international collaboration on the challenges, and bringing innovative solutions to market.

Strategic priorities will catalyse focussed investments in areas for which Australia must maintain a strong research and innovative capability. These capabilities need to be harnessed to address emerging problems of national significance and deliver benefit to society.

Addressing strategic priorities and implementing solutions of national significance will lead to a major impact on the Australian research and development landscape, by building critical mass in research effort and scale in areas vital to Australia's future.

Engagement in common challenges will enhance Australia's capability to compete in the global economy, and encourage inter-agency effort.

This letter outlines the Government's research priorities for the fiscal year 20xx-yy Budget. It provides guidance for research and development activities in Government departments, research agencies and funding bodies.

BUDGET GUIDANCE

In preparing 20xx budget submissions Government departments, research agencies and funding bodies should clearly outline the direction and allocation of available resources in yearly/x year budget submissions. Complementary to this more focussed approach, departments, research agencies and funding bodies should also ensure support for long-term high-risk, high-return research.

Expected investment outcomes and quantitative metrics, where possible, should be provided. Directives and allocations should be consistent with the overall missions of individual departments, agencies and funding bodies, and accordingly, address research priorities within the five societal challenges (as outlined in Appendix X).

PRIORITISING RESEARCH AREAS

Departments, research agencies and funding bodies should endeavour to provide outcomes against the five key societal challenges in the National Interest.

Departments, research agencies and funding bodies should submit budget plans that:

- show how activities will address societal challenges;
- b indicate the proposed level of investment in priority areas and projected changes in investment;
- > contribute to developing critical mass in the priority areas;
- > show how activities will enhance collaboration and achieve synergies within Australia and internationally;
- b identify performance measures to enable the assessment of impact; and
- > show how transformative research will be supported.

Addressing these challenges will require:

- identifying research capacity and capability; and
- identifying and addressing gaps and vulnerabilities.

APPENDIX X - KEY SOCIETAL CHALLENGES

Societal challenges focus and guide "Australian Government research investment in a way that improves national wellbeing by increasing productivity".

Departments, research agencies and funding bodies should direct and allocate resources as appropriate to address the following five societal challenges and respective research priority areas.

- 1. Living in a Changing Environment
- 2. Promoting Population Health and Wellbeing
- 3. Managing Our Food and Water Assets
- 4. Securing Australia's Place in a Changing World
- 5. Lifting Productivity and Economic Growth

REFERENCES

1. Congressional Record Volume 142, Number 139 (Tuesday, October 1, 1996).

2. Derek Bok, Universities and the Future of America (Duke University, Durham and London, 1990).

3. Timothy Fuller, ed., The Voice of Liberal Learning: Michael Oakshott on Education (New Haven, Conn.: Yale University Press, 1989), p.41.

4. White House Office of Management and Budget Memorandum for Heads of Executive Departments and Agencies, 21 July 2010

- 5. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0808:FIN:en:PDF
- 6. http://www.rcuk.ac.uk/research/xrcprogrammes/Pages/home.aspx
- 7. National Research Investment Plan