SCIENCE & TECHNOLOGY AUSTRALIA POLICY SUBMISSION

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SUPPORTING THE DEVELOPMENT OF SOVEREIGN CAPABILITY IN THE AUSTRALIAN TECH SECTOR

Science & Technology Australia thanks the Senate Standing Committee on Finance and Public Administration for the opportunity to respond to this inquiry.

Science & Technology Australia is the peak body for the nation's science and technology sectors, representing 139 member organisations and more than 115,000 scientists and technologists. We connect science and technology with governments, business and the community to advance science's role in solving some of humanity's greatest challenges.

Key points

- A lack of long-term, stable funding and increased international investment and competition mean Australia's current system does not adequately support local innovation across the R&D pipeline.
- Greater alignment across Government support for R&D, as well as translation and commercialisation, is needed.
- Deepening investment in research translation funds and investing in multi-platform technologies and capabilities are key to strengthening Australia's sovereign capability and will also boost job creation, build new industries, and bolster Australia's economic resilience.
- Currently, indirect costs are not incorporated into value propositions, creating additional barriers for sovereign tech development.
- Building Australia's sovereign capability in advanced technologies is an imperative to ensure we can deploy these technologies in Australia's national interest.

Science & Technology Australia recommendations

1. Conduct a swift review of the Australian R&D system to identify gaps and areas for enhanced support.
2. Deliver stronger returns on investments in R&D through enhanced coordination of Government funding schemes across the R&D system. This could be achieved through:
    - joint Board appointments
    - shared grant administration processes
    - targeted reporting requirements
    - targeted sequential grant rounds aimed to progress successful projects through the pipeline/across schemes.

3. Australia should strategically support 'multi-platform' technologies – from research through to commercialisation and manufacturing – that have the potential to boost our sovereign tech capability in more than one sector.

4. Government initiatives to develop sovereign capability should consider the indirect cost of reliance on overseas solutions, and mandate a deep commitment to data sovereignty, environmental sustainability, local innovations and Australia's national interest.

Alignment across Australia's R&D system

Effective support for R&D – and Australia's sovereign tech capability – must be underpinned by a cohesive and aligned funding and support system. Currently, gaps in support across Australia's R&D pipeline lead to barriers that prevent Australian ideas becoming Australian solutions. Ever-increasing competition for limited funding, a lack of long-term funding options and increasing investment from international competitors leaves Australia inching, rather than charging, towards sovereign capability.

Digital tech holds immense potential for the Australian economy, security and future capability. Artificial intelligence (AI) and other new digital technologies and services are set to deliver $315 billion in gross value for the Australian economy by 2028. Strategic R&D investment is vital to ensuring that local digital tech innovation is translated and commercialised locally, rather than overseas, so we can reap the benefits of local solutions for local needs. Strong sovereign AI capability is essential to protect Australia from cyber attacks, biosecurity risks and technology supply chain disruptions – and to ensure we do not become dependent on imported tech solutions.

R&D investment has a strong return and long-term benefits. CSIRO research found every $1 Australia invests in R&D generates $3.50 for the economy, with a 10% annual return on investment from R&D. This is even higher for research translation and commercialisation funding with a 2021 review finding government investment into the Cooperative Research Centres added $5.61 to Australia's GDP for every dollar spent since 2005. The CRC program is projected to return an estimated $32.5 billion in economic impact by next year, with $13.3 billion being generated between 2012 and 2020. The program supported the cochlear implant development, is building opportunities for specialist battery manufacturing and will support machine learning as part of the funding for the Augmenting Ability CRC announced earlier this year. for every dollar spent since 2005. The CRC program is projected to return an estimated $32.5 billion in economic impact by next year, with $13.3 billion being generated between 2012 and 2020. The program has supported the development of the cochlear implant, is building opportunities for specialist battery manufacturing and will support machine learning as part of the funding for the Augmenting Ability CRC announced earlier this year.

These strong returns on Government investment in R&D would be further maximised through enhanced cohesion across the schemes and initiatives that support Australia's R&D effort. The Government administers several funding schemes, primarily across the federal portfolios of Education, Industry, Science and Resources and Health, as well as other R&D programs and initiatives targeted to specific priorities. These schemes are administered through several different agencies and departments (noting this is not an exhaustive list):

- The Australian Research Council (Discovery Program; Linkage Program; ARC Industry Fellowships)
- The National Health and Medical Research Council (Ideas Grants; Development Grants)

- The Department of Education (Australia's Economic Accelerator; National Collaborative Research Infrastructure Strategy)
- The Department of Industry, Science and Resources (Industry Growth Program; CRC Program; CRC-P Program)
- CSIRO (CSIRO Future Science Platforms; CSIRO Missions)
- The Department of Health (MRFF; clinical trials)
- The Australian Renewable Energy Agency (various funding streams)
- Grains Research and Development Corporation (various initiatives)

This range of schemes provides support across the entire research pipeline from discovery through to translation and commercialisation. However, there is a high level of disconnect between the various programs which means research impact is not maximised. Despite efforts to develop a more cohesive approach, administration of these schemes remains largely siloed within the different government departments and agencies.

There is currently no streamlined pathway for successful ideas and projects to efficiently progress through the various stages. Improved coordination and connection between these schemes would deliver a better return on government R&D investment, as well as improved translation, commercialisation and impact.

This could be done through joint Board appointments, targeted reporting or shared grant administration processes, and/or targeted sequential grant rounds to transition research across the various schemes.

Science & Technology Australia Recommendation:

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2. Deliver stronger returns on investments in R&D through enhanced coordination of Government funding schemes across the R&D system. This could be achieved through:
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Multi-platform tech development

Developing technologies that can be deployed across multiple sectors of the economy presents a huge opportunity to build new industries and economic growth. Understanding the research and application of a technology in one field, then applying this knowledge to another field can lead to new groundbreaking research, application and translation and cross-sector mobility.

Research commercialisation and translation funding programs like the NRF can be directed to seek out potential technology options for cross-sector applications. Strategic investment in technologies with the potential to be applied in more than one sector will generate stronger returns on investment and boost job creation across the economy.

R&D that integrates digital tech with existing or new products offers new functionalities, widens existing capabilities and could uncover new and untested sectors. Digital tech, such as AI, has already made significant inroads in addressing health, supply chain logistics and manufacturing. This provides

added value in terms of personalising or automating services, and it also has the potential to learn, suggest and adapt based on needs. For instance, AI can be used to support medical imaging analysis, detect defects in manufacturing, predict failures of equipment and pre-emptively schedule maintenance activities, improving efficiency. All these functions could be applied in other sectors – with benefits to productivity and economic growth.

To realise the benefits of building sovereign capability in AI, investment is needed to build an AI-skilled workforce, and to support SME tech companies to build their AI capability. This will create options for Australia to develop – and then purchase – home-grown tech solutions.

The benefits of cross-platform technology have already been realised with other types of technology. Optical fibres for high-speed internet are being used to take pictures of human cells and organs for diagnosis and to grade the quality of meat from livestock. 3D printing is being used to build houses, joint replacements for surgery and micro-needle arrays for vaccine delivery.

Similarly, semiconductor chips are integral to every device we use from phones to parking meters, blood tests to MRIs, television to WiFi. Australian companies are currently designing some of the most advanced semiconductor chipsets, but with no local manufacturing or prototyping opportunities.

Significant opportunities lie in developing pilot manufacturing capabilities, as outlined in the STA submission to House of Representatives Standing Committee on Industry, Science and Resources inquiry on Developing Advanced Manufacturing in Australia. These would be next-generation pre-cursor facilities where start-ups can test products and their viability for scale-up. Such facilities would also deepen Australia's sovereign capability in tech development.

There are significant opportunities to realise cross-platform capabilities here in Australia and coordinated policy and investment across tech and other sectors. It will ensure Australia has a nimble and diversified economy that can rapidly pivot to emerging technologies.

Science & Technology Australia recommendations

3. Australia should strategically support 'multi-platform' technologies – from research through to commercialisation and manufacturing – with the potential to boost tech capability and advanced manufacturing in more than one sector.

Accounting for indirect costs and Australia's national interest

Australia cannot afford to be dependent on imported products or solutions – tech developed overseas in different contexts and different markets. This is particularly crucial when these technologies are used in potentially sensitive applications, such as defence or health. Developing our sovereign capability in powerful and transformative digital technologies is critical – we must ensure we have the capability to use these tools in ways that best serve Australia – and Australians. We must invest at a larger scale in areas crucial to our national needs, where sovereign capability is an imperative.

Environmental sustainability is another important factor. A 2021 World Trade Organization (WTO) report has estimated that 20-30% of CO_2 emissions are associated with international trade – this environmental cost is rarely, if ever, factored into pricing imported products. Insisting the climate cost be compensated for in price costs (e.g. through an environmental or climate tariff) to Australian consumers will not only make Australian options potentially more competitive, it would decrease our carbon footprint in line with the Paris Climate Agreement and our emissions reduction target.

Science & Technology Australia recommendations

4. Government initiatives to develop sovereign capability should consider the indirect cost of reliance on overseas solutions, and mandate a deep commitment to data sovereignty, environmental sustainability, local innovations and Australia's national interest.

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