

Collaborating for economic benefit

The Academy believes that Australia's economic competitiveness and social and environmental well-being depend on translating its science and technology research into industry innovation and application – a process vitally strengthened through effective international engagement.

Australia's place in the world

Australia has the twelfth largest economy in the world, with a per capita gross domestic product (GDP) ranked at about seventh. We are unusual in the Organisation for Economic Co-operation and Development (OECD) community in that our main industries investing in research and development (R&D) are the agriculture, mining and finance-business services sectors. Industry in other OECD countries is investing its R&D in chemicals, minerals and ICT hardware and services. Australia does not rate well in global trade competitiveness in science, technology and industry, with large trade deficits in machinery and equipment and in computers, electronics and optical products. Moreover, recent growth in employment has come mainly from the public and private services sectors, rather than from mining, agriculture and manufacturing. Australian investors tend to be more risk-averse than those in other countries. The ready availability of natural resources leads Australian industries to be configured differently from those in other OECD countries. On the other hand, our strategic R&D is well aligned with global trends: Australian research ranks well based on scientific publications that are highly cited. While our strategic research rates highly, internationally Australia ranks poorly on innovation-related collaboration, with only about 5 per cent of companies involved in international collaboration and 10 per cent on national collaboration. Australia was one of the few countries to have a lower growth rate in royalties and licence fees than in GDP over the last decade.

National science and technology policy framework

It is clear that international engagement is an essential strategy for an island country with a small population. In the past, the Australian Government has had a long-term commitment to global engagement through bilateral and multilateral agreements, targeted dialogue with other countries and actively funding effective science and technology activities aimed at emerging research leaders and their institutions. This is reflected in the fact that the Government has bilateral science and technology agreements with 33 countries covering all regions of the globe. Some of these treaties reflect a continuous government-to-government relationship on science, technology and innovation for many decades.

Despite these relationships, currently there are only two special country engagement funds (China and India) with no necessary funds for the remaining 31 countries, which risks the excellent science diplomacy of the past. While welcoming the renewal of the special fund with China and its focus on research-business-industry linkages and alignment with government priorities, Australia needs to further nurture world-class international engagement in education, science and technology, industry and cultural exchange with other strategic regional partners.

The New Colombo Plan (NCP) is investing \$100 million over five years to strengthen linkages mostly based on individual engagement. A feature of the NCP is the award of internships to scholarship holders so that they gain insights into the operation of overseas industries, in addition to benefiting from study at an overseas university. The NCP aims to enhance both institutional and personal links between Australia and Asia, leading to generational change in these relationships and demonstrating our citizenship of the Asian region. The NCP, which includes science and technology activities, complements the existing Endeavour Scholarships and Fellowships program, as well as the university programs that attract overseas students to study science and engineering in Australia. The Free Trade Agreements (FTAs) between Australia and Japan, South Korea and China provide opportunities to enhance Australia's research, innovation, and productivity through enhancing research translation and commercialisation of technology into the market place.

Business, especially small and medium enterprises (SMEs), access to these specific markets is a vital step in realising this opportunity.

National benefits

Australia's economic competitiveness and social and environmental well-being depend on translating scientific and technological research into industry innovation and application. With 97 per cent of global research being undertaken outside Australia, two-way international engagement vitally strengthens that translation. Thus, the strength of our research and innovation depends upon the effectiveness of our international engagement, which leads to:

- » **Assurance of international best-practice:** Engagement with overseas peers provides a significant level of assurance that our activities are well aligned with international standards
- » **Compounding of national investment:** Effective collaboration with overseas peers underpins a much larger effort and output than from an isolated national activity, including access to infrastructure not available in Australia
- » **Enhancement of quality:** Optimal solutions to our research and innovation challenges are obtained through access to the best global resources in science and technology
- » **Enhancement of international leadership:** Australian contributors to international activities have influence in global forums; influence that allows Australia to help set the international agenda for research and innovation and ensures that the international agenda includes issues of importance to Australia
- » **Reduction in risk exposure in commercialisation:** Partnerships with large overseas companies which are facilitated through international networks allow Australian SMEs to overcome the challenges of commercialisation in the global market
- » **Accelerated development of future leaders:** Emerging leaders in research and innovation derive immediate and long-term benefits from the development of strong international networks and collaborations

These benefits apply to all aspects of science and technology activity from research and development to marketing. Innovation and product development in Australia needs more than ever to be aimed at global supply chains and markets.

Key issues

- » International engagement is a long-term investment that builds trusted and culturally sensitive relationships developed at the personal, institutional and diplomatic levels
- » The effectiveness and efficiency of international cooperation is enhanced when programs are aligned with national priorities
- » Australian engagement needs to be global in scope to include the long-standing ties with USA and Europe, but it also needs targeted activities to strengthen the ties with Asia where economies and technological innovation capabilities are growing rapidly
- » Government needs to utilise long-standing bilateral science and technology relationships through sustained funding of strategic collaborations
- » International engagement is an essential element of national public-good activities such as environmental monitoring and prediction and disaster management and mitigation

Australia's way forward

International collaboration provides opportunities to optimise our investments in research and innovation.

It is essential for Australia to value and enhance multi-national connections through involvement in relevant high-level activities.

A global plan for a global economy

Australia needs a long-term global strategy for science, technology and industry engagement. The plan needs to identify the country partnerships that will assure Australia's global position and the new partnerships that will afford Australian research and business new opportunities in the future. A strategy can identify targeted action priorities aligned with Government priorities and provide a strategic and targeted base for funding. The Academy calls for the Government to look to new funding models that provide for long-term relationships with global partners.

Bilateral agreements

Bilateral collaborations are a key mechanism for driving economic prosperity; research-industry partnerships will deliver better research, better technology and better business opportunities for Australia. Scheduled meetings with partner nations under existing bilateral agreements provide opportunities for Australia to enhance its science and technology efforts through targeted international connections. These partnerships are very effective at the pre-competitive stages of research and innovation, where broad collaboration promotes the identification and solution of specific challenges. The Australian Government needs to use its prior deep experience in international science and technology collaboration to drive new ideas, building on the existing China and India special Funds and expanding into new partnership Funds focused on Australia's key technology challenges. This approach will attract investment into Australia.

Commercialisation and adoption of new technologies

International partnerships provide an effective mechanism for enhancing research-industry collaboration leading to commercialisation and application. Australia needs to use its current linkages to leverage deeper international collaboration, linking research and industry to optimise our productivity. The Australian Government should utilise the Free Trade Agreements to facilitate progress on these important partnerships.

Education and career development

The New Colombo Plan could be enhanced by clear linkages to peak bodies in industry and research, linking New Colombo Plan recipients with research and innovative industry leaders in Australia with a view to foster ongoing collaboration. A strategic international engagement plan supported by bilateral agreements linked to the New Colombo Plan would provide a basis for developing young Australian emerging leaders through international workshops and exchanges. This would advance the capabilities of scientists and engineers throughout their careers ensuring that our future research and industry leaders have substantial research, and research translation networks and business linkages across the globe.