

SUBMISSION TO THE

Department of Foreign Affairs and Trade Soft Power Review

SEPTEMBER 2018

SUBMISSION TO THE AUSTRALIAN GOVERNMENT

DFAT SOFT POWER REVIEW

The Australian Academy of Technology and Engineering welcomes the opportunity to provide input to the Australian Government's review on Soft Power.

The Academy is an independent think tank that comprises the leaders in the fields of technology and engineering, who gain Fellowship to the Academy in a highly competitive process. The Academy advocates for a future in which technological sciences, engineering and innovation contribute significantly to Australia's social, economic and environmental wellbeing. The Academy is empowered in its mission by some 800 Fellows drawn from industry, academia, research institutes and government, who represent the brightest and the best in technological sciences and engineering in Australia. The Academy provides robust, independent and trusted evidence-based advice on technological issues of national importance. The Academy fosters national and international collaboration and encourages technology transfer for economic, social and environmental benefit.

The focus of this submission reflects our expertise and considerable experience in international engagement in science, research, technology and innovation over more than 25 years. This engagement (previously termed science diplomacy) has been undertaken in cooperation with our extensive international network of sister Academies as well as utilising the global linkages of our Fellows and the Government.

The growing importance of global technology change, and the disruption it will bring, needs to be embraced by Australia to secure our economic future and the fabric of our society. To take full advantage of the opportunities and manage the challenges this new technology revolution will bring, our science and technology innovation industries need to be globally connected to remain competitive and relevant. This will need to see a sustained strategy for building programs for delivering soft power.

Executive Summary

Technology change, globalisation and demographics will create a set of major opportunities and challenges for Australian business and society. Global engagement in science, technology and innovation is a proven pathway for delivering national benefits and enhancing Australian business competitiveness. Australia is well placed to use the expertise, networks and infrastructure of our science, technology and innovation sectors to leverage international influence through building and maintaining trusted partnerships. Importantly, these partnerships can outlive political cycles.

In order to ensure Australia is globally competitive by 2030, the Academy strongly supports the proposed whole-of-government approach and call for bipartisan support for ongoing stable investment in facilitating independent, apolitical institutions, such as Australia's learned Academies, to sustain existing, and forge new international linkages for the economic and social benefit of Australia. This contributes to a key soft power objective by opening access to world-leading expertise, infrastructure, markets, investment and funding programs. This science and innovation engagement includes collaboration among individual and groups of scientists and engineers, between individual businesses and among organisations such as research institutions and Industry sectors.

As a Learned Academy, we have a unique ability to engage with organisations and individuals overseas to further Australia's science and innovation diplomacy. The Academy's Fellows bring extensive networks and experience in working with partner countries, and these capabilities can be leveraged to further Australian interests and diplomatic goals. We believe our Academy has a significant role to play in contributing to the growth of Australia's soft power, particularly in the Indo-Pacific region and countries with complementary resource, agriculture, and/or education based economies.

The Academy fully supports the National Innovation and Science Agenda's (NISA) Global Innovation Strategy and its ambition to strengthen and expand Australia's strategic international science partnerships and programs, in conjunction with other treaties, partnerships and science diplomacy initiatives.

The Academy's recommendations to the Australian Government Department of Foreign Affairs and Trade are as follows:

- **Recommendation 1**

Funding in science, technology and innovation diplomacy should include a "user selected" model for identifying partner economies that allows for flexible, opportunistic, and planned programs for global engagement in activities. These programs should include extension of current successful activities and develop new strategies particularly focussed on linkages between researchers and business.

- **Recommendation 2**

Enhance opportunities for our newer innovative industries to increase engagement with global counterparts through greater long-term funding of the current Global Innovation Strategy under the National Innovation and Science Agenda.

- **Recommendation 3**

Australia should pursue global standards (including regulation) for production strategies related to new technologies.

- **Recommendation 4**

Informed by science and technology, Australia should seek to ensure global standards that minimise our ecological footprint, that is, our human demand on natural resources.

- **Recommendation 5**

Give consideration to re-establishing financial support for a broader range of bilateral science and technology agreements. The Newton Fund scheme in the UK is a model worth consideration.

- **Recommendation 6**

Take greater advantage of Free Trade Agreements with countries in the Asia-Pacific region to enhance science and technology linkage arrangements which can lead to benefits for Australia's research, innovation, and productivity.

- **Recommendation 7**

Ensure that Australia has an adequate and appropriate network of science and innovation diplomats by expanding and investing in Australia's existing system of international counsellors, in order to maintain the excellence of the Australia's research base and the competitive advantage of our innovative businesses.

The importance of Soft Power for Australia's technology led future

Technology change, globalisation and demographics will create a set of major opportunities and challenges for Australian business and society. Australia will require an inspirational policy vision to remain a leading society and economy by the end of the next decade. Our economy will be reliant on greater entrepreneurship, innovation and technology skills to prepare for the disruptive forces of change.

With a greater wealth of knowledge and the rise of digital technologies, consumers will grow more empowered and have a major influence on markets and industries. Digital technology will disrupt all facets of the Australian way-of-life. As a result, the stark divisions already appearing in our society will grow more serious and need mitigation. Thus, rapid and disruptive technological change will be a constant to 2030 (and beyond) and will transform how we secure our nation and the very nature of business, work and how we go about our daily lives. More than ever, Australia will need to have a technologically advanced economy and be ready for the transitions.

Global engagement in science, technology and innovation is a proven pathway for delivering national benefits and enhancing Australian business competitiveness. Australia is well placed to use the expertise, networks and infrastructure of our science, technology and innovation sectors to leverage international influence through building and maintaining trusted partnerships. International science, technology and innovation engagement activities can facilitate the development of lasting personal, institutional and business relationships, in the same way the Colombo Plans have built lasting connectivity. Importantly, these relationships can outlive political cycles.

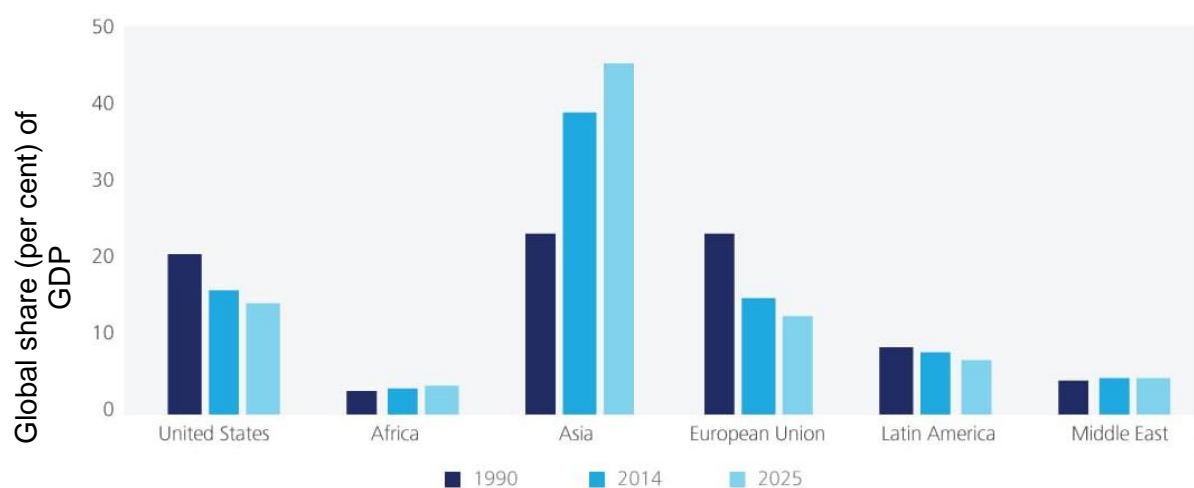
In order to ensure Australia is globally competitive by 2030, the Academy strongly supports the proposed whole-of-government approach and call for bipartisan support for ongoing stable investment in facilitating independent, apolitical institutions, such as Australia's learned Academies, to sustain existing, and forge new international linkages for the economic and social benefit of Australia.

The Challenge

Asia remains the world's fastest growing region, and its increasing influence is undeniable. Oxford Economics forecasted that Asia's share in global GDP will increase to 45 per cent by 2025. This is illustrated in Figure 1, which compares global differences in GDP. Australia is currently well-positioned to seize economic opportunities that flow from Asia, specifically their growing appetite for raw materials, food, energy, ageing related products and services and our world-class education and research sectors. There is much potential for Australia to

strengthen these national assets and reinforce influence by investing in effective science, technology and innovation diplomacy.

Figure 1. Regional shares (percentage) of global GDP



Source: Oxford Economics, Deloitte Services LP economic analysis. Forecasts are by Oxford Economics.

Graphic: Deloitte University Press | DUPress.com

Enhancing Australia’s science and innovation capabilities through international engagement will not only help us build soft power and exercise influence, it will also allow our research and innovation sectors to remain globally relevant and competitive. According to the Asia Power Index (Lowy Institute), Australia currently ranks 7th in Technological and Scientific sophistication of Index economies, with US, China and Japan in the lead. Worryingly, Australia’s lowest ranking (13th) occurs in ‘future trends’, which measures economic size, military expenditure and working-age population in 2030. Investing in our technology led economy now will help ‘future-proof’ our nation by enabling Australian businesses to harness innovation, deliver new sources of economic growth (including through enhanced connectivity with global supply chains) and boost our international soft power capabilities by 2030.

An accelerated growth in our Soft Power capabilities in science, research, technology and industry innovation will be achieved by investment in dedicated program funding that allows for flexible, opportunistic, and planned programs for global engagement in activities. These programs should include extension of current successful activities and develop new strategies particularly focussed on researcher-business and innovation engagement.

International Engagement Approach

Australia needs to commit to a long-term global strategy for science, technology and industry engagement. The plan needs to promote 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 enhance the development of effective and long-term global relationships in areas of greatest technology change.

Recommendation 1

Funding in science, technology and innovation diplomacy should include a “user selected” model for identifying partner economies that allows for flexible, opportunistic, and planned programs for global engagement in activities. These programs should include extension of current successful activities and develop new strategies particularly focussed on linkages between researchers and business.

Bilateral collaborations have proven to be a successful mechanism for driving economic prosperity in Australia, as they result in higher quality research, faster access to new and better technology and enhanced business competitiveness. The Australian Government needs to use its prior deep experience in international science and technology collaboration to build on the existing China and India special Funds and expand into new international partnerships focused on Australia’s key technology challenges.

However, there is now a need to enhance opportunities for our innovative industries, small and medium-sized enterprises and start-ups to engage with global counterparts to increase market access and hence growth. The shift from fixed, and often limited, formal bilateral engagements to a broad “user selected” partner economy such as used in the Global Connections Fund Priming Grants and Bridging Grants, has widened the opportunities for, and returns from, global collaboration. Any new development of Soft Power in technology innovation must include a “user selected” model for identifying partner economies. These collaborations will attract investment into Australia.

Recommendation 2

Enhance opportunities for our newer innovative industries to increase engagement with global counterparts through greater long-term funding of the current Global Innovation Strategy under the National Innovation and Science Agenda.

Options to Maximise Australia’s Soft Power

1. Exploring the nature of attraction & influence in the changing global context, particularly in the face of rapid globalisation & unprecedented technology change

People in Australia are increasingly moving towards living major parts of their lives in the digital world including socialising, learning, conducting financial transactions and storing and sharing personal data. Emerging technologies will accelerate this evolution with a deepening of human-machine partnerships and relinquishing of tasks to autonomous systems. We are arguably on the cusp of what various futurists and analysts are describing as the Fourth Industrial Revolution characterised by significant advances in, and the convergence of, emerging technologies including artificial intelligence, robotics, autonomous systems, block-chain, big data and quantum computing.

Technologies (such as digital, artificial intelligence, machine learning, precision medicine, mining, and agriculture) are key drivers of economic and societal success. Their development and uptake are accelerating at an unprecedented rate across the globe.

Within Australia there are a range of initiatives and capabilities that are helping to carve out our digital futures pathway. The government has set a vision for our future and will release Australia's Digital Economy Strategy in the near future. The Australian business world is recognizing the digital transformation opportunities with a number of global business areas successfully using ICT to improve productivity, including in agriculture, health, mining, materials, and logistics industries. Countries that achieve global leadership in the digital transformation process will obtain significant soft power benefits. In order to achieve global leadership, Australia's policies and strategies should focus on expanding our science, research and technology ecosystem by greater investments in digital technologies, innovation and skills development.

The social consequences of this digital technology advancement need to be carefully considered. As we deploy more systems utilising artificial intelligence and machine learning we need to demonstrate that our nations is giving attention to issues such as trusting data sources and protecting them from being corrupted or hijacked. One way to build Australia's soft power reputation would be to work together with other nations on ensuring data security and cyber resilience.

Australia also needs to join in the thrust for global production strategies that aim to minimise our ecological footprint that is our demand on natural resources. Our leadership in science and technology will be critical in ensuring first mover advantage for innovative companies aiming at contributing to national prosperity, together with ensuring minimum negative long term impact on our natural and human resources.

Recommendation 3

Australia should pursue global standards (including regulation) for production strategies related to new technologies.

Recommendation 4

Informed by science and technology, Australia should seek to ensure global standards that minimise our ecological footprint, that is, our human demand on natural resources.

2. Australia's Soft Power Objectives & its Key Soft Power Assets and Challenges

Science and Innovation Partnerships

A key element of Australia's soft power is its international science and innovation partnerships which extend Australia's research and development output and impact. This contributes to a key soft power objective by opening access to world-leading expertise, infrastructure, markets, investment and funding programs. This science and innovation engagement includes collaboration among individual and groups of scientists and engineers, between individual businesses and among organisations such as research institutions and industry sectors.

The Academy fully supports the National Innovation and Science Agenda's (NISA) Global Innovation Strategy and its ambition to strengthen and expand Australia's strategic international science partnerships and programs, in conjunction with other treaties, partnerships and science diplomacy initiatives.

The Free Trade Agreements (FTAs) between Australia and Japan, South Korea, Malaysia, China, and, most recently, Indonesia, provide opportunities to boost Australia's research, innovation, and productivity through enhancing research translation and commercialisation of technology into the market place. To date a lack of flexible program funds for internationally trusted and respected organisations such as Learned Academies, to engage in soft power has not seen this opportunity fully exploited.

Assets Contributing to Soft Power

As a Learned Academy, we have a unique ability to engage with organisations and individuals overseas to further Australia's science and innovation diplomacy. The Academy's Fellows bring extensive networks and experience in working with partner countries, and these capabilities can be leveraged to further Australian interests and diplomatic goals. We

believe our Academy has a significant role to play in contributing to the growth of Australia's soft power, particularly in the Indo-Pacific region and countries with complementary resource, agriculture, and/or education based economies.

The Academy actively engages (albeit on a modest basis due to resource constraints) both with the science, technology and innovation 'super-powers' as well as emerging science and innovation countries, notably in the Asia Pacific region. Additionally, there can be benefits gained in specific countries from collaboration where there is similar scope and scale of activities to Australia (e.g. in mining or agriculture).

The Academy's contribution to international research collaboration is in opening new, and enhancing existing pathways, for science, research and technology cooperation with priority countries, through our significant networks with international research institutions and academies. It also supports Australian scientists, from both the public and private sectors, to collaborate with international partners on leading edge science and technology and research and development. These pathways have led to tangible benefits for Australian research and businesses.

The Academy also has 19 Foreign Fellows drawn from the Asia-Pacific, Europe and the United States, who provide access to further extensive networks and intelligence on a wide range of issues including new thinking in technology and innovation that can be utilised for Australian benefit.

The Academy through its membership of the International Council of Academies of Engineering and Technological Sciences (CAETS), is linked to 26 sister Academies worldwide. We enjoy a close working relationship with all CAETS members and engage collaboratively on a wide range of issues including: energy technology and policy, engineering education, promoting gender equity and diversity in science, technology, engineering and maths professions, formulating evidence-based policy advice to governments and international bodies.

A full list of the Academy's recent and current international activities can be found in **Appendix 1**.

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.

Under a former International Science Linkages (ISL) Fund, Australia had bilateral science and technology agreements with some 33 countries covering all regions of the globe. Some of these agreements reflect a continuous government-to-government relationship on science, technology and innovation for many decades.

We note that on closure of the ISL Fund in June 2011, a review of its effectiveness showed significant benefits of the Learned Academies funded component ISL-Special Academies Program (SAP) as soft power assets.

Under the ISL-SAP, our Academy delivered over 100 missions, workshops and delegations involving 40 countries including China, Japan, the United States and Germany. The Fund provided a strategic and cohesive program to initiate and strengthen international collaboration in science, technology and engineering. Further, such cohesive approach was seen to be unlikely as effective if it was attempted by, for example, individual universities or industries that are driven by specific stakeholder imperatives. The review showed positive returns on the investment in the Academy with a leverage factor of some 3-5 fold depending on the activity.

While the Academy has remained active in its international engagement, the lack of resourcing has seen this be a modest output compared with that achieved under ISL-SAP funding. If the Australian Government wishes to enhance its soft power capabilities and reach and exercise influence effectively, consistent funding is required for meaningful, long-term science, research technology and innovation engagement between Australia and key international players.

The Newton Fund in the UK uses science and innovation partnerships to promote economic development and social welfare of partner countries, resulting in stronger bilateral relationships between the UK and sixteen partner countries¹. The initiative is aimed at producing long-term relationships between researchers, funders and policy makers. The Fund facilitates collaborative work by international scientists and builds trust between national agencies by allowing them to become more familiar with one another's processes and systems. All participating countries co-own, co-fund and bilaterally determine the research priorities of work programs.

The Newton Fund originally consisted of £75 million each year for five years since 2014, but due to the degree of engagement and enthusiasm of partner countries, the Fund has now doubled to £150 million by 2021, with partner countries providing matched resources with the Fund.

Recommendation 5

Give consideration to re-establishing financial support for a broader range of bilateral science and technology agreements. The Newton Fund scheme in the UK is a model worth consideration.

¹ Grimes, RW, McNulty, C. *The Newton Fund: Science and Innovation for Development and Diplomacy*. Science & Diplomacy. Vol 5, No 4. 2016.

Education Partnerships – New Colombo Plan

The New Colombo Plan (NCP) is investing \$100 million over five years to strengthen linkages in tertiary education, mostly based on individual engagement. The NCP builds on earlier experience that such engagement enhances both institutional and personal links between Australia and Asia, leading to generational change in these relationships and demonstrating our citizenship of the Asian region.

With the investment ending in 2020 – 2021 it's important that the impact of this program and its continuation be considered as part of the Soft Power Review.

The Free Trade Agreements (FTAs) between Australia and Japan, South Korea and China and future FTAs across other Asia-Pacific player provide excellent opportunities to enhance Australia's research, innovation, and productivity through enhancing research translation and commercialisation of technology into the market place.

Recommendation 6

Take greater advantage of Free Trade Agreements with countries in the Asia-Pacific region to enhance science and technology linkage arrangements which can lead to benefits for Australia's research, innovation, and productivity.

3. Policy Options to Build & Leverage Soft Power Assets to Promote Australia's Security and Prosperity, & Strengthen our Reputation in an Increasingly Networked World

The strength of Australia's research, science, technology and innovation depends upon the effectiveness of our international engagement. Key issues being:

- 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 and other regions 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 has a significant number of government and industry agencies which are significant soft power assets since their roles encompass global promotion of Australian science, technology, industry and education. The Academy has collaborated with many of these agencies in support of their international programs and considers these programs worthy of strengthened resources. These agencies include the following:

- **Other Learned Academies**

As a member of the International Council of Academies of Engineering and Technological Sciences (CAETS) we have direct access to 26 sister academies and their networks which allows us to be in an excellent position to stage Academy-Academy science and technology and innovation workshops, exchanges and missions which greatly benefit enhance soft power influence. The extent of our soft power is only limited by lack of funding.

- **Research Agencies - ARC and NHMRC**

Agencies such as the Australian Research Council (ARC) and the National Health and Medical Research Council (NHMRC) have extensive global connections and include in their programs a considerable expenditure in support of multilateral research initiatives. These make important contributions to Australia's soft power. The Academy's initiatives often involve collaborative support from NHMRC and ARC in terms of providing information on Australia's research funding systems to visiting delegations and exchange participants.

- **DFAT Foundations and Councils**

The Academy wishes to acknowledge the increasingly important role the DFAT Foundations and Councils including the Australia Korea Foundation (AKF), the Australia Japan Foundation and the Australia-China Council play in providing modest support that allows the Academy to continue collaborative activities with long standing partner countries. This is effectively the only source of funding available to organisations such as academies to pursue bilateral technology challenge areas of mutual interest. As such these funds play a vital role in support of Australia's soft power ambitions through supporting people-to-people links underpinning our key bilateral and regional relationships. Many of these bodies have a history of nearly 40 years activities and could certainly benefit from expanded resources.

- **The Crawford Fund**

Crawford Fund which is a non-profit, non-government organisation dedicated to outstanding international agricultural research and development was an initiative of the Academy. The Crawford Fund raises awareness of the benefits to Australia and developing countries of Australia's engagement in international agricultural research and development; supports training programs for developing country scientists and

farmers, drawing on Australian experience, and encourages and supports young Australians in their careers, studies and volunteering in agriculture for development.

On average, Australian farmers produce enough food to feed approximately 60 million additional people in neighbouring countries. Each farmer in Australia feeds 150 compatriots and another 450 people overseas². Australian research on improving crop nutrition is an important contribution to a global fight against malnutrition suffered by 800 million in the world. The Crawford Fund activities benefit overseas agricultural researchers, agencies, the private sectors and farming communities, and contribute to a very significant “soft power” influence on our neighbours.

Like most non-profit organisations, the Crawford Fund operates on government grants and donations from companies, corporations, charitable trusts and generous Australians alike. Its activities make a significant contribution to Australia’s soft power, especially in underdeveloped countries in the region and are well deserving of strong government support.

- **Industry-based agencies – e.g. AKBC, AIBC**

Australian international business agencies such as the Australian Korea Business Council (AKBC), and the Australia Indonesia Business Council, (AIBC) and others represent a strong industry contribution to Australia’s soft power. The Academy believes that maximizing soft power leverage might be aided by building enhanced coordination between such industry bodies, the DFAT Foundations and Councils, and the Academies.

- **Science Counsellors in Australian Embassies**

The role of dedicated Science Counsellors is to engage with host country governments, other key partner countries, businesses, peak bodies and research organisations to support their home department’s key strategic international engagement objects for industry, resources, science and innovation.

The Counsellors also play an important role in advising the Australian Government about relevant policies and initiatives in their host countries, provide support for visiting Australian Ministers or departmental staff, and represent the department at key engagements and events. This unique role is clearly vital for establishing and maintaining relationships that support Australia’s innovation ecosystem and facilitate growth and productivity for globally competitive industries.

² Anderson, J., B. McMullan, and C. Chartres, *There’s no value in diverting foreign aid funds into drought relief*, in *The Australian*. 2018.

We note that the UK Science and Innovation Network (SIN) have approximately ninety officers in over thirty countries and territories around the world building partnerships and collaborations on science and innovation. Unsurprisingly, the UK was ranked first in the Soft Power 30 Index in 2018. This is partly because the UK promotes its status as a leading technology and innovation hub that dominates in emerging technologies (particularly fintech and AI), thereby attracting a significant amount of investment.

In comparison, the Australian Department of Industry, Innovation and Science only has five dedicated Overseas Innovation Counsellors. It is essential to increase the number of Australia's international network of science and innovation diplomats in order to maintain the excellence of the Australia's research base and the competitive advantage of our innovative businesses.

Recommendation 7

Ensure that Australia has an adequate and appropriate network of science and innovation diplomats by expanding and investing in Australia's existing system of international counsellors, in order to maintain the excellence of the Australia's research base and the competitive advantage of our innovative businesses.

- **Austrade**

The Australian Trade and Investment Commission – Austrade – contributes to Australia's economic prosperity by helping Australian businesses, education institutions, tourism operators, governments and citizens as they:

- develop international markets and promote international education
- win productive foreign direct investment
- strengthen Australia's tourism industry
- seek consular and passport services.

In 2017, Austrade commissioned the Australian Public Service Commission to undertake an Organisational Capability Assessment to assess Austrade's ability to operate successfully in a future context. The Organisational Capability Assessment made a number of observations about what we can and should be done in response to future challenges and opportunities.

We note that as part of the implementation of the review that Austrade is working with key government partners, in particular the Department of Industry, Innovation and Science, to provide integrated assistance for Australian businesses, as they pursue growth strategies in the domestic and international markets.

This work should specifically consider the capabilities in new technology and innovation (eg Digital Futures) within the Austrade offices located across the 50 countries.

- **Defence Science and Technology Group, Department of Defence**

We note that DST Group in the Department of Defence is one of Australia's employers of scientists and engineers and that they work closely with industry, universities and the scientific community to be in the best possible position to support Australia's defence and national security capability and interests.

We note that DST Group has Defence science counsellors located in North America, Europe and Japan and will soon have people filling these roles in South Korea and Singapore to build engagement with key partner countries, government agencies and research organisations.

The Academy acknowledges the impact of the 2016 Defence Industry Policy Statement which is transforming the ability of industry and the research community in Australia to realise the benefits of innovative and emerging technologies through the investment of \$1.6 billion over a decade. Although this initiative has only been operational for two years there has been growth in exports and international engagement.

The Government might wish to consider examining some of the partnering mechanisms created within the Next Generation Technologies Fund, such as the Grand Challenges program, to determine how these might be used to build soft power in sectors other than Defence. Grand Challenges are strategic, focussed, large-scale multi-disciplinary programs which address complex problems. They have clearly-defined goals. Building uniquely focussed, collaborative international partnerships involving government, industry and the research community would enhance Australia's soft power.

Appendix 1

Academy Engagement in Current International Programs:

- **Australia-China Young Scientists Exchange Program**

The Australia-China Young Scientists Exchange Program (YSEP) is a joint governmental initiative funded by the Australian Department of Industry, Innovation and Science and the Chinese Ministry of Science and Technology (MOST). The program is managed by ATSE and the China Science and Technology Exchange Center (CSTEC).

YSEP funds an annual exchange of Australian and Chinese early to mid-career researchers in the fields of science, technology and medicine.

The program aims to:

- Increase early to mid-career Australian and Chinese researchers understanding of the cultures, particularly the science and research practices and systems, of the two countries
- Develop the researchers' leadership skills as future 'science ambassadors' for Australia and China
- Provide a catalyst for long-term, sustainable Australia-China research collaboration

YSEP also provides participants with exposure to higher order issues outside their scientific/technical specialty, including science and technology policy and best practice research management.

- **Global Connections Fund**

The Global Connections Fund (GCF) aims to provide initial funding support specifically to promote Australian Researchers and Small to Medium Enterprises (SMEs) collaboration. The Program consists of two forms of funding: Priming Grants and Bridging Grants which are designed to:

- increase linkages and collaborations with key global economies
- promote researcher-industry engagement and knowledge transfer
- encourage translational activities, end use development and commercialisation outcomes

- **Australia-Japan and Korea Emerging Research Leaders Exchange Program**

The Emerging Research Leaders Exchange Program linking Australian mid-career researchers with emerging leaders in Science and Technology researchers from Korea and Japan. The program was aimed at creating new collaborations, on a personal and institutional level, while also strengthening existing institutional links.

Recent International Workshops and Delegations:

- **Indonesia**

Joint Water Workshop 2015

The Indonesian Academy of Sciences (APII), the Australia-Indonesia Centre and ATSE convened a two-day workshop Sustainable Urban Water Management in Indonesia in Jakarta in October 2015. The workshop was also supported by the Monash University Sustainable Urban Water Management Project. It tackled the many and varied problems contributing to water issues in the Greater Jakarta Region.

STELR STEM Training workshop 2017

The STELR (Science and Technology Education Leveraging Relevance) Project is the flagship education initiative of the Australian Academy of Technology and Engineering (ATSE). The instigator and architect of STELR is Dr Alan Finkel, Australia's Chief Scientist.

STELR is an in-curriculum STEM program that provides inquiry-based, hands-on student programs for secondary school students. STELR uses purpose-built equipment packs that lead easily to STEM activities. The STELR Project runs in over 620 schools from Australia, New Zealand and Asia with more than 75,000 students and 2,000 teachers involved each year.

Building on past successful workshops, STELR has conducted STEM workshops in Indonesia for teachers and trainers from Southeast Asian countries. The workshop was hosted by the SEAMEO QITEP for science and was made possible through a grant from the Australia Indonesia Institute.

- **China**

ATSE-CAE Food Safety workshops 2016 & 2017

ATSE hosted the Chinese Academy of Engineering for a Food Safety Workshop program, focused on improving trade in food and agricultural products between Australia and China, in November 2017. This provided ATSE the opportunity to introduce Chinese colleagues to a wider range of Australians involved in the area of food safety and included relevant and interesting site visits. The workshop helped strengthen ties between Australian and Chinese researchers and agriculture industry representatives, ultimately forging a stronger bond between the two countries. Funding for the workshop was provided by the DFAT Australia China Council. This event built on an earlier workshop in Beijing in 2016.

- **India**

Joint INAE-ATSE water workshop 2017

The Indian National Academy of Engineering and ATSE ran a three-day Sustainable Urban Water Management Workshop in Jodhpur, India, March 2017. Professor Tony Wong FTSE led the eight-member ATSE delegation. The workshop was an excellent opportunity to showcase Australia urban water management technology and expertise and to build links for ongoing cooperation with Indian counterparts. The Australia India Strategic Research Fund provided

funding to support the workshop. A significant outcome from the workshop was an ongoing partnership between the Governments of South Australia and Rajasthan to establish a centre of excellence in water resources management, brokered by delegation member The Hon Karlene Maywald FTSE (former SA Minister for Water).

- **Korea**
Innovation Workshop – Future of Transport 2018

ATSE and the National Academy of Engineering of Korea participated in a joint workshop in Korea in June on the future of transport. The experience brought together high-level Australian and Korean experts in public transport policy and planning. The group conducted site visits to a number of organisations, including the Seoul Transport Operations Control Centre and the Korean Transportation Safety Authority. The findings from the visit were used to inform the industry technology readiness project on transport.

Digital Transformation Workshop 2016

Following the ATSE delegation to the Republic of Korea in March 2016 for a workshop and associated site visits under the Korea Australia Science and Innovation Connect (KASIC) program, the second element of the KASIC program, a workshop and site visits focusing on Digital Transformation, took place in Adelaide in April 2017. The theme was Digital Transformation with a focus on Transport of the Future, Energy Networks and Smart Cities. Six Korean experts attended the workshop, including the International Director of ATSE's sister academy, the National Academy of Engineering Korea (NAEK).

- **Germany**
Joint Policy Development & Future of Transport Workshop 2018

ATSE and acatech (the German Academy of Science and Engineering) collaborated on a policy brief on Future Energy Systems for the 2017 G20 meeting held in Hamburg, as part of an initiative to establish an international monitoring process for the transition of energy systems.

- **Europe Delegation, April 2017**

Professor Hugh Bradlow FTSE participated in an Australian Government innovation delegation to Germany, Switzerland and France in April 2017. The delegation comprised leaders from Australia's Industry Growth Centres and other peak bodies supporting innovation and science in Australia. The delegates met with industry research organisations, government officials and industry in a series of workshops, site visits and events.

The delegation aimed to:

- Study the national, regional and local strategies that have underpinned success in research and innovation;
- Share ideas and learn from examples of commercial innovation success, including through the formation of clusters; and

- Identify potential collaborations and partnerships in research and innovation between Australian organisations and organisations within these three partner countries.