Chapter 17

Science and technology

> An important new dynamic in the next half decade will be the revolution in science and technology. The government is pouring funds into R&D on a scale likely to propel China further and faster on its development trajectory than most observers currently estimate.[1]

17.1 Collaborative scientific activity is an often-understated aspect of the relationship between Australia and China. This chapter considers China's growing influence in international science and technology and examines the extent of Australia's current links with China, the benefits arising from these links, and the potential for strengthening and expanding the relationship.

Chinese science and technology

17.2 All science-related submissions to this inquiry commented on China's growing international influence and the scale of its investment in scientific endeavour. The Department of Education, Science and Training's (DEST's) submission stated:

> China's emergence as a world player in science and technology over the last decade has been spectacular. Much has been written about its drive towards technological and economic supremacy.[2]

17.3 According to DEST, China's research and development intensity doubled between 1996 and 2002. In terms of absolute expenditure, in 2002 it ranked third in the world, spending $US72 billion on research and development, behind only the USA ($US277 billion) and Japan ($US107 billion).[3] China's investment in research and development as a proportion of GDP has also doubled from 0.6 per cent in 1994 to 1.2 per cent in 2002. In the same period, US spending rose from 2.51 per cent to 2.67 per cent, and Australia's rose from 1.58 per cent to 1.62 per cent.[4]

17.4 China is investing heavily in technological infrastructure, reorienting itself to become technologically competitive and increasing the technical and human resources devoted to manufacturing products. China is also dedicating significant resources to higher education, increasing technology-intensive exports, and experiencing rapid growth in foreign investment in research and development.[5]

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1 Stephen Fitzgerald, *China 2001–2010: An Update,* additional information provided by AusAID, p. 2.

2 DEST, *Submission P30,* p. 15.

3 DEST, *Submission P30*, Attachment 1, p. 1. See also OECD *Science and Technology Industry Outlook,* vol. I (2004), no. 76, p. 21.

4 DEST, *Submission P30*, Attachment 1, p. 1.

5 DEST, *Submission P30*, Attachment 1, pp. 1–2.

Sino-Australian linkages in science and technology

17.5 It is against the backdrop of rising Chinese investment in science and technology that the committee has considered the nature and extent of current Sino–Australian linkages. In its 1996 report, the committee recognised that scientific and technological exchanges helped to build long term contacts in China, dispelled images of Australia as a primary producing nation, and often led to commercial spin-offs.[6]

17.6 Since 1996, it would seem that much has been done to strengthen the scientific links between Australia and China. The committee considers that this is a valuable aspect of the bilateral relationship that should be developed further.

The extent of current linkages

17.7 Current collaborative links between Australia and China are based on the efforts of many different entities in the scientific community, including the Department of Education, Science and Training (DEST), the Department of Environment and Heritage (DEH), the Australian Academy of Science, the Australian Academy of Technological Sciences and Engineering, CSIRO, the Australian Research Council, and individual researchers and institutions. The committee received submissions from many stakeholders in the scientific community. The Chinese Embassy also commented on the extent of the relationship in science and technology.

Department of Education, Science and Training

17.8 DEST regards China as a priority partner for bilateral collaboration, due to the level of Australian research agency interest in China and China's growing influence in international science and technology.[7] It is the key implementing agency for a number of national agreements with China including the Treaty on Cooperation in Science and Technology; an MOU on Cooperation in Science and Technology; and an MOU on Establishment of a Special Fund for Scientific and Technological Cooperation.

17.9 The Chinese Ministry of Science and Technology is DEST's key bilateral partner. DEST also liaises with the National Natural Science Foundation of China and the Chinese Academy of Science. Its activities mainly centre on raising Australia's science and technology profile. It manages the Joint Science and Technology Commission (JSTC), which provides a forum for high-level dialogue between key policy makers, research agencies and funding agencies.[8]

17.10 It funds the International Science Linkages (ISL) Program. The ISL aims to increase the uptake of leading edge science and technology by promoting access to and participation by Australian researchers in strategically focussed international

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6 Senate FADT References Committee, *Australia China Relations*, June 1996, pp. 152–153.

7 H. Borthwick, *Committee Hansard,* 14 June 2004, p. 24.

8 DEST, *Submission P30,* p. 17.

scientific research and technology. DEST also provides competitive funding to the network of Cooperative Research Centres (CRCs) throughout Australia and liaises with a variety of Australian organisations that have an interest in Chinese science and technology.[9] The National Science and Technology Centre (Questacon) also has a good working relationship with its counterpart organisation, the China Science and Technology Museum in Beijing.

17.11 DEST supports two counsellors based in Beijing and Shanghai. The Counsellors maintain contact with Chinese authorities and provide advice to DEST on Chinese science and technology issues. DEST informed the committee that the Chinese Embassy in Canberra also has dedicated science personnel, including a science and technology counsellor.

17.12 DEST participates in regular high-level bilateral visits. Several significant visits occurred during 2003, including the visit to China by the Minister for Education, Science and Training, the Hon Dr Brendan Nelson MP and visits to Australia by Dr Wu Zhongze, Chinese Vice-Minister for Science and Technology and Professor Lu Yongxiang, President of the Chinese Academy of Science.[10]

Department of Environment and Heritage

17.13 The Department of Environment and Heritage (DEH) has a significant amount of scientific interaction with China, based predominantly around environmental protection initiatives. Under the Declaration on Bilateral Cooperation on Climate Change—signed in September 2003—Australia and China cooperate in climate change science.[11] Australia also works with China under the China–Australia Migratory Bird Agreement. An MOU also exists between the Australian Bureau of Meteorology and the Chinese Meteorological Administration.[12] DEH states that Australia also enjoys a high level of engagement with China on Antarctic affairs.[13]

The Australian Academy of Science and the Australian Academy of Technological Sciences and Engineering

17.14 In their joint submission, the Australian Academy of Science and the Australian Academy of Technological Sciences and Engineering (the Academies) highlighted the 'increasingly strong links in science and technology between Australia

9 Including CSIRO, Australian Research Council, Australian Centre for International Agricultural Research, Australian Vice-Chancellors' Committee, National Health and Medical Research Council, Australian Academy of Science, Australian Academy of Technological Sciences and Engineering, and the Department of Industry, Tourism and Resources.

10 DEST, *Submission P30,* p. 18.

11 DEH, *Submission P27*, p. 4.

12 DEH, *Submission P27*, pp. 5–7.

13 DEH, *Submission P27*, p. 8.

and China'.[14] They asserted that these links are being fostered by recognition of their importance at levels that include governments, research institutes and universities, and individual scientists.[15] Professor Andrew Smith, from the Australian Academy of Science, indicated that the Academies perform a role in promoting the bilateral relationship, through interaction with equivalent academies in China, involvement in high level mutual understandings, brokering MOUs, and running exchange programs.[16]

17.15 According to the Academies, recent examples of successful and growing linkages between Australia and China in science and technology include:

- DEST-funded programs to facilitate bilateral links;
- an inbound delegation from the Chinese Academy of Science (CAS), that resulted in the establishment of a series of high-level Australia-China planning symposia;
- the election of a member of the Chinese Academy of Sciences as a corresponding member of the Australian Academy of Science;
- a growing number of individual agreements for collaboration between Australian universities and institutes and their Chinese counterparts;
- an increase in the number of post-doctoral and post-graduate Chinese researchers working in Australia; and
- the signing of an MOU between the Polar Research Institute of China, the Australian Antarctic Division, and the University of Newcastle to undertake research in atmospheric and space physics.[17]

Commonwealth Science and Industrial Research Organisation

17.16 The Commonwealth Science and Industrial Research Organisation (CSIRO) outlined the extensive level of engagement that it has had with China since its first official interaction in 1979.

17.17 In 2003–04, CSIRO was involved in 52 projects funded by the Australian Centre for International Agriculture Research (ACIAR); 13 projects funded by AusAID; and 63 other projects, all of which had links with China. CSIRO's recent interactions with China led to 41 joint publications in 2003 and 47 joint publications in 2004. CSIRO also has 322 employees who speak either Mandarin or another

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14 Australian Academy of Science and Australian Academy of Technological Sciences and Engineering, *Submission P58,* p. 1.

15 Australian Academy of Science and Australian Academy of Technological Sciences and Engineering, *Submission P58,* p. 1.

16 A. Smith, *Committee Hansard,* 20 June 2005, p. 14.

17 Australian Academy of Science and Australian Academy of Technological Sciences and Engineering, *Submission P58,* p. 3.

Chinese dialect, 248 of whom were born in China.[18] Over $A24 million has been invested in joint research projects between CSIRO and over 170 Chinese organisations since the 1980s.[19] CSIRO indicated that collaboration with China tends to be particularly efficient in fields such as agricultural research, mineral exploration, and water and land conservation.

17.18 CSIRO stated that its strategy for the medium to longer term is to expand the sphere of interaction in China. It is currently building on the success of a high-level CSIRO delegation visit to the Chinese Ministry of Education and the Ministry of Science and Technology (MOST), and negotiating an MOU of collaboration with MOST. It signed an MOU with the Ministry of Education in March 2005. These two MOUs will give CSIRO more access to opportunities of collaboration with Chinese universities, key research laboratories and national research agencies.[20]

The Australian Research Council

17.19 The Australian Research Council (ARC) undertakes activities in three broad areas:

- supporting the best research which is most likely to contribute to innovation;
- brokering partnerships among researchers, industry, government, community organisations and the international community; and
- providing policy advice to the Australian government on investment in the national research effort.[21]

17.20 In 2002 it supported 2,725 international collaborations with researchers from 56 countries. Collaborations with researchers in China ranked equal sixth, with a three per cent share of all collaborations.[22] The ARC cited 197 projects it currently supports that involve Chinese partners. The projects are extremely broad-ranging and although the majority involve science and technology, a significant number are in the social sciences.[23]

The Embassy of the People's Republic of China

17.21 In their submission, the Embassy of the People's Republic of China in Australia drew attention to the considerable bilateral activity occurring in science and technology.[24] They acknowledged the extent of technological development in both

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18 CSIRO, *Submission P38,* p. 3.

19 CSIRO, *Submission P38,* p. 4.

20 CSIRO, *Submission P38*, p. 8.

21 ARC, *Submission P71,* p. 1.

22 ARC, *Submission P71,* p. 1.

23 ARC, *Submission P71,* pp. 2–22.

24 Embassy of the People's Republic of China in Australia, *Submission P66*.

nations and claimed that there is great potential for increased collaboration, owing largely to the complementarity of the two nation's areas of scientific expertise.[25] Since the two countries signed an Intergovernmental Technology Cooperation Agreement in May 1980, exchanges between technological personnel have increased and the scope for cooperation has expanded.[26] They drew attention to five China–Australia Technological Cooperation Joint Committee Conferences that have determined over 70 official projects in fields covering agriculture, nuclear technology, metallurgy, geology, meteorology, space, telecommunication, environment, material, biology, pharmaceutical and health, traditional Chinese medicine and fundamental science.[27]

17.22 The Embassy noted that China and Australia have agreed to conduct annual talks (in addition to the current tri-annual bilateral conference) to explore additional areas for scientific cooperation. Recently there has been significant cooperation between the two countries in the development of a SARS vaccine, the establishment of a high-level biological safety laboratory, and the Olympic Games. Negotiations are currently underway for the establishment of a 'Technology Park' in Australia, 'aimed at attracting Chinese enterprises' investment and facilitating the industrialisation of the R&D outcomes'.[28]

The flow-on benefits

17.23 A number of benefits flow from the scientific community's activities. There are obvious economic benefits from collaboration, but the work of the scientific community also plays a vital role in enriching the political, cultural and social aspects of the bilateral relationship.

Economic and scientific benefits

17.24 Scientific linkages may lead to commercial benefit when research projects move out of the laboratory and into the market place. China's economic growth, the size of its market, and the vast and growing resources poured into science and technology should make China a priority nation for Australia.

17.25 CSIRO identified a number of economic and scientific benefits for both nations arising from its 25–year long involvement in China. It stated that, although many cannot be quantified, they are nonetheless important, including:

- the establishment of China’s eucalyptus research centre—leading to the planting of Australian tree species like acacia and eucalyptus in broad areas of southern and central China—facilitating the sale of Australian tree seeds and associated services and equipments;

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25 Embassy of the People's Republic of China in Australia, *Submission P66,* p. 30.

26 Embassy of the People's Republic of China in Australia, *Submission P66,* p. 30.

27 Embassy of the People's Republic of China in Australia, *Submission P66*, pp. 30–31.

28 Embassy of the People's Republic of China in Australia, *Submission P66,* p. 31.

- the establishment of the radio telescope in Urumqi, by designing and manufacturing the receiver;
- the export of dry land farming technologies, services and equipments;
- the export of membrane and water treatment technologies, services and equipments;
- better understanding of exotic diseases (such as foot and mouth disease, avian virus, SARS etc);
- a better understanding of the management of water and soil resources; and
- a better understanding of mineral ore formation processes which may lead to the discovery of new ore bodies.[29]

17.26 It should be noted that Australian mines are in the process of introducing technology that will improve productivity, safety and environmental outcomes from technology originally developed in China, such as the Longwall mining technology, with the cooperation of Chinese companies and research agencies. Similarly, Australian mining practice and machinery is being exported to benefit Chinese industry with support from CSIRO and other Australian groups.

17.27 Ms Mara Bun, on behalf of CSIRO, gave the example of research in the area of stored grains as an economic benefit that can flow from scientific collaboration. She also commented on the leadership role that some key Chinese thinkers within CSIRO have played in forming a value-added path to China:

> These are young scientists who have been involved in developing the equivalent of the AQIS system in China and have now come to Australia to help forge this partnership, again of mutual benefit. I think what happens in a very beneficial way culturally is that, through these exchanges, the grains industry in Australia is able to partner and have an entree into China which is actually translated or put into a context which is much more accepted, much more contemporary and much more connected on the ground, through science. In my observation that is very valuable to the farming community here, and certainly it does feature in terms of economic benefit.[30]

17.28 CSIRO also stated that China has significant potential to become an important source of science talent, thereby contributing to the development of Australian science. As China invests more into education and develops its scientific infrastructure and expertise, the 'growing pool of recognised talent can, over time, be recruited to build on the excellent contribution by CSIRO's many scientists of Chinese origin'.[31]

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29 CSIRO *Submission P38,* pp. 3 and 6–7.

30 M. Bun, *Committee Hansard,* 20 June 2005, p. 16.

31 CSIRO, *Submission P38*, p. 8.

Political, cultural and social benefits

17.29 The committee recognises that scientific links are not only valuable from a trading and commercial perspective, but can also strengthen the bilateral relationship in other areas. One of the distinguishing features of the global scientific community is its capacity to build self-sustaining networks independent from the more traditional aspects of international relationships. The scientific community often has dynamic links that can provide the foundation for ever-growing cooperation between nations on any number of levels. The methods by which the scientific community establishes and maintains its international networks can provide useful lessons for building other linkages.

17.30 Similarly, the contributions of Australian and Chinese scientists to global science and the betterment of each other's societies can be very important in promoting goodwill and increasing levels of mutual understanding.

Strong foundations for building the relationship

17.31 CSIRO informed the committee that it has had a rich and mutually beneficial relationship with China for over 25 years.[32] The Academies also emphasised the importance of the bilateral scientific relationship, both in its own right and in 'underpinning economic, environmental and social developments in both countries'.[33] Endorsing this view, Professor Andrew Smith considered that scientific collaboration can be used as a base upon which Australia and China can build broader networks and mutual respect, 'that is one of the great values of what we are doing'.[34]

17.32 The Academies made the point that, whereas science can help to strengthen political ties, political difficulties tend not to have a detrimental effect on science:

> Tensions that may arise (as between China and Taiwan and Japan) have little direct impact on collaboration in S&T…There is no doubt that scientists in Australia and China will continue along the present track of increasing collaboration. The person-to-person interactions required in these collaborations form one basis for improved relations between the countries.[35]

17.33 Ms Bun and Professor Smith commented on the ability of science to provide a springboard for developing better and deeper political relationships. Ms Bun stated:

> So areas like water and energy are critical priorities for CSIRO. They absolutely align with the relevant research priorities at a national level in

32 CSIRO, *Submission P38,* p. 3.

33 Australian Academy of Science and Australian Academy of Technological Sciences and Engineering, *Submission P58,* p. 1.

34 A. Smith, *Committee Hansard*, 20 June 2005, p. 17.

35 Australian Academy of Science and Australian Academy of Technological Sciences and Engineering, *Submission P58,* p. 3.

> Australia and they have been confirmed at a political level in China as the basis for heightened collaboration—I think that is only appropriate.[36]

17.34 Ms Bun indicated that networks established through CSIRO tend to be very 'bottom-up'—researcher-to-researcher based relationships, that over time provide the basis upon which much bigger projects and networks of association are formed. This report has recognised the importance of people-to-people links in the creation of broader bilateral relationships. The way the scientific community operates is a good example of this.

The scientific community's role in promoting goodwill and understanding

17.35 It is perhaps easy to assign a dollar value to the products of scientific endeavour, and focus on the economic benefits that can flow from collaboration. The contribution that science makes to the general betterment of society should not, however, go unacknowledged. Where Chinese and Australian scientists make positive contributions to one another's societies, this can have an important positive impact on the ways our nations view one another and advance the bilateral relationship.

17.36 CSIRO scientists are being recognised in China for their contribution to the bilateral scientific relationship. This has the potential to impact substantially on the political relationship.[37] Ms Bun stated:

> In our submission, we tried to document eight or 10 examples of Australian scholars who have made such a contribution in China that they have received prizes—in one case, an honorary citizenship and in another case invitations to organise major conferences and the like.[38]

17.37 She also commented on the positive social impact that has arisen in the mining industry through CSIRO's work to predict outbursts of coal and gas in seams. This work has had a significant impact on safety standards and a concomitant 'powerful social impact'.[39] Dr Ta-Yan Leong also cited the cultural, social and trade advantages resulting from collaboration with the Beijing Meteorological Bureau. He stated that this work:

> …is to help them predict air quality over Beijing, which they could then expand to other parts of China to help them understand the sources of all the pollution and so on. This has a big impact on the green Beijing Olympics in 2008. This is going to impact both socially and culturally.[40]

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36 M. Bun, *Committee Hansard*, 20 June 2005, p. 17.

37 CSIRO, *Submission P38,* p. 7.

38 M. Bun, *Committee Hansard*, 20 June 2005, p. 16.

39 M. Bun, *Committee Hansard*, 20 June 2005, p. 15.

40 T.Y. Leong, *Committee Hansard*, 20 June 2005, p. 16.

The potential for closer relations

17.38 The committee acknowledges the invaluable contribution that the scientific organisations have made to the bilateral relationship. The benefits already gained from current linkages demonstrate that it is in Australia's long-term interest to support the work of these organisations and develop closer science and technology links with China. Moreover, based on evidence to this inquiry, the time would also appear to be right to undertake a concerted effort to augment the bilateral relationship.

The right place at the right time?

17.39 The Academies assert that Australia is 'in the right place at the right time' to develop even stronger links with China.[41] It is well placed because of its eastern hemisphere location, similar geographical zones, landscapes, and terrains; its strong underlying economic resources; and the common environmental threats faced by both nations. CSIRO's submission supported the notion that Australia is in the 'right place'. It stated that China is an important partner because of 'the complementarity of northern and southern atmosphere locations; similarity in terms of geographic and climatic conditions; favourable conditions for CSIRO to test some of its technologies in China; and both countries have a diverse range of biodiversity, making it advantageous to expand the germplasm and gene pool'.[42]

17.40 According to the Academies, this is the 'right time' to expand the relationship because:

- China has a self-perceived need for better international recognition of its science and technology;
- high-level government contacts and agreements for collaboration between the two nations already exist;
- there is an increasing availability of funds for Chinese scientists to undertake international research and travel;
- Chinese investment in cutting edge research infrastructure is rapidly expanding;
- a number of Chinese scientists working in Australia have strong links to the 'mother country'; and
- political developments favour Australia as a partner country for scientific collaboration (including training) over the USA.[43]

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41 Australian Academy of Science and Australian Academy of Technological Sciences and Engineering, *Submission P58,* p. 1.

42 CSIRO, *Submission P38,* p. 5.

43 Australian Academy of Science and Australian Academy of Technological Sciences and Engineering, *Submission P58,* pp. 2–3.

17.41 Professor Andrew Smith, on behalf of the Australian Academy of Science, commented on the potential for developing a deeper relationship with China, based on the complementarities between our research and development priorities:

> We see China as being a most important partner in science and technology. This comes from the enormous amount of money that China is putting into research and development. It is the third in the world at the moment, after the USA and Japan, and I suspect that in a couple of years it will be ahead of Japan. China is a really big spender in targeted areas of research and development, most of which, I think, are very similar to our own.[44]

17.42 DEH also reiterated the complementarities between China and Australia as a basis for future collaboration, especially in the area of climate change:

> The China–Australia collaboration on climate change is a very active one. I think it is rooted in a recognition of considerable similarity of circumstances and complementary economic interests. For example, in the area of land management, where it is well known that China is particularly challenged by degradation of the landscape, there is an opportunity for win-win outcomes in China in terms of restoring tree cover, sustainable agricultural management and the like. Australia, with its similarly large land area, diverse climate circumstances and so on has a good deal to contribute. I might say that there is a deal of two-way flow.[45]

17.43 DEST also acknowledged that a number of factors are strongly conducive towards the establishment of closer links, including the complementarity of the two government's political and development agendas. For example 'in the fields of energy, water environment, agriculture and biotechnology as well as basic research and public health'.[46]

17.44 The evidence to this inquiry indicates that not only are the temporal, geographical and physical conditions conducive, but there is also real willingness within the Australian scientific community to expand its links with China. Professor Smith told the committee:

> The eyes of Australian science are very much on China and many more people wish to go.[47]

The way forward

17.45 In turning to the future, the Academies believe 'very strongly that maintaining (and as far as possible increasing) funding dedicated to strengthening links in S&T is

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44 A. Smith, *Committee Hansard*, 20 June 2005, p. 14.

45 I. Carruthers, *Committee Hansard,* 20 June 2005, p. 30.

46 H. Borthwick, *Committee Hansard*, 14 June 2005, p. 25.

47 A. Smith, *Committee Hansard*, 20 June 2005, p. 17.

an excellent investment to help ensure strong and mutually beneficial relationships with China, and that practical commercial outcomes will eventuate in many areas'.[48]

17.46 The committee agrees with this statement. It recognises the complementarities between Australia and China, and acknowledges current trends that augur well for strengthened bilateral ties. It now turns to consider what actions could be taken to build on the significant progress already made in science and technology.

17.47 The committee is aware that DEST has two 'education and science counsellors' based in Shanghai and Beijing. These counsellors are tasked with the promotion of Australian education and science. The majority of their work, however, would appear to be oriented towards promoting education, rather than science.[49] Ms Fiona Buffinton stated:

> At the moment the local staff in Beijing have been largely hired on the basis of their ability to engage in the education side of things. In the past, in terms of science, the small engagement has been handled well in Beijing, but there is further potential with China becoming a much stronger player in science…As China emerges, surpasses and produces a very large proportion of [world science], we in turn will want to engage and know what the latest developments are. It is something that we are having an active dialogue about with both the science group and our science counsellor.[50]

17.48 The committee understands that at the moment, the department is considering whether there is a need to employ a science-literate, locally engaged staff member in the Beijing office. The committee asked representatives of the ARC, AAS, ATSE and CSIRO whether they supported this initiative. They strongly welcomed the idea, considering it to 'be of great benefit'.[51]

17.49 Representatives indicated that the capacity for a science counsellor to 'look westward' would also be beneficial, given the shape of the Australian economy and agriculture. They also stated that, as China looks towards commercialising the products of its research, it is in Australia's interests to 'get in early':

> The transition that China is going through will inevitably mean that over time the needs for commercialising science and partnerships which are about fundamental research will find a path to impact in the marketplace, and therefore there will be greater activity around the collaborators that help to deliver that path. Whether that is through DEST, the industry

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48 Australian Academy of Science and Australian Academy of Technological Sciences and Engineering, *Submission P58,* p. 3.

49 *Committee Hansard*, 14 June 2005, pp. 41–42.

50 *Committee Hansard*, 14 June 2005, p. 42.

51 A. Smith, *Committee Hansard*, 20 June 2005, p. 21.

> departments or other mechanisms, those are important links for Australia to forge.[52]

17.50 The committee considers that establishing at least one highly skilled science-literate counsellor, based perhaps in Australia's embassy in Beijing, should be a priority. It is not sufficient to have two DEST officers tasked and skilled primarily under the education portfolio, who may or may not have sufficient time available to devote to promoting Australian science. This is no criticism of the Education Counsellors—the committee has stated elsewhere that they perform a very important role—but rather, a recognition that the growing significance of Chinese science to Australian interests should be reflected by the creation of a dedicated in-country resource.

17.51 The science counsellor position would be geared towards building bilateral links between government organisations, and acting as a conduit for research agencies wishing to establish or strengthen their presence in China. The science counsellor would have extensive knowledge of the Australian scientific context and be supported in his or her role by a science-literate locally engaged staff member with a high degree of familiarity with the Chinese scientific context. The science unit would be in a position to monitor and report on significant developments in Chinese science, indicate where there is potential for Australian involvement, and actively promote Australian innovation and scientific achievement. It would encourage Chinese researchers to view Australia as a destination of choice for international scientific collaboration and promote the trade-related aspects of innovation.

Recommendation 25

17.52 The committee recommends that the Australian government consider the appointment of a dedicated science counsellor based in China to promote Australian science and technology.

17.53 DEST informed the committee that a number of proposals agreed to at the last JSTC meeting are currently being discussed with China, including the establishment of a science leaders exchange scheme between future leaders in key science and technology (S&T) organisations in both countries. Its purpose would be to improve mutual understanding of each other's systems and establish important links between institutions. DEST and the Chinese Ministry of Science and Technology are also considering jointly hosting a website to give prominence to existing collaborations and provide information on sources of funding for prospective collaborators. A series of annual symposia between the Chinese Academy of Sciences (CAS) and its Australian counterparts, the Australian Academy of Science (AAS) and the Australian Academy of Technological Sciences and Engineering (ATSE) are also under consideration.

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52 M. Bun, *Committee Hansard*, 20 June 2005, p. 21.

17.54 The committee fully supports these initiatives, and considers that the establishment of a science counsellor position in Beijing could facilitate the operation of these activities and assist the Australian government to identify further opportunities.

17.55 On a broader level, representatives indicated that Australia lacks a forum in which the various agencies across government with an interest in pursuing international links can communicate and coordinate their activities.[53] The committee considers there is a need for government and non-government stakeholders to meet and discuss opportunities in China and to coordinate their activities. The committee notes that the scientific community has a particular strength in building networks and working cooperatively. These strengths should be utilised. Creating a forum, perhaps hosted by DEST, to discuss China issues would be beneficial. Creating a dedicated scientific presence in China could provide a focal point through which the government could direct its activities.

17.56 The committee urges the government to expand Australia's capacity to form and foster scientific links. The sheer size of the Chinese market, the scale of its development, and the rising levels of investment in research and development present Australia with many opportunities. Science can act as a bridge to closer economic, political and cultural ties. It has significant potential to contribute to the advancement of both nations. Through science, China and Australia can jointly confront the challenges facing both our nations and explore new horizons, to both nations' benefit. In so doing, we can also come to understand more about one another.

53 S. Sedgley, *Committee Hansard*, 20 June 2005, p. 22.