Australian Academy of the Humanities
Submission to *Vision for a Science Nation* Consultation Paper
July 2015

The Australian Academy of the Humanities (AAH) welcomes the opportunity to comment on the *Vision for a Science Nation* (the Vision) consultation paper. As one of Australia's four Learned Academies, a key role of the Academy is to provide independent expert advice to government and policy makers, promoting the social significance of humanities scholarship and its importance in shaping effective public policy.

The humanities disciplines are fundamental components of every comprehensive national education system around the world. In Australia, the humanities disciplines make a vital contribution to the national interest by developing the knowledge of our own society and culture, and that of the history and cultures of other nations and peoples. They provide the cultural, historical and linguistic context which underpins Australia's participation in the global community. Where the science, technology, engineering and mathematics (STEM) disciplines contribute numeracy and technological proficiency, it is the humanities, together with the arts and social sciences (HASS), which deliver Australia's literacy and communication skills.

Overall, HASS represents a significant proportion of Australia's education and research system. HASS researchers comprise 42% of the research workforce, HASS teaches 65% of Australia's university students, produced 34% of the nation's research outputs and comprised 42% of the total numbers of units of evaluation in ERA 2012.[1]

The AAH supports the development of a strategic approach to research, education and innovation in Australia and congratulates the Chief Scientist on his efforts to develop a strategy for the development of the STEM disciplines.

The Chief Scientist's report to which this Vision responds, *Science, Technology, Engineering and Mathematics: Australia's Future*, acknowledges the importance of contextualising STEM-focused policy work within a broader framework that incorporates the work of HASS: "Work in the social sciences and humanities is vital to our deep understanding of social context. Their contribution will contribute to a creative and innovative Australia. It is this context that will influence the extent to which STEM can be effective."[2]

By contrast, *Vision for a Science Nation* makes no reference to the important connections between the STEM disciplines and the HASS disciplines – connections which will be vital to addressing the future challenges we face as a nation. Whether it be managing environmental change, or developing a safe/clean/green agricultural industry, or tackling the challenges of

cybersecurity – these are as much cultural challenges as they are scientific or technical ones, and therefore will not be solved through STEM alone.

The AAH has been a vocal advocate of the need to develop an integrated and high-level vision for the national research, education and innovation agenda that includes the HASS disciplines, both in their own right and for their collaborative potential with STEM disciplines. In the absence of a more encompassing strategy for the research sector in Australia, the *Vision for a Science Nation* should articulate how the agenda for the STEM disciplines connects with HASS, the other half of the research, education and innovation system.

To do otherwise risks STEM operating in a silo-like environment and without regard to the social context identified by the Chief Scientist in his STEM Strategy. There is a risk to the overall health of the system, and its potential to deliver the social, economic and environmental benefits to the nation, if higher education and research policy is segmented along discipline lines or by aims to improve outcomes in one area without keeping the broader system in view.

In terms of the pillars of the Vision, we offer the following observations:

1. Australia's competitiveness

Innovative companies foster HASS and STEM skills mixes to great effect. A recent report from the Australian Council of Learned Academies (ACOLA), found that productivity gains based on innovation, including company growth through exports, rely on a mix of HASS and STEM skills.[3] In the case of Cochlear, a "diverse range of disciplines and collaborations is vital to [its] success", including technological innovation alongside design thinking, studies on social isolation, communication and community engagement, and cultural diversity.

Innovation policy also needs to go beyond private businesses to include not-for-profits, community groups and the public sector to reap the full benefits of publicly funded research. Professional and financial services, health, education and tourism services are all areas of growth for Australia, with great potential for industry/ public sector/ research partnerships with universities to find cost effective solutions for critical issues in ageing, disability, health, unemployment, and related services.

Industries and organisations that wish to innovate need access to researchers who "understand systems, cultures and the way society uses and adopts new ideas" [4] – skills and knowledge from the HASS disciplines.

To maximise Australia's competitiveness, we need public policy (and programmes) to mobilise the capacity for innovation, creativity and entrepreneurship across the research and innovation system.

2. Research, education and training

Australia's graduates need to work effectively across a range of industry settings in an increasingly interconnected world. STEM disciplines are increasingly recognising the value of developing broad skills sets which are underpinned by, and brought together with, HASS knowledge, and this is true also in the reverse. Internationally, some countries are adopting a

STEAM approach, integrating STEM education with the fostering of artistic and creative talent, including South Korea as outlined in its 2013 Creative Economy Plan.[5]

The Engineering Leadership Programme at Monash University is one example of a curriculum shift, recognising that engineering leaders of the future will need to augment their STEM skills with other knowledge systems. The programme covers off topics ranging from globalisation and change management, to people skills and ethics, and includes an industry experience component.

There are also a range of HASS disciplines where mutual exchange and collaboration with the STEM disciplines is vital, from the burgeoning field of digital humanities (requiring IT and computational skills together with humanities methodologies), to research in the environmental humanities, through to the scientific and forensics methodologies that inform archaeological research.

Multi-disciplinary and multi-sector collaboration will be vital to tackle the sorts of long-term challenges Australia faces. In launching the ACOLA Securing Australia's Future report: *Australia's Agricultural Future*, the Chief Scientist recognised that the development of a robust and internationally competitive industry "calls for science-trained people, but not exclusively science-trained people. It calls for all of our skills and talents across all of the disciplines".[6]

Likewise, the Science and Research Priorities (SRPs) all have their roots in social structures and human behaviour. Understanding how to deal with the complex problems they reference is a matter for both STEM and HASS disciplines, and will require a collaborative, interdisciplinary approach. The success of these collaborations relies on excellence in the individual disciplines – this provides the core capacity which underpins multidisciplinary engagement.

Ensuring "long term stable investment in science and research, including infrastructure" will provide a solid foundation for all research disciplines to thrive. If this goal is pursued in a holistic, whole-of-system way, it will stand Australia's future prosperity in good stead by contributing to a functional research and innovation system which excels globally.

The AAH would also emphasise that fundamental basic research gives the system its enabling capability, underpins discovery and innovation, and provides capacity for the system to respond to unforeseen challenges. A situation where the scales are tipped too heavily towards short-term applied research at the expense of basic research would ultimately limit this capability.

3 International engagement

It is vital that STEM disciplines are engaged internationally. It is equally vital for the HASS disciplines, both in their own right and in collaboration with STEM. There is an increased interest in HASS disciplines in the Asia region, "in line with the global trend to embrace a more rounded conception of knowledge, not just in science and technology but also on society and culture, required to understand and tackle more holistically the complex challenges of our time."[7] Taking a strategic approach to international collaboration for Australian researchers across the disciplines will reap the benefits that can be derived from being a part of the global exchange of ideas.

The recently released *Smart Engagement with Asia* report finds that Australia needs to develop "smart engagement" strategies which move beyond a "pragmatic emphasis on economic benefit" and work "towards nurturing wide-ranging, long-term, deep and mutually beneficial relations, based on the principle of reciprocity".[8]

Building people to people links creates more durable bridges in the long term, as evidenced by the work of historian Professor Colin Mackerras FAHA – who was singled out for special mention when China's President, Xi Jinping, addressed the Australian parliament in November 2014. The President thanked Mackerras for building "a bridge of mutual understanding and amity between our people". It is clear that business and culture are inextricably linked for this key trade partner.

The Academy welcomes the opportunity to be involved in further consultation, and would be pleased to elaborate on any of the observations contained in this submission.

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President

[1] Turner, G. and Brass, K. (2014) *Mapping the Humanities, Arts and Social Sciences in Australia*. Australian Academy of the Humanities, Canberra. Available from http://www.humanities.org.au/Portals/0/documents/Policy/Research/MappingProject/txt/Mapping_HASS_Aust_FinalReport_All_Oct2014.pdf

[2] *Science, Technology, Engineering and Mathematics: Australia's Future*, p. 8

[3] Bell, J, Frater, B, Butterfield, L, Cunningham, S, Dodgson, M, Fox, K, Spurling, T and Webster, E (2014) *The Role of Science, Research and Technology in Lifting Australia's Productivity* (June 2014), Australian Council of Learned Academies. Available from http://www.acola.org.au/PDF/SAF04Reports/SAF04%20Role%20of%20SRT%20in%20lifting%20Aus%20Productivity%20FINAL%20REPORT.pdf Companies included in the study were Resmed (medical devices), Cochlear (medical devices), Invetech (design for manufacturing), Halfbrick Studios (games, mobile applications), MBD Energy Limited (waste management), and Westpac.

[4] *The Role of Science, Research and Technology in Lifting Australia's Productivity*, p. 24.

[5] Ang, I., Tambiah, Y. and Mar, P., *Smart Engagement with Asia: Leveraging Language, Research and Culture*, p. 77, available from http://www.acola.org.au/PDF/SAF03/SAF03%20SMART%20ENGAGEMENT%20WITH%20ASIA%20-%20FINAL%20lo%20res.pdf

[6] Daly, J, Anderson, K, Ankeny, R, Harch, B, Hastings, A, Rolfe, J and Waterhouse, R (2015). *Australia's Agricultural Futur*e. Report for the Australian Council of Learned Academies, Available from http://www.chiefscientist.gov.au/2015/07/speech-australias-agricultural-future/

[7] Ang, I., Tambiah, Y., and Mar, P. (2015) *Smart Engagement with Asia: Leveraging Language, Research and Culture*. Australian Council of Learned Academies. Available from http://www.acola.org.au/PDF/SAF03/SAF03%20SMART%20ENGAGEMENT%20WITH%20ASIA%20-%20FINAL%20lo%20res.pdf

[8] Ibid.