

List of critical technologies in the national interest consultation

7 October 2022

The Australian Technology Network of Universities (ATN) welcomes the opportunity to provide a submission to the Department of Industry, Science and Resources on the 2022 update to the list of critical technologies in the national interest.

ATN is the peak body representing Australia's six most innovative and enterprising universities: Curtin University, Deakin University, RMIT University, The University of Newcastle, University of South Australia, and University of Technology Sydney. This submission should be read in conjunction with any individual university submissions.

ATN shares the Government's goals of positioning Australia as a secure partner and hub of excellence for investment, research, innovation and collaboration, ensuring our sovereign and strategic capabilities, and safeguarding our national interests.

As universities focused on engagement and impact, we know that by harnessing Australia's own ideas and capability we can develop and make the most of our own skilled workforce, deliver on national priorities, and build our national knowledge and innovation base.

Critical technologies will be a key part of this and vital to securing Australia's future. We welcome the focus on critical technologies and further investment in these key capabilities and ideas.

Recommendations

ATN's principal recommendation is that the critical technologies list should be focused on improving, investing in and protecting Australia's research and innovation capability in key strategic and practical areas. It is important that the list is curated and used for this defined purpose and not used to guide policy and regulation outside of this scope (including undergraduate student visas).

1. Develop a risk-based and proportionate approach (both in terms of sovereign capability and sovereign risk) that makes use of existing assessment, intelligence and resources and creates a framework for trusted international and institutional collaboration.
2. Lay out a practical and achievable way of putting the critical technologies list into action by developing a capability map to understand the current gaps and strategic partnerships already in place.
3. Use the capability map to refine the critical technologies list to those that present an unsustainable sovereign risk and require further coordinated national action.
4. Outline to stakeholders how the critical technologies list and capability map will help direct any investment to build the capability and safeguards needed in those areas of national interest and include universities as key partners in consultations and reviews.
5. Consult with stakeholders if the list is intended to be used outside of this scope - for example, visa approvals (including under Public Interest Criterion (PIC) 4003B and visa condition 8208).

info@atn.edu.au
www.atn.edu.au

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Key points

- Recent domestic and international events – including regional instability, cyber warfare and supply chain disruptions – have focused attention on our defence, security and sovereign capability. Australia’s capacity to conduct research, safeguard resulting intellectual property, share that with trusted partners, and engage in secure product development will be crucial to protecting and promoting Australia’s interests.
- Australia’s capacity to conduct research, safeguard resulting intellectual property, share that with trusted partners, and engage in secure product development will be crucial to protecting and promoting Australia’s interests. Australia’s universities are well positioned to participate in this research and development due to an ever-increasing awareness of, and vigilance towards, security risks.
- Given the large scope of the list, the Government and stakeholders need an over-arching understanding of:
 - Where the current capabilities lie
 - Existing and potential strategic partnerships
 - The nature and extent of sovereign risks
 - Where there is the possibility that Australia may constrain its capacity to develop sovereign capability in key areas.
- To understand the current capabilities, partnerships and risks and devise a plan to operationalise the critical technologies list, the Government needs to undertake a capability mapping exercise in collaboration with the university and research sectors.
- This capability mapping exercise will be a valuable way for the Government to articulate its priorities and strategic needs (including across defence and cyber security), for universities to demonstrate their existing and potential capability and networks, and to coordinate our collective investment and development.
- The capability mapping can inform investment in research and innovation and also help all partners to plan and develop the skills pipelines needed to generate that research and take advantage of the opportunities created for job creation, translation and commercialisation. This will by necessity include post-school foundational pathways and lifelong learning.
- Australia (like most nations) is a net consumer of the vast majority of critical technologies, rather than an originator or producer – the critical technologies list and any policy or regulation flowing from it will need to accommodate international partnerships.

This is made clear in the Productivity Commission’s interim report [5-year Productivity Inquiry: Innovation for the 98%](#) that reveals between 1 and 2 per cent of Australian businesses are currently producing ‘new to the world’ innovation. We must consider how international partnerships can help the other 98 per cent improve performance and productivity.

The report states that “many ideas and technologies will come to Australia from overseas” so it is important not to unduly restrict our own access to innovation.

- The Productivity Commission’s report also recommends that “skilled migration policy should be reframed as a way of diffusing innovation and best practice among Australian businesses”. This is important to bear in mind regarding potential uses of the critical technologies list.

That is why consultation and certainty are needed regarding the potential use and application of the critical technologies list to other areas of policy and regulation to properly understand the potential implications. This includes, but is not limited to, the potential application of Public Interest Criterion (PIC) 4003B and visa condition 8208 and the consequences for international collaboration in a context where this engagement is necessary to build up or support Australia’s own sovereign capability.

- The list contains a significant number of technologies where Australia does not currently have sovereign capability, or the pipeline of research and development, to develop such capability in the near term. There is the risk of cutting off our own development if the critical technologies list is used to close off potential collaboration opportunities with international partners and students.
- The technology development pipeline from basic to applied research has a long timescale and uncertain path. The critical technologies list is appropriate for identifying technologies at the applied end of the Technology Readiness Levels (TRLs), but we must continue to invest in a broad range of research to enable new discoveries and innovations.
- We must invest in the full pipeline of critical technologies research, which includes creating and investigating new solutions and applications of these technologies to a wide variety of fields and uses. We must explore new technological solutions to health provision which depend on critical technologies like artificial intelligence.
- It is also important to understand that to continue our supply of ideas and expertise to industry and communities, a broad range of research is needed including discovery research and research in the humanities, arts and social science (HASS) which is vital for understanding our world and the people in it. HASS research is vital for our society’s understanding of, and interaction with, critical technologies.
- University research contributes to national economic development, international competitiveness and the attainment of social goals. This contribution requires translation of research into those economic, social, environmental, cultural and other impacts, particularly in partnership with communities and industry. These partnerships are crucial for critical technologies to have a positive impact.

Example – Artificial intelligence, computing and communications

Australia has an opportunity to lead in the social impacts of AI, AI and the labour force (domestic), and AI and the transnational labour force (outsourcing, migrant labour).

Australia already has the ARC Centre of Excellence for Automated Decision-Making and Society (led by RMIT) with the aim: “to create the knowledge and strategies necessary for responsible, ethical, and inclusive automated decision-making (ADM)”.

This research needs to be expanded and sustained into the future and be conducted as a regular part of research funding.

Example – Energy and environment

Australia is well positioned to make impactful research on the social and economic impacts of energy transitions, especially in regions facing dramatic ruptures. This impacts jobs, migration, and the design and infrastructure of cities.

There is a major gap here and Australia risks being left behind as regions in transition in other parts of the world, especially East Asia and the Gulf States, make rapid advancements in smart city technology, infrastructure, and the social and cultural (and political) appetite for alternative energy.

Example – Transportation, robotics and space

Australia has an opportunity to advance research into the use of drones and autonomous robots for disaster relief and humanitarian aid, both domestically (e.g. floods, drought, fire) and internationally (especially in the Asia-Pacific).

Further enquiries should be addressed to:

Executive Director

Australian Technology Network of Universities

info@atn.edu.au