**Response from the National Committee for Information and Communications Sciences (NCICS) and the National Committee for Data in Science (NCDiS)**

We welcome the opportunity to enhance the translation and commercialisation of research outputs from Australia's world-class research institutions. There is a need for a strategic approach that focuses on cultural changes across academia and industry to build on Australia's long standing track record on research excellence and build relationships founded on collaboration, trust and mutual benefits. In areas such as Information and Communication Sciences (ICS), where research impact spans multiple industry sectors, there is a heightened need for strong partnerships that harness the unique capabilities and competencies across research, technology and industry sectors. There have been several attempts to tackle these challenges from time to time with specific priorities, missions, and schemes, often over shorter periods. The following response has been prepared by two national committees at the Australian Academy of Science. We hope that these recommendations will help shape the approach towards a long-term cultural shift in university-industry partnerships and improved research translation and innovation outcomes.

I would be happy to discuss any issues rained in this submission. Please contact the Australian Academy of Science via the National Committees for Science office (nc@science.org.au).

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1. **Mission-driven research**

a) **Are Missions the appropriate priority-setting mechanism? Should they be accompanied by smaller, targeted Challenges?**

The missions aimed at long-term strategic directions to build existing strengths or nurture an emerging strength could provide a constructive approach. Previously, national priorities and growth centres have been used to influence the research focus with intermittent success. To achieve its goals, missions would require an investment commensurate with its goals, buy-in from major political and economic policy stakeholders, and long-term commitment similar to other nations' 2040 or 2050 goals. While they provide a higher-level focus, practical investments should target the gaps in the innovation ecosystem to address emerging market needs and allow the potential for disruptive ideas. Guidance can be sought from decadal and strategic plans [1] prepared by the various groups within the learned academies to identify gaps, priorities and specific programs to address the real issues.

b) **What criteria should be used to select Missions?**

Many key areas of strength in Australian research have cross-sectoral focus and opportunities missed in the past with the setting of National Priorities. ICS areas are crucial enablers of innovation and

disruption and play an essential role in shaping futures across all economic sectors. For example, a "digital futures" driven mission [1] could have been far more effective than limiting research investments to specific industry growth centre initiatives. The proposed missions need to be broader to allow interdisciplinary collaborations with the potential to target multi-sector opportunities, e.g. UK's Mission identifies higher level shifts in society's priorities that can address multi-sector opportunities. Similarly, Japan's mission is a mix of higher-level societal priorities and aspirations.

**c) Is Australian research sufficiently linked to demand? Where are the opportunities to link supply to demand?**

Current R&D tax incentives primarily drive industry development efforts that do not motivate collaboration with the University sector. Incentives for Australian industry to aspire to lead internationally will encourage growth strategies and build collaborations to accelerate and leverage existing innovation capacity in Australian universities. The benefits of such collaborative relationships go well beyond the narrow focus of commercialisation. Australia needs to celebrate the research skills and capacity of research institutions for knowledge advancement and capacity to train future generations with innovation mindsets, e.g. research graduates can be agents of collaboration between industry and universities and better equip industrial teams to build the innovation mindsets crucial to progress the commercialisation and innovation agenda.

**d) How can university researchers identify this demand?**

We emphasise that research-industry interactions must be viewed as a partnership if long-term research translation outcomes are to be achieved. Several successful models can be utilized to connect university research(ers) with industry needs, e.g. short term sabbaticals for University researchers to help understand industry drivers and develop relationships [1], industry programs for PhD students (e.g. APRIntern), and allowing industry experts to spend time with research institutions. We also advocate creating and using expert databases to overcome institutional and disciplinary silos where publicly accessible research profiles can help industry identify researchers with specific expertise [2].

**2. Stage-gated Scheme design**

**a) Is a stage-gated model suited for the purpose of the Scheme?**
A suitable scheme targeting research translation with appropriate funding can deliver uplift to commercialisation efforts. It will be important to allow a large number of PoCs to be validated and scaled up through adequate funding to position them such that commercialisation can proceed with external investment. Noting that viable PoC's can only emerge from excellence in basic research and it is important to ensure that university research and technology delivery ecosystems remain complementary and mutually beneficial, i.e. the proverbial baton passing [3].

**b) What is the appetite from industry and private investors to participate in such a Scheme?**

For the first two stages, it may be difficult initially to get private investments in all cases. In some cases, especially in later stages, this may promote university-industry partnerships, knowing that there is a clear pathway to translate the outcomes to market opportunities, e.g., SMEs. Risk-offset from public investment in the first two stages will facilitate investment for the commercialisation stage. The scheme should always retain the flexibility of helping startups gain access to such collaborative activities.

**c) How should any stage-gating process be defined to ensure any additional incentive is maximised?**

**d) How should projects be selected?**

The universities can see the benefit of getting PhD students and postdoctoral staff motivated to invest in translational efforts through proof-of-concept grants. We can anticipate a funnelling effect here with a large number of ideas entering the pipeline. The selection should be streamlined to take short applications at the start and at least two rounds per year.

**e) How should the success of projects be measured?**

Any approach should be able to handle the evaluation of different artefacts. Especially for ICS, we note that Australia is a signatory to the 2021 revision of the OECD Recommendations on Access to Publicly Funded Data which expand the scope of the term 'data' to include 'not only research data ... but other research-relevant digital objects, such as metadata and bespoke algorithms, workflows, models, and software (including code)'. Hence any proposals for commercialisation of research should be compatible with these OECD recommendations.

**3. Incentives for participation**

**a) What broader incentives influencing the business and university sectors may influence their participation in a Scheme?**

**b) What would motivate businesses, universities, or private investors to invest in this Scheme?**

Encouraging joint appointments between government, universities, publicly funded research agencies, and industry will facilitate investment in the scheme [1]. Research organisations can also consider revising employment contracts to assist researchers in taking simultaneous employment with businesses.

**c) Aside from co-funding, should universities or businesses have any additional requirements for participation?**

The scheme should not compromise the capacity to further the scientific and educational objectives of a particular area. The scheme must emphasise the importance of partnerships and recognise the value of intellectual property and the cost of research. Where appropriate, universities should be encouraged to promote open IP policies. At the same time, industry and startups can expect to have rights to commercialise in identified markets to enhance the mutual respect of each party's mandate in the pursuit of their future activities.

**4. Industry-university collaboration**

**a) How may the Scheme incentivise or support better industry-university collaboration?**

This scheme can create a pipeline of research translation activities and encourage risk-taking by researchers to be engaged in this such activity as part of their portfolio of activities. The scheme will also demonstrate the value of collaboration to industry and filter/de-risk investment in research.

**b) Would an Industry PhD program help improve collaboration outcomes?**

Current PhD programs need enhancements to help develop additional skills and mindsets that would make it easier for interested graduates to undertake careers in industry and boost innovation capacity, research translation and commercialisation.

**c) Are there skills gaps in academia or business that inhibit collaboration or commercialisation?**

See 3b and 4b

**d) How can we increase collaboration between university researchers and industry, particularly amongst SMEs?**

Many SMEs do access universities with collaborative agendas as compared to large companies that rely on their internal capacity to activate innovation projects. However, there are barriers for SMEs to engage with research (see 2b)

**5. Governance arrangements**

a) **What stakeholders should be involved, and where, in the governance arrangement?**

The governance arrangements should include representatives of the funding scheme and industry sector(s), academic experts, and independent commercialisation advisors.

b) **What type of Governance arrangement is best suited for the Scheme?**

c) **How should projects be selected and managed?**

See 2d/e

d) **How can the Governance arrangement minimise administrative burden whilst also minimising risk?**

[1] https://www.science.org.au/support/analysis/decadal-plans/ics/preparing-australias-digital-future
[2] https://www.science.org.au/covid19/ICS-experts
[3] https://www.chiefscientist.gov.au/node/1501