

**Submission to the University Research Commercialisation consultation paper  
National Committee for Chemistry**

The National Committee for Chemistry welcomes the opportunity to comment on the University Research Commercialisation Consultation paper. This submission presents a summary response to each issue (mission-driven research, stage-gated design, incentives for participation, industry-university collaboration, governance) and direct responses to each discussion question at the [appendix](#).

I would be happy to discuss any issues raised in this submission. Please contact the Australian Academy of Science via the National Committees for Science Office ([nc@science.org.au](mailto:nc@science.org.au)).

Professor Martina Stenzel FAA  
Chair, National Committee for Chemistry

### **1. Mission-driven research**

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

Missions and accompanying smaller Challenges are fine. They are not materially different from National Innovation and Science Agenda priorities or the industries identified as priorities for Linkage schemes. The important aspect is the process that defines them and the people involved.

b) What criteria should be used to select Missions?

Missions should be defined by the end users of the technology. It is up to the investor to articulate who this group is. In this case, it is probably the organisations performing the commercialisation.

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

Australian R&D supply is not sufficiently connected to its demand. The largest opportunity to link supply with demand exists in changes to the governance of R&D, and greater representation of end users selecting where funding is directed.

d) How can university researchers identify this demand?

Most university researchers are talented and passionate and have made significant sacrifices to gain a tenuous job in a competitive job market. Existing researchers have done this in the university culture articulated in the DESE Consultation Paper. It is unreasonable to expect that most will be able to change in an election cycle.

Greater alignment and collaboration between industry and universities in teaching and training will provide a natural progression of academic researchers who have the networks to identify market pull for commercially relevant R&D.

### **2. Stage-gated Scheme design**

a) Is a stage-gated model suited for the purpose of the Scheme?

Any expensive, risky activity should be stage gated.

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

- a) High: As end users of research outcomes, industry and private investors usually understand the market pull much more than academic researchers, hence they need to have rapid, easy access to R&D capacity within universities and research providers, in order to 'drive' the market pull for the research.
- b) High: BUT only if it is adequately de-risked and is not a talk fest. De-risking could be:
  - i. by a guaranteed or high likely purchaser of the product/service
  - ii. transparency
  - iii. short time frames and quick decision-making processes.

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

A panel of people suitably qualified to identify the risks inherent in each project would be appropriate. It should include scientific experts to identify the technical risks, business partners with an interest in commercialisation to identify the business risks and legal experts to identify compliance risks.

d) How should projects be selected?

By end users.

e) How should the success of projects be measured?

Success should be evaluated according to best practice, and ideally 30 years after it is completed. This is the time recognised as appropriate for benefits to manifest. However, investors usually want and deserve political capital for their investments and need to evaluate projects as soon as they complete. Existing evaluation frameworks, including estimation of Return on Investment, are probably appropriate.

### **3. Incentives for participation**

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

University researchers are often motivated by passion – they want to work on what they love. Many in the university sector are passionate about making a tangible difference in the world. A Scheme that enables them to achieve this will be well subscribed.

The business sector is motivated by staying in business. This means being profitable, complying with regulation and maintaining a social licence to operate. Any Scheme that enables a net positive outcome (i.e., that generates more revenue than it costs, allows compliance with regulation while not imposing more, etc) in these areas will be well subscribed.

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

One significant current impediment is Intellectual Property (IP) ownership policies in universities, which stipulate that universities will own any project IP, with external investors able to utilise the IP through licencing. In our experience, more businesses prefer a model that in which investors own IP and universities gain a revenue stream in royalty payments on commercialisation.

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

There needs to be a commitment to commercialise or, at least, an agreement that commercialisation will not be hampered.

#### 4. Industry-university collaboration

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

- a. Inclusion of end users on advisory committees and boards.
- b. Development of trusted relationships and a workforce dedicated to this task.
- c. Improved understanding of translational research (which often is not accompanied by well-cited publications).
- d. Realistic understanding of what industry can contribute to the research.
- e. Recognition of the value that industry can add, e.g., the translation of the research to a product or service; the initial idea based on their market understanding and presence.
- f. Long-term strategic investment (e.g., CRCs) with a mix of short-term tactical investment (e.g., CRC-Ps).
- g. Ensuring it is industry led and university supported.
- h. Disincentivisation of universities to pursue publications and money.
- i. Establishment of a hub that enables industry to have free access to taxpayer-funded university infrastructure that can enable rapid information for decision support.
- j. A scale-up facility that enables the idea, once the concept proven, to be scaled up with limited risk.

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

In many instances a student internship program will improve collaboration. From experience, the primary requirement that any PhD makes a novel contribution to human knowledge is an inhibitor. Industry rarely makes money on new knowledge. Even cutting-edge tech companies do not make money on a novel idea. Technology deployed commercially almost always requires a body of work behind it for full understanding of risks and benefits, trouble shooting, regulatory compliance, etc.

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

Yes. Collaboration between the two worlds is often catalysed by 'trusted intermediaries'. Currently, most universities try to service this need with business development professionals, whose function is clearly to make money for the university. Their role is not to maximise collaboration.

Commercialisation requires a skillset and infrastructure that does not – and probably should not – exist in universities, for example in agriculture, which has a traditional framework of 'R,D&E' (Research, Development and Extension). Here, 'Extension' is parallel with commercialisation, involving similar skills and seeking the same outcomes. Extension professionals have been almost exclusively employed by governments around the world (with some exceptions in the USA in the land grant universities). Interestingly, Australian governments have recently ceased their investment in extension, arguing that government should not be delivering benefits to private entities, such as farm businesses (see <https://www.researchgate.net/publication/232887903> *The Many Turnings of Agricultural Extension in Australia*).

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

A common inhibitor to SMEs engaging with research organisations is capacity. Small businesses do not necessarily have a legal department to review the agreements required to formalise these relationships. They do not always have an engineering team or lab facility to transfer technology, troubleshoot and

design scale up. A government-funded function within DESE to provide those services to SMEs would assist with this.

## **5. Governance arrangements**

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

- a. SMEs/industry and end users should have primacy at the table and in decision making.
- b. Academic researchers should be trusted advisors.
- c. Depending on research field, there is a need for an industry advisory comprised of an industry association member, an economic support advisor and an acknowledged specialist practitioner in the field, along with a relevant academic.
- d. The ARC focuses on theoretical and academic research and thus should not be involved in these discussions.

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

- a. A CEO, CFO, project manager, company secretary and specialist advisor, all of whom report to a board of governance every two months. The board should report to the Funding body every 12 months.

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

- a. With considerable input from the people who will be making, marketing, selling, and delivering the product/service.
- b. Use of a multi-criteria analysis template.
- c. Each project has a responsible project manager at 0.1-0.2 FTE.
- d. Selection should include a socio-economic assessment with input by suitably qualified practitioners (not researchers).

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

- a. Ensure distance from universities.
- b. Have few rules.
- c. Have clear accountabilities.
- d. Minimise political input.

## Appendix

### 1. Mission-driven research

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

- a) Missions need to be developed and evolved around the end users of the research outcomes.
- b) Yes for national and strategic challenges; No for addressing workforce training and development, unless it comes with long-term strategic funding support without the need to chase research funds on an ongoing basis, i.e., security. While missions provide the important research needs framework, their goals and mission are often vague and difficult for SMEs to engage with because they cannot clearly see their place in the supply chain. The need for clarity around the role of SMEs and an understanding of the value that their agility in the supply chain offers is an important consideration.
- c) Yes, they should be accompanied by smaller, targeted challenges, however the funding and scale of these need to recognise the workforce training and capability development needed for Australia to have genuine sovereign capacity, rather than 'off-the-shelf' purchases that will come and go and generally be highly priced.

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

- a. Identification of the end users of the product/service, and who the mission services.
- b. Long-term vision rather than those driven by electoral cycles.
- c. A national sense of vision with a well-defined big picture that fills in the detail all the way to the end users of the innovation – whether they are in Australia or are an international trading partner.
- d. Sustainable workforce development and training utilising refurbished TAFE and universities.
- e. National economic needs that aim for a well-educated and trained workforce, without the parochialism of States.
- f. Security of work with a sense of genuine contribution to society.
- g. A recognition that the thinking and imagination of well-trained people who will implement the vision requires respect and adequate reward.

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

- a) There is often insufficient consultation around framing the research with the end users, and the research is 'pushed' into the market rather than 'pulled' by the market.
- b) No. It is poorly linked to demand with the relationships 'transactional' rather than 'trusted advisor', where research is often the last resort because of the fear of red tape along with the hazards and minefields associating with navigating university and government bureaucracy in accessing funds and the appropriate researchers.
- c) The questions need to include a teasing out of Australia's R&D ecosystem, and an understanding of which 'Australian Research' is being referred to, i.e., STEM, Services, Business, etc,. Additionally, clarity around whether it includes universities, and which university subgroups, (as different universities are better at delivering different types of research or State/federal-based scientific bodies such as DPI, CSIRO, Dept of Environment, etc.).

- d) The identification and understanding of 'industry demand' are relatively poorly understood within university frameworks because the movement of people between industry and university is not as fluid as it could be.

d) How can university researchers identify this demand?

- a) Deeper, more relevant and genuine consultation with the end users, manufacturers, marketers and sales engineers, so that the likelihood of success is maximised and failure is de-risked.
- b) Development of business plans/strategies that aim to build long-term and sustainable relationships with various industry sectors.
- c) A change in focus from being the experts to being a service.
- d) Adequately fund and direct these roles so that they do not become a 'chasing industry funds' role and use soft or emotionally intelligent KPIs for sustainable relationships.
- e) Employ people who understand the sector/area along with the business imperative – consider the ANSTO model that established an externally focused industry engagement section.

2. Stage-gated Scheme design

- a) Is a stage-gated model suited for the purpose of the Scheme?
  - i. Yes, as a common project management strategy this is already well-practiced by research providers across the country and should be a concern if not. It needs to be combined with quality systems such as Six Sigma, etc.
  - ii. There are very few end-user SMEs that do not utilise this approach, so it is consistent with current thinking.
- b) What is the appetite from industry and private investors to participate in such a Scheme?
  - a. High: As end users of research outcomes, industry and private investors usually understand the market pull much more than academic researchers, hence they need to have rapid and easy access to the R&D capacity within universities and research providers, so that they can 'drive' the market pull for the research.
  - b. High: But only if adequately de-risked and is not a talk fest. De-risking could be achieved through:
    - i. guaranteed or high likely purchaser of the product/service
    - ii. transparency
    - iii. short time frames and quick decision-making processes.
- c) How should any stage-gating process be defined to ensure any additional incentive is maximised?
  - a. It needs to be objective with support of a transparent and well-understood multi-criteria analyses (spreadsheet).
  - b. Use of stop/go decision points.
  - c. Removal of 'legalistic loopholes' with a focus on the intent of the scheme, so end users or those who will utilise the research outcomes are included in the process.
  - d. While the decision gate may be a stop/go scenario, it could be a diversion to an alternate product service or a different route to the same objective.
- d) How should projects be selected?

Based on:

- a. consideration of those who will use the research outcome, including end users, manufacturers, etc., need to have a seat at the table and be taken seriously so that the context of the research can be understood and the research implemented
  - b. ideas (70%), capacity (20%) and cost-benefit (10%); and if the capacity is limited, the idea promoter should be assisted with identifying and linking to relevant capacity within the R&D ecosystem
  - c. immediate, medium-term and long-term economic needs
  - d. a combination of SME business needs, national needs (e.g., carbon reduction etc.), and capacity building. These require long-term national vision, such as what is being done routinely in current transport sector infrastructure builds and similar programs between the World Wars
  - e. consideration of economic assessment of employment opportunities, the value adds of employment within the community (including the recirculating of monies within the community) and the social impact of employment.
- e) How should the success of projects be measured?
- i. The research outcomes users need to have some input into the evaluation.
  - ii. Dollars made for the SME/industry partner.
  - iii. Jobs created.
  - iv. Dollars returned to the community.
  - v. Social impact.
  - vi. Publication should not be included as a measure of success.

### **3. Incentives for participation**

- a) What broader incentives influencing the business and university sectors may influence their participation in a Scheme?
- a. For business:
    - i. More generous R&D tax incentive, comparable to some European trading partners.
    - ii. Low and realistic cost of entry to the scheme.
    - iii. Improved trade/standards rules (with less exposure to countries who (for example) have values consistent with our values) within Australia that enables development of sovereign capability.
  - b. For universities
    - i. An improved understanding of the requirements and needs of those in the supply chain who, at some stage of the research implementation, will be either end users, consumers, sellers or manufacturers.
    - ii. Genuine recognition of industry engagement via sensible metrics or KPIs other than publications.
    - iii. The development of teaching, theoretical and applied research streams all with the same reward/recognition.

- iv. Funds to support industry engagement.
  - v. Less emphasis on PhDs as a training tool and more on specific and targeted 18 to 24-month quick turnover courses with appropriate recognition, such as a Masters or Graduate Diplomat, such as European trading partners have in place.
  - vi. Providing a second pathway to explore new research ideas in parallel to blue-sky research. It needs to be noted that a scheme like this will only be attractive if funding is provided on top of existing ARC and NHMRC funding.
  - vii. Enable engagement with industry that may support new research ideas generated during the lifetime of an ARC or NHMRC grant.
- b) What would motivate businesses, universities, or private investors to invest in this Scheme?
- a. Businesses:
    - i. Reduced cost, rapid access to decisions, real-time response to proposals and reduction in bureaucratic processes.
    - ii. Reduced IP disruption and the ability to make money from the new knowledge in the form of a service or product.
    - iii. Universities and research providers who are more externally focused rather than process driven and internally focused.
    - iv. An understanding of end-user requirements, so that a sensible evaluation of the market need drives the research.
  - b. Universities:
    - i. Limiting of ARC oversight by which the funding is delivered, so that young researchers and young universities have access to opportunities to explore their ideas with suitable industry partners.
    - ii. Additional funding for employing researchers (rather than teachers or administrators).
  - c. Private investors:
    - i. Transparency, quick response times, rapid time from proposal to assessment and funding.
    - ii. Improved funding models that see sufficient money allocated to the high overhead of research administration.
- c) Aside from co-funding, should universities or businesses have any additional requirements for participation?
- a. Universities:
    - i. Yes: An interest in engaging with industry that could be demonstrated by the establishment of industry engagement groups within universities with KPIs around external engagement rather than internal processes.
    - ii. The question of IP needs to be better resolved by genuine consideration of how the economy can benefit from the IP and who can do the most with it in terms of converting it to realistic products and services.
    - iii. An understanding of end-user needs and market demand. This could be demonstrated by a social study or survey.



- b. Business:
  - i. Yes: Transparency in operations.
  - ii. Openness in market position and product/service application.
  - iii. An openness to the conversation and a record of contribution to R&D or a genuine desire to commit to R&D via workforce development and employment opportunity creation.

#### 4. Industry-university collaboration

- a) How may the Scheme incentivise or support better industry-university collaboration?
- b) Would an Industry PhD program help improve collaboration outcomes?
  - a. An industry PhD program is limited by conflicting needs, with industry wanting innovation and a PhD program wanting novelty and discovery.
  - b. No: The evidence from the myriad of CRCs and CRC-P programs since ~1990 has shown this not to be the case, as performance has improved only slightly depending on the metrics used.
  - c. No: PhD programs are aligned with university outcomes while Master's programs are better aligned with industry outcomes.
  - d. No: PhD programs are too high risk, and they take too long whereas a Master's program can deliver an outcome within two years (lower cost, limited exposure of IP, fail-fast).
  - e. No: There is often a misalignment of KPIs such as the need to publish and hence potential loss of IP.
  - f. Disciplines such medical research are different, because this is often public domain funding.
- c) Are there skills gaps in academia or business that inhibit collaboration or commercialisation?
  - a. Yes: Academia does not have a lot of the common or historical knowledge of the business or the environment in which business decisions are made.
  - b. Yes: Academic tends to be highly specialised.
  - c. Yes: Academia does not necessarily understand the effort and funds needed to manufacture, market, sell and support the product or service beyond the initial proof of concept.
  - d. Yes: Business does not necessarily understand the timeframe by which models or experiments need to be developed in order to achieve an outcome – this relies on capability development and sound research practice so that the outcomes are de-risked and the likelihood of success maximised.
  - e. Yes: Business does not necessarily understand the expense of research, including training and facility development and maintenance.
- d) How can we increase collaboration between university researchers and industry, particularly amongst SMEs?
  - a. Enable cost-free engagement between the two.
  - b. Enable and empower end users of the research to input into the research strategy.
  - c. Remove the issue of IP from discussions.

- d. Develop suitable university 'door ways' and entrances by which industry can approach to be heard and understood.
- e. Develop genuine university outreach activities whereby industry is engaged in discussions based on connected needs for collaboration rather than a sales pitch.
- f. Reduce the overhead of legal agreements which SMEs simply cannot make and is too much effort and time, often for no reward.
- g. De-focus on publications as a KPI for academic researchers.
- h. Reward academic researchers in the same way as they are for publications, etc.
- i. Less focus on administration and more on the innovation/ideas.

#### **5. Governance arrangements**

- a) What stakeholders should be involved, and where, in the governance arrangement?
- b) What type of Governance arrangement is best suited for the Scheme?
- c) How should projects be selected and managed?
- d) How can the Governance arrangement minimise administrative burden whilst also minimising risk?