

Submission to the Department of Education, Skills and Employment consultation on the University Research Commercialisation Scheme

9 April 2021

The Early- and Mid-Career Researcher Forum of the Australian Academy of Science (**EMCR Forum**) welcomes the opportunity to contribute to the consultation on the proposed *University Research Commercialisation Scheme*.

The EMCR Forum is the representative body of over 6000 early- and mid-career researchers (EMCRs) in science, technology, engineering, mathematics and medicine (STEMM) in Australia. Our submission refers to the unique and important perspective of EMCRs on the proposed scheme and highlights the opportunities the scheme should support.

Our submission addresses the five key design elements of the new scheme from an EMCR perspective and provides recommendations that will support the participation of Australia's future science leaders.

Mission-driven research

Impactful research that underpins commercial and industrial outcomes can take many years to develop, set up, and execute. In particular, it can take a significant amount of time and resources to re-tool laboratories, to train PhD students and to allow post-PhD researchers (postdoctoral fellows) to pivot between research fields.

Long-term, multi-decade goals and research themes such as missions are excellent mechanisms for providing clarity to researchers, particularly to EMCRs who typically have their whole careers ahead of them. To avoid the pitfalls of previous research priorities, the missions should be selected, designed and regularly reviewed collaboratively with the research sector.

Short-term targeted research programs can also be appropriate if they are clearly integrated as part of a structured set of priorities. Non-strategic short-term projects can disproportionately disadvantage EMCRs, as their salaries are directly paid from research contracts paid through "tied" grant funds for a specific project, and thus with a specific reporting deadline and end-date. Ad-hoc short-term projects, therefore, do not provide sufficient job security and career continuation necessary for the many EMCRs who significantly contribute to the success of these projects.

Recommendations

- a) Develop clear, long-term, multi-year and multi-decade research goals to enable sufficient time for researchers to pivot their resources and expertise into the appropriate fields.

Stage-gated scheme design

Stage-gating is one potential mechanism for selecting viable projects for future longer-term funding. Projects must be selected on the merits of the proposed idea and the projected

outcomes, rather than relying on the track-record of the participants, to provide the right incentives for EMCRs to commercialise their research. Stage-gated schemes that have appropriate short-term milestones while also having long-term over-arching goals, will allow postdocs the opportunity to demonstrate and develop their skills while at the same time giving them long-term job certainty should they continue to deliver the proposed outcomes.

The value of EMCRs to the myriad of potential research and commercialisation opportunities should not be underestimated. In many of these projects, it is actually the postdocs and early- to mid-career academics who are responsible for conducting the bulk of the project deliverables. Therefore, during project selection (at any stage), in addition to conventional merits such as project significance, commercial benefit and IP generation, consideration should be given to projects that successfully demonstrate true participation of EMCRs, from the projects' inception. Particular weight should be given to projects that encourage embedding EMCRs within the industrial context, e.g., through secondments or shared university-industry employment.

Nonetheless, there are some challenges with stage-gated projects, particularly where significant administrative procedures are required in between stages. In particular, most researchers working on these projects are contracted on a stage-by-stage basis, and hence long periods between stages results in high staff turnover and a general lack of continuity. This in turn significantly risks the project outcomes, as training new staff within the short time frames of the projects is impractical and hiring new researchers with the appropriate skills can be challenging.

Recommendations

- a) Encourage direct involvement of the personnel delivering the industrial research programs in the design and execution of the project from the beginning of the project proposal. In particular, the development of project aims, milestones and stage-gates should be done in collaboration with EMCRs and EMCRs should be provided with chief investigator status on the grants;
- b) Enable rapid turnaround between project stages by reducing the time taken to assess the progress to the stage-gates;
- c) The scheme should include funding to allow Australian universities to provide bridging contracts to the personnel on short-term contracts who participate in the stage-gate projects.

Incentives for participation

While the latest dataset from the [National Survey of Research Commercialisation](#) shows positive trends, Australia continues to underperform compared with peer nations on almost all indicators. A key barrier for EMCR participation in commercially driven research programs is the discrepancy between the metrics by which industry projects are judged and those used as indicators of success in academia, with the latter emphasising journal publications, citations, and the pursuit of institutional rankings over other considerations.

The lack of consistent incentives for researchers within universities to engage in commercialisation activities, and the lack of recognition within university reward structures, is well documented.¹² In particular, commercialisation activity appears to be highly gendered: in the period 2012-15 in Australia, only 8.9% of patents were invented by women.³

Significant opportunities lie in developing mutually beneficial industry-university partnerships in which both academic and commercial outcomes are aligned.

Recommendations

- a) Develop mutually beneficial industry-university partnerships which align performance metrics of all parties (e.g., publications and commercial outcomes). These aligned performance metrics should be included in project proposals, milestones and stage-gates;
- b) Engage research funding bodies (e.g., ARC and NHMRC) and universities to formally include commercial outcomes, such as patents, inventions, industrial funding, etc. as success metrics for grant assessments and academic performance, respectively;
- c) Ensure that recognition of research and commercial outcomes are distributed equitably within the project team to incentivise all team members to work together to achieve common goals.

Industry-university collaboration

Industry-university collaborations are crucial to the success of any endeavour to commercialise research. Current attempts to commercialise research is limited by the lack of a bridge between academia and industry. Engaging PhD students and postdocs is an excellent avenue to close this bridge. With over half the research workforce in universities being Higher Degree by Research (HDR) students, they must be considered a necessary force in driving industry-research collaboration. Implementing programs that engage HDR students in industry collaboration, such as the successful APR Intern program, can help create a necessary shift in Australia's research culture.

Another avenue to promote industry-university collaboration is through engagement of early- to mid-career academics. The EMCR Forum is supportive of the establishment of an industry fellowships scheme, similar to what is offered by The Royal Society.⁴ The UK model provides a pathway for academic scientists who wish to work on a collaborative project with industry and for scientists in industry who wish to work on a collaborative project with an academic organisation. This offers more expansive collaboration with an industry partner than existing programs.

Recommendations

- a) Promote industry-based PhD programs. Industry-sponsored PhDs provide an excellent opportunity for recruiting high-calibre PhD students while also delivering high-quality research directly relevant to the industry partners;
- b) Establish an industry fellowships scheme, mainly targeted at late-stage HDR students and early- to mid-career researchers. The outcomes from these fellowships should be considered as positive outputs for the purposes of academic promotion and grant applications. Furthermore, academics and postdocs should not be penalised for their time spent away from conventional teaching and research responsibilities;
- c) Encourage universities to allow more flexible post-doctoral working arrangements (e.g., part time industry funded, part time university funded).

Governance arrangements

The governance arrangements for a new mission-based program are likely to be the most critical part of the scheme's implementation. It is important to involve the scientific community and the community more broadly when creating and implementing missions to ensure the impacts are properly assessed and considered.

Recommendations

- a) Projects should be encouraged to include a diverse range of participants across different professional ranks, academic qualifications, genders and cultural backgrounds. In particular, projects involving Indigenous communities or land ownership must include Aboriginal and Torres Strait Islander representation;
- b) The success of projects should be monitored by the governing body, with only limited new project submissions allowed from the researchers and industrial partners until previous partnerships have been assessed;
- c) Researchers and industrial partners should have limitations placed on the number of concurrent commitments to ensure high quality of project outcomes and effective time management.

References

¹Devinney, T., Dowling, G., Devinney, T. & Dowling, G. What Are the Strategies of Australia's Universities? Arenas, Vehicles, Differentiators, Staging and Economic Logic. in *The Strategies of Australia's Universities* 143–167 (Springer Singapore, 2020). doi:10.1007/978-981-15-3397-6_9.

² Compagnucci, L. & Spigarelli, F. The Third Mission of the university: A systematic literature review on potentials and constraints. *Technol. Forecast. Soc. Change* 161, 120284 (2020).

³ OECD. Highlights from the OECD Science, Technology and Industry Scoreboard 2017 - The Digital Transformation: Australia. (2017) doi:10.1787/888933616883.

⁴ Industry Fellowships | Royal Society <https://royalsociety.org/grants-schemes-awards/grants/industry-fellowship/>