



Australian Academy of Science

SUBMISSION TO THE
**2014 COOPERATIVE RESEARCH
CENTRES PROGRAMME REVIEW**

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Australian Academy of Science Submission to the Cooperative Research Centres Programme Review

The Australian Academy of Science welcomes the opportunity to provide a submission to the Cooperative Research Centres Programme Review. The Academy promotes scientific excellence, disseminates scientific knowledge, and provides independent scientific advice for the benefit of Australia and the world. The Academy is made up of over 470 of Australia's leading scientists, each elected for their outstanding contribution to science. The Academy would be pleased to provide further information or explanation on any of the points made in this submission.

Summary

The CRC programme is the only publicly funded mechanism of scale that brings together researchers and end-users to solve pressing big problems facing the nation. The advantage of this programme is that it is businesses and service delivery partners, rather than government, which identify the problems facing their sector and undertake research to develop solutions. This focus on meeting end-user needs helps ensure that through a relatively modest investment by government and other partners the programme delivers real solutions that lead to significant economic, social and environmental benefits. The flexibility of the programme to tackle significant issues across different sectors is advantageous and should remain.

The Australian Academy of Science strongly supports the continuation of the CRC programme.

The Academy offers the following recommendations to the review on how the programme might develop.

- **An appropriate mechanism, such as the CRC programme, should continue to support end-user driven public good research.**
- **The CRC programme should continue to support basic research (as is already being undertaken by CRCs) when this is identified as a need by end-users.**
- **In accordance with the recommendations that will emerge from the concurrent consultation into 'Boosting the commercial returns from research' targeted action should be taken to enhance the desirability to universities of participating in the CRC programme.**
- **Increased efforts are needed to 'sell' the programme to industry and be more explicit about the potential benefits, including commercial and financial outcomes that can be achieved through the programme.**
- **The security of CRC funding should be guaranteed at least six months in advance of application submissions and the process of submission should be reviewed and streamlined.**
- **The CRC programme should continue to provide appropriate opportunities for early career researchers so that researchers gain experience working with industry at an early stage of their career.**
- **Appropriate intervention should take place at an early stage where CRCs are not performing as expected.**
- **The Government should build on the success of the CRC programme and continue to invest in mechanisms that improve collaborations between researchers and business.**
- **If priority areas are employed in the CRC programme, bids should relate to research priority and/or industry priority areas.**

- **Flexibility should be employed within future guidelines if they make use of priority areas, so that bidders can put forward applications covering multiple priority areas, and that applications covering newly emerging areas can also be permitted.**

Public good Cooperative Research Centres

From the beginning of the CRC programme 25 years ago there has been recognition of the need to advance science and technology to achieve both positive public good (seen as social and environmental benefits) and economic outcomes. As the Minister for Industry noted in his foreword to the discussion paper, the first CRC programme guidelines in 1990 stated that “there is a need to ensure that advances in science and technology are linked as effectively as possible to applications in Industry and other sectors such as health and the environment.”¹ Whilst the role of public good as a key objective within the programme has varied, public good (defined as social and environmental benefits) was enshrined as a key objective of the programme following the 2008 O’Kane Review. To reinforce this, a priority public good funding mechanism was introduced in 2013 to fund CRCs that had reached their maximum funding term.²

The terms of reference and subsequent discussion paper for this review make no mention of the role of public good within CRCs. Instead the question asked is whether the programme “...is the most appropriate vehicle to support business and researchers to work together to develop and transition Australia’s industries of the future”³. The past and future role of public good within the programme does need addressing in this review, as public good research in Australia’s interest will continue to be needed. The programme has been an excellent mechanism to bring together researchers and end users to solve pressing and long term issues facing the nation. The numerous examples where the programme has delivered successful outcomes include the Bushfire CRC, Young and Well CRC, the Mental Health CRC, the Antarctic Climate and Ecosystems CRC, the Aboriginal and Torres Strait Islander Health CRC, and the Living with Autism Spectrum Disorders CRC, amongst many others. Undertaking research to sustain the “national interest” and solving end user problems in many of these public good areas continues to fit with many areas of government policy. Whilst focused on public good, rather than direct economic outcomes, they do deliver unique indirect economic benefits for the nation. In most of these areas there is currently no other mechanism for bringing together end users, such as governments, service providers, industry and researchers to solve what are important issues facing the nation. Without this connected, joined up approach, Australia will suffer negative economic, social and environmental impacts.

The Academy recommends that an appropriate mechanism, such as the CRC programme, continue to support end-user driven public good research.

¹ Department of Industry (2014) *Cooperative Research Centres Programme Review: Discussion Paper*. Available at: http://www.business.gov.au/grants-and-assistance/Collaboration/CRC/CRC-Programme-Review/Documents/CRC_Discussion_Paper.pdf

² Department of Industry (2013) *Cooperative Research Centres Program: Program Guidelines*, p.1. Available at: <http://www.business.gov.au/grants-and-assistance/Collaboration/CRC/about-the-program/Documents/CRC-Program-Guidelines-June-2013-v2.pdf>

³ Department of Industry (2014) *Cooperative Research Centres Programme Review: Terms of Reference*. Available at: http://www.business.gov.au/grants-and-assistance/Collaboration/CRC/CRC-Programme-Review/Documents/CRC-Terms_of_Reference.pdf

Basic, applied and translational research within the CRC programme

The discussion paper, and the Government's recently released Industry Innovation and Competitiveness Agenda⁴, make it clear that the Government's goal is for Australia to increase the commercialisation outcomes from science and research. The barriers to research commercialisation differ across sectors. The type of research currently undertaken by CRCs is set by end-user goals. Industry or other partners identify specific problems with which science and research can address and these are used to set the direction of the CRC. As the problems facing different industries will inevitably vary considerably, this means that different CRCs are engaged in a wide range of different types of research to meet end-user needs. For some industries that can be focussed on undertaking applied research, or demonstration of proof-of-concept leading to potential commercialisation is straight forward. However for others, for example agriculture, the need is not necessarily at this later stage and the end-user gap can be a requirement for basic research in specific areas. The spectrum of research, development and extension is complex, and the advantage of the current programme is that it allows end-users to identify gaps in the pipeline and a clear focus for research.

The Academy recommends that the CRC programme continue to support basic research being undertaken by CRCs when this is identified as a need by research end-users

Enthusiasm of participating in the CRC programme

On some occasions there have been instances where universities have been reluctant to participate in the CRC programme, and there are a number possible reasons why this might be the case. It could be that receiving funding through the programme is not seen as desirable for universities as receiving funding through the ARC and the NHMRC. It is difficult to know the extent of this perception and whether it is acting as a disincentive to universities or individual researchers from participating in the programme, but it was in part recognised in the CRC Association 2014-15 Pre-budget submission.⁵ If this perception is acting as a disincentive then it should be addressed to avoid reduction of the size and quality of the pool of potential participants. For the programme to have maximum positive impact participation should be seen as desirable as participating in research council-funded research.

In accordance with the recommendations that will emerge from the concurrent consultation into 'Boosting the commercial returns from research', the Academy recommends that targeted action should be taken to enhance to universities the desirability of participating in the CRC programme.

Business desirability of participating in the CRC programme

The 2008 review of the CRC programme recommended the purpose of the programme be to "deliver significant economic, environmental and social benefits to Australia by supporting end-user driven research partnerships to address clearly articulated major challenges that require medium to long term collaborative efforts".⁶ However the purpose does not sufficiently emphasise the CRC as a

⁴ Department of Industry (2014) *Industry Innovation and Competitiveness Agenda*. Available at: [http://www.dpmc.gov.au/publications/Industry Innovation and Competitiveness Agenda/docs/industry_innovation_competitiveness_agenda.pdf](http://www.dpmc.gov.au/publications/Industry%20Innovation%20and%20Competitiveness%20Agenda/docs/industry_innovation_competitiveness_agenda.pdf)

⁵ Cooperative Research Centres Association (2014) *2014-2015 Pre-budget submission*. Available at: <http://crca.asn.au/crc-association-pre-budget-submission-2014-2015/>

⁶ Australian Government (2008) *Collaborating to a purpose: Review of the Cooperative Research Centres Program*. Available at: www.business.gov.au/grants-and-assistance/Collaboration/CRC/about-the-program/Documents/2008-collaborating-to-a-purpose.pdf

potential vehicle for driving *business development and innovation* and consequently it is not always easy for industry to immediately understand the ‘business case’ proposition for participation.

The Academy recommends that increased efforts are needed to ‘sell’ the programme to industry and be more explicit about the potential benefits, including commercial and financial outcomes that can be achieved through the programme.

PhD training and Post-doctoral opportunities

In addition to the substantial economic, social and environmental benefits that the programme delivers⁷ it must be recognised that the programme supports career development for early career researchers. This is particularly important in an environment where funding opportunities for such researchers are exceptionally difficult to come by, with research council success rates for ARC early career researcher awards now at rates as low as 14%.⁸ According to a 2012 study CRCs are the 12th largest provider of research training nationally by overall research load, and in partnership with universities, CRCs represent the 9th largest provider of doctoral completions.⁹ The involvement of researchers in industry collaboration opportunities at the early stage of their career must be seen as highly desirable, and essential to boosting future university-industry collaboration. Participation at this early stage of career allows researchers to develop the links needed to facilitate positive industry outcomes in their future career. This is particularly important given the Government’s desire to increase collaboration between industry and researchers.

The Academy recommends that any future CRC programme continues to provide appropriate opportunities for early career researchers so that researchers gain exposure working with industry at an early stage of their career.

Administrative burden

It usually takes over 12 months to develop a successful CRC application, and it would not be unusual for the cost of putting together an application to be in the range of \$200,000. Whilst this can act as a disincentive to potential applicants, it does allow time for relationships and trust to develop and build between partners. Where possible, efficiencies should be found to make the process as straightforward and as appealing as possible for applicants. As important as developing a smooth process for applicants is ensuring confidence in the ongoing future of the CRC programme. After considerable work had been put into applications for the 17th round of the programme, the round was cancelled as a budget saving measure just six weeks prior to the submission of bids. Such a late cancellation undermines trust in the programme and will inevitably deter industry partners from participating in future bids.

The Academy recommends that security of CRC programme funding should be guaranteed at least six months in advance of application submissions and that the process of submission should be reviewed and streamlined.

⁷ As outlined in Allen Consulting Group (2012) *The Economic, Social and Environmental Impacts of the CRC Program*. Available at: <http://www.business.gov.au/grants-and-assistance/Collaboration/CRC/about-the-program/Documents/2012-crc-program-impact-study.pdf>

⁸ Australian Research Council (2014) *Discovery Early Career Researcher Award: Selection Report for Funding Commencing in 2015*. Available at: <http://www.arc.gov.au/pdf/DECRA15/DE15%20Selection%20Report.pdf>

⁹ Cooperative Research Centre Association (2012) *The CRC Contribution to Research Training: Report of a Scoping Study for the Cooperative Research Centre Association*. Available at: [http://www.cshe.unimelb.edu.au/research/experience/docs/The_CRC_Contribution_to_RT_Final_Report\[1\].pdf](http://www.cshe.unimelb.edu.au/research/experience/docs/The_CRC_Contribution_to_RT_Final_Report[1].pdf)

Performance of CRCs

It is inevitable that the performance of individual CRCs will vary. Some CRCs have been delivered substantial economic, social and environmental benefits to the nation, whilst others have performed less well. Both in science and industry, there is acceptance that some endeavours will succeed, whilst others fail. However it is important to have a mechanism in place at an early stage to assess whether a CRC is on track and likely to deliver the milestones as promised, and crucially, whether it is delivering for end-users as envisioned.

The Academy recommends that appropriate intervention take place at an early stage where CRCs are not performing as expected.

The role of the CRC programme in lifting collaboration between businesses and researchers

The need to improve on Australia's relatively low-levels of collaboration between businesses and with higher education or public research institutions has been a cause of concern for some time.¹⁰ The Government, through its Industry Innovation and Competitiveness Agenda, has made it clear that action in this area is a priority.¹¹ Whilst Australia's performance is not strong, it would be unfair to attribute this entirely to the CRC programme. More likely reasons include the absence of a substantial industrial base in many sectors, and significantly lower levels of government investment in business R&D compared to other nations. The CRC programme is not a large programme and its role has been shrinking, and as a result, we can expect its impact to shrink. In 2003-04 the Australian Government invested \$201.8 million through the programme representing 3.8% of Australian's annual investment in science, research and innovation. The forecast investment for 2014-15 is \$149.7 million, which represents 1.6% of investment in science, research and innovation.¹²

Such low levels of collaboration should not be seen as unwillingness on the part of researchers or researcher organisations to collaborate; rather there are fewer opportunities here to collaborate than overseas, and with a shrinking programme, collaboration is made more difficult. Australia needs, but does not yet have, the science, technology and engineering businesses on the scale that of the United States, United Kingdom, Germany, Israel, Japan, Korea and other leading nations. Sustained investment over time, both in research and its subsequent translation into useful products and services is what will bring about change. Unfortunately, in comparison to other leading countries direct government support for Australian business R&D is still very low.¹³ The programme is one of the very few formal funding mechanisms that are currently in place to assist in improving collaboration in this area, and without its existence Australia's performance would be even lower. The programme demonstrates the potential successes that can be made through a relatively small

¹⁰ See ACOLA (2014) The Role of science, research and technology in lifting Australian productivity. Available at:

<http://www.acola.org.au/PDF/SAF04Reports/SAF04%20Role%20of%20SRT%20in%20lifting%20Aus%20Productivity%20FINAL%20REPORT.pdf>

¹¹ Department of Industry (2014) Industry Innovation and Competitiveness Agenda. Available at:

[http://www.dpmc.gov.au/publications/Industry Innovation and Competitiveness Agenda/docs/industry_innovation_competitiveness_agenda.pdf](http://www.dpmc.gov.au/publications/Industry%20Innovation%20and%20Competitiveness%20Agenda/docs/industry_innovation_competitiveness_agenda.pdf)

¹² Figures taken from the annual Science, Research and Innovation budget tables published by the Department of Industry, available at: <http://www.industry.gov.au/innovation/reportsandstudies/Pages/SRIBudget.aspx>

¹³ ACOLA (2014) The Role of science, research and technology in lifting Australian productivity. Available at: <http://www.acola.org.au/PDF/SAF04Reports/SAF04%20Role%20of%20SRT%20in%20lifting%20Aus%20Productivity%20FINAL%20REPORT.pdf>

investment. However progress in this area will be difficult whilst the size of the programme shrinks and other areas that support research commercialisation have been reduced, for example the ARC Linkage Programme, or closed, such as Commercialisation Australia.

The Academy recommends that the Government builds on the success of the CRC programme and continues to invest in mechanisms that improve collaborations between researchers and business.

Priority areas for CRCs

Unlike in previous years, no specific priority areas were set for the 17th selection round. An indication of priority areas can be helpful in that they provide focus for bids and help industry to understand where they might participate. It could make sense to concentrate efforts in areas of comparative advantage, and where the greatest benefits can be delivered. The Government recently announced through its Industry Innovation Competitiveness Agenda, that it would (subject to interest) develop five non-profit industry growth centres in food and agribusiness; mining equipment, technology and services; oil, gas, and energy resources; medical technologies and pharmaceuticals; and advanced manufacturing. In addition to these potential areas of focus, the Chief Scientist has recommended that innovation priorities be developed, and also that strategic research priorities be developed.¹⁴ If priority areas for the CRC programme are to be employed, then consideration needs to be given to whether the priority areas should be where Australia has research or industry strengths. For the greatest benefits to be derived from the programme, CRCs should build on areas of both research excellence, and areas where the potential to deliver benefits is greatest.

Whilst priority areas can be useful, some degree of flexibility is required to take advantage of emerging opportunities or where issues in the national interest arise and need addressing. Furthermore, priorities do need to be reviewed from time to time to ensure they remain current. If priority areas are employed within the programme, then applications should be allowed to straddle more than one sector area. Bids should not be forced to address a single priority area if this is not appropriate, and if priority areas are used, they should be sufficiently flexible to recognise emerging areas of importance.

The Academy recommends that if priority areas are employed in the CRC programme that bids should relate to research priority and/or industry priority areas.

The Academy recommends flexibility is employed within the process so that bidders can put forward applications covering multiple priority areas, and that applications covering newly emerging areas also be permitted.

¹⁴ Office of the Chief Scientist (2014) Science, Technology, Engineering and Mathematics: Australia's Future. Available at: http://www.chiefscientist.gov.au/wp-content/uploads/STEM_AustraliasFuture_Sept2014_Web.pdf