



Australasian Centre for Rail Innovation

SUBMISSION TO THE

JOINT SELECT COMMITTEE ON TRADE AND INVESTMENT GROWTH

INQUIRY INTO

Australia's Future in Research and Innovation

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Executive Summary

Australia's research and innovation spending has been at record lows in recent years, ranking a lowly 28th out of 30 OECD countries. There is much work to do for Australia to achieve parity with nations whose investment in innovation in recent years has far out-stripped our own.

The new organisation, the Australasian Centre for Rail innovation (ACRI), established following the completion of the CRC for Rail Innovation in July 2014, is already working to ensure that the rail and broader transport sectors can gain access to international innovation through strategic use of cooperative agreements.

It is important that these initial steps are built upon and appropriately resourced to maximise the potential for access to new innovation that can in turn underpin economic growth.

The options presented in this report include:

A. A new International Collaboration Hub through ACRI

Now proven and trusted within the sector, ACRI is ideally placed to formalise the initial steps already taken towards international cooperation, through the establishment of an International Collaboration Hub. This Hub could operate on the same basis that ACRI's initial collaborations with the UK RSSB have taken, in that a free exchange of innovation be sought with those nations who have aligned interests and innovation priorities. While initially focused on Transport, this operating model could then be expanded to other sectors where collaborative exchange would benefit Australia, all administered by a small central team within ACRI's existing governance structure. The potential benefits from such a formalisation would be numerous, but the fundamental driver would be to ensure Australia maintains or catches up with other OECD nations in research and development, thus accelerating the rate of domestic innovation.

B. Infrastructure Project-Specific Research Programs

An identified issue with infrastructure investment is that frequently, due to the scale and length of major infrastructure programs, potentially desirable innovations are identified too late in the construction project to be developed and incorporated prior to completion of construction. This means that a 10 year infrastructure project might be unable to capitalise on the latest developments due to its inability to commission research to coincide with construction timeframes. Through its established delivery model, ACRI is already well setup to deliver the innovation that may be required for major infrastructure projects, with specialist geotechnical, structural, human factors and civil already engaged and contracted. What is proposed here is the creation of specific research and innovation groups through ACRI to partner major infrastructure projects. This would enable the project engineers to identify problems or inefficiencies during planning and delivery that need to be addressed and incorporated prior to project completion. A specific research and innovation group created alongside each major infrastructure project would enable a responsive approach to ensuring the latest innovation can be incorporated into new infrastructure.

C. An Expanded Domestic Research Program

Having proven already that ACRI has the ability to deliver research outcomes in a tightly controlled, efficient manner for both industry and the states, the expansion of the work programs to deliver research directly for the federal government would enable an immediate and rapid increase in transport innovation within Australia. Entire new programs could be quickly established to target key government transport priorities as well as those of industry and the states, captured through the existing governance model that is currently operating within ACRI.

With each of the options outlined, resource constraints are the only thing preventing Australia from amplifying the benefit of an independent transport research entity such as ACRI, that is already established and working to bring new technology and innovation to Australia.

Recommendations

The Australasian Centre for Rail Innovation (ACRI) recommends:

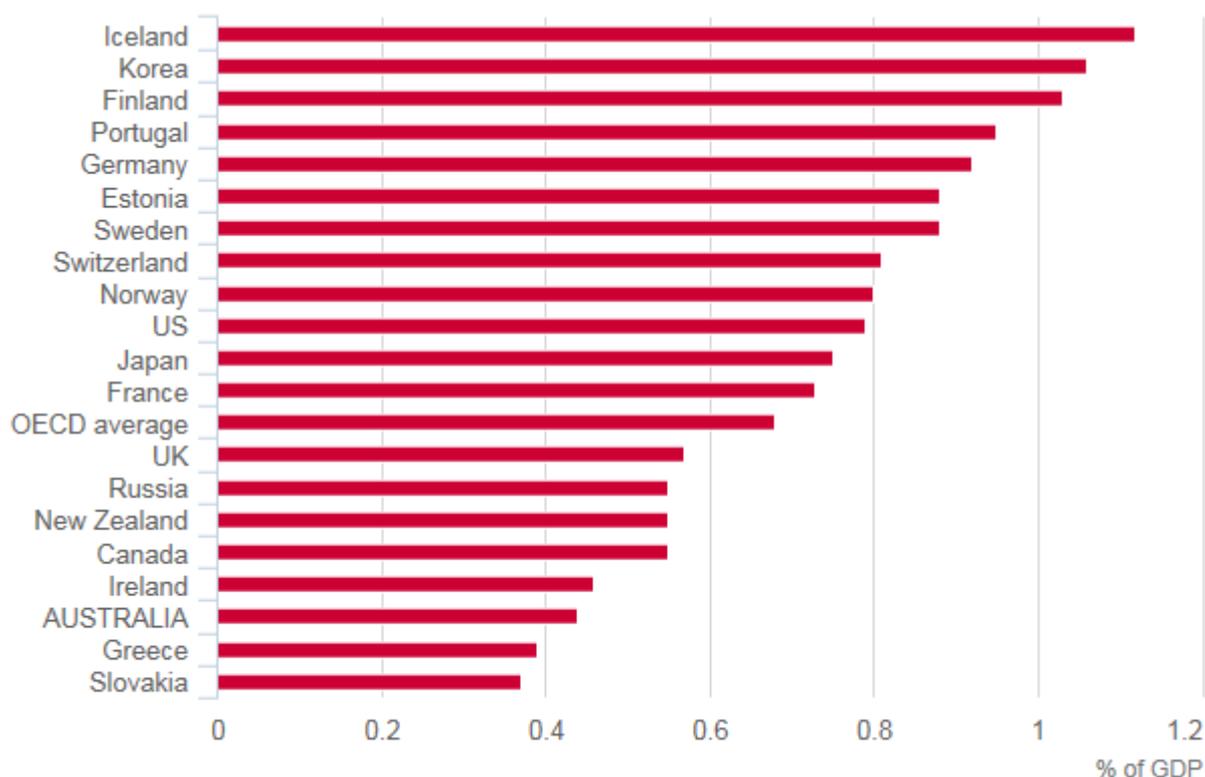
- 1.** that the Joint Select Committee on Trade and Investment Growth inquiry into Australia's Future in Research and Innovation, consider recommending resources are directed to one or all of the options (A-C) presented above, to build upon the activity already underway at ACRI to improve Australia's research and innovation capability;
- 2.** that members of the Joint Select Committee on Trade and Investment Growth consider granting ACRI an audience to further present our organisation and provide the opportunity for Committee members to raise questions or discuss issues they may have in relation to ACRI's operating model and how this can benefit innovation in Australia;
- 3.** that the Joint Select Committee on Trade and Investment Growth, as an agent of government, acknowledges the work ACRI has undertaken, without federal government funding, to date towards international collaboration and the betterment of Australian research capability. Where opportunity presents itself, promotion of ACRI's capability will serve to bolster external investment in innovation and ACRI believes the public endorsement of federal government would go a long way towards supporting this goal.

1 Introduction

The importance of research and innovation to the Australian economy cannot be underestimated.

Australia's research and innovation spending has been at record lows in recent years. In 2013 for example, at 0.441 per cent of GDP, Australia was ahead of only Greece at 0.391 and the Slovak Republic at 0.369. That year Japan's ratio was 0.754 per cent, the US 0.795, and Germany 0.917 per cent of GDP.¹ The most recent OECD figures, also from 2013, show Australia ranked 18th out of 20 countries (fig. 1).

Fig. 1 Australia ranks poorly among OECD countries for R&D expenditure as a share of GDP.²



R&D investment has grown at less than half the rate of total budget expenditure over the past two decades (fig. 2)

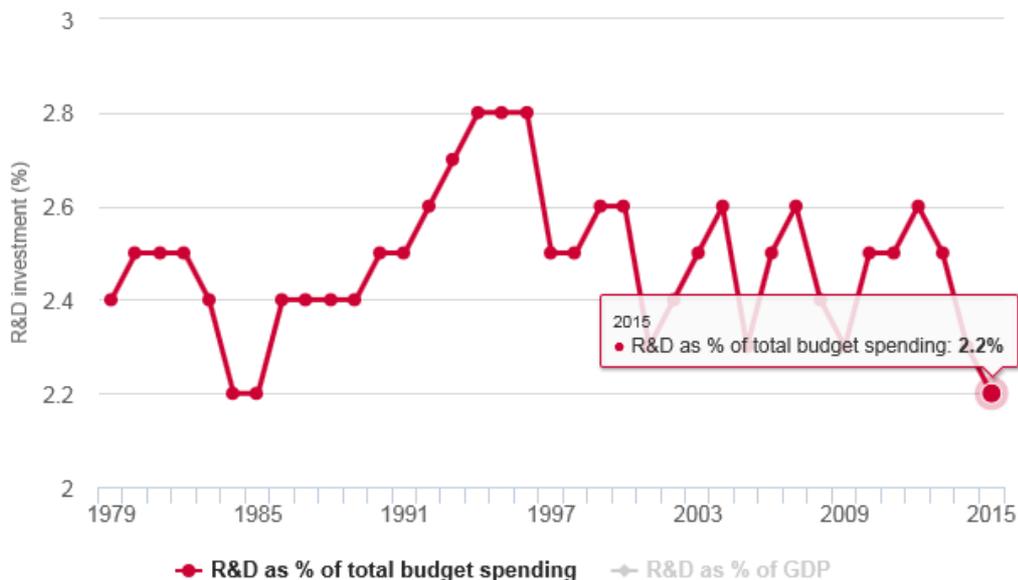
Fig. 2 R&D as a percentage of total budget spending.²

¹ ABC 7 Oct 2014

² SMH September 29, 2014

Funding innovation

Government investment in research and development has sunk to a 30-year low.



There is much work to do for Australia to achieve parity with nations whose investment in innovation in recent years has far out-stripped our own.

The inquiry of the Joint Select Committee on Trade and Investment Growth into Australia's Future in Research and Innovation, is an important step in ensuring that Australia does everything it can to keep abreast of new innovation that lead to increased productivity, a stronger economy and improved use of infrastructure.

The new organisation, the Australasian Centre for Rail innovation (ACRI), established following the completion of the CRC for Rail Innovation in July 2014, is already working to ensure that the rail and broader transport sectors, which are pivotal to a strong and productive economy, can gain access to international innovation through intelligent use of cooperative agreements. These agreements, initially established in spirit, have recently been yielding practical dividends through the acquisition and distribution of Intellectual Property, innovation, and research outcomes to the Australian transport sector.

It is important that these initial steps are built upon and appropriately resourced to maximise the potential for access to new innovation that can in turn support economic growth.

This document explains the role of ACRI to date, and presents options to further the work already undertaken to strengthen innovation in Australia.

2 The Australasian Centre for Rail Innovation

The Australasian Centre for Rail Innovation (ACRI) was established to take the research, economic and strategic analysis task forward for the Australasian Rail Industry. ACRI is a not-for-profit organisation launched in November 2013 and commenced full operations on 1 July 2014. The role of ACRI is to provide professional, independent applied research, strategic analysis, advice and innovative solutions for the Australasian rail industry and transport sector more broadly, and to act as a hub through which collaboration and the exchange of ideas can be facilitated. ACRI receives no direct funding from the federal government.

ACRI has already delivered numerous projects as part of several work programs to the rail industry in Australia and New Zealand. These include programs to benefit Heavy Haul, Track Operators, Freight Rail and Passenger Rail, and to meet the policy objectives of Jurisdictional Government Transport Departments.

In addition to this important domestic quest for innovation, **ACRI has also established a variety of international partnerships, with a goal of bringing additional innovation to Australia** through collaboration and the free exchange of ideas. It is this function that is directly relevant to the inquiry into Australia's Future in Research and Innovation.

3 ACRI: An Independent Entity

ACRI has a Board of Directors chaired by a person who is **independent of industry, government and research providers**; former deputy Prime Minister, the Hon John Anderson AO. ACRI's independence is further supported by a Board with membership from both industry and Government. Independence is critical in achieving acceptance of research outcomes.

The ACRI Board comprises of the following membership:

Chairman:

- **The Hon John Anderson AO**, former member of the Federal Parliament with responsibility for the portfolio of Transport and Regional Services and Deputy Prime Minister.

Members:

- Vicki Brown, Executive Director/CEO, ACRI;
- Ken Matthews, Independent Director with Research Experience;
- Neil Scales, Director-General, Queensland Department of Transport and Main Roads;
- Matthew Dowd, General Manager Railroad Operations, BHP Billiton;
- Sid Hay, Manager, Future and Innovation, Rio Tinto;
- Greg Pauline, Managing Director, Genesee & Wyoming;
- Sue McCarrey, Chief Executive Officer, National Rail Safety Regulator;
- Bela Felsner, Infrastructure Manager, Rail, Fortescue Metals Group Ltd;

- Garry Liddle, Chief Executive Officer, Public Transport Victoria;
- Murray Cook, General Manager Strategy and Development, Brookfield Rail;
- Tim Ryan, Executive General Manager Enterprise Services, ARTC;
- Jim Modrouvanos, Director, Asset Standards Authority, Transport for NSW.

The full list of ACRI Participants is included at Attachment A.

4 The Operating Model of ACRI

ACRI operates by a series of agreements with partners from across the domestic sector, called 'Participants'. Participants can join ACRI as part of agreed work programs, individually for commissioned work, or both. The Agreed Work Programs that form the central part of the ACRI model allow organisations to pool their resources thereby improving outcomes for the entire sector rather than on an individual basis. This approach not only achieves a funding multiplier effect through pooling of resources, but also economic benefits from harmonised or standardised outcomes across Australasia.

By operating a model by which industry engages with research institutions to direct research priorities, ACRI ensures that its research, strategic and economic analysis is of direct relevance to each Participant. Research outcomes or solutions are shared amongst Participants, so that outcomes from one work program can also benefit Participants in other work programs. As indicated, Participants can task ACRI to undertake projects outside of the Agreed Work Programs.

To deliver its research, strategic and economic analysis, ACRI has established agreements with Australia's leading universities. These partnerships assist in maintaining an Australian rail and broader transport research capability, which has long term economic benefits for Australia.

An important part of ACRI's mandate, is to act as a conduit for the transmission of existing Australasian and international research outcomes or solutions to the Australasian Rail Industry.

5 Research Competitiveness on the International Stage

5.1 Domestic research capability and competitiveness

ACRI has established a number of Strategic Research Participant Agreements with key research institutions within Australia. It is the aim of ACRI to ensure that Australia maintains a strong research capability to support the sector. By becoming a Strategic Research Participant of ACRI, research institutions receive targeted research funding to deliver innovation projects on behalf of other ACRI Participants. This direct relationship and funding model is essential in supporting research institutions in attracting and retaining key skills relevant to innovation in the transport sector.

This will benefit not only the Participant institution. **The attraction of research funding facilitated by ACRI will contribute directly to Australia's ability to attract, fund, train and retain a healthy research and innovation workforce.** This is already improving Australia's standing in the international research community and helping contribute to Australia being a desirable destination for researchers, improving the skilled workforce and leading to further investment in Australian research.

In addition, ACRI is directing funding to research institutions specifically to engage postdoctoral researchers specialising in the transport sector. By committing a significant amount of investment over a number of years, ACRI will directly support and influence the ability of Australian research institutions to attract, retain and expand their expertise in transport innovation, providing a boost to Australia's ability to maintain a healthy and active research capability. Specific engagements of this type ensure that the full range of projects planned for delivery by ACRI, or already underway, will have guaranteed access to the most qualified personnel, enabling delivery of research outcomes to a consistently high standard.

5.2 International collaborations and access to innovation

To complement the strong links ACRI has founded domestically, ACRI is also actively working to develop numerous partnerships internationally. This is being undertaken with the aim of not only delivering joint projects, but to ensure that developments overseas can be adapted to the Australian transport sector and implemented, without needing to 'reinvent the wheel'.

This arrangement has already been highly successful. A Memorandum of Understanding has been established with the UK Rail Research and Standards Board (RSSB) **that has led to the free exchange of IP-protected research outcomes and innovation.**

In exchange for access to the IP developed under ACRI's industry and state funded Level Crossing Agreed Work Program, the UK RSSB have provided ACRI with access to their own Level Crossing program research outcomes. Given the disparity in investment in innovation between Australia and the UK, this has proved to be a highly beneficial arrangement to ACRI's Australian industry and state participants, who have received these research outcomes at no cost.

A Memorandum of Cooperation has also been established with the Federal Railroad Administration, part of the US Department of Transport. Work is ongoing to identify areas where collaboration or IP-exchange may be viable ahead of putting this MoC into practice.

These initial two agreements, with the UK RSSB and the US FRA, are examples of how **ACRI is able to gain access to research and innovation from the international community for the betterment of Australian industry and government.**

In addition to the direct exchange of innovation outcomes, ACRI is also representing Australia at the International Union of Railways (UIC). This international body helps to raise the profile of Australian research and the work being undertaken by ACRI to improve safety, drive productivity and deliver innovation.

By doing so, **the reputation of Australia as a modern and forward thinking innovator can be reinforced around the world**, which in turn will contribute towards increasing Australia's research competitiveness on the international stage.

Full details of ACRI's international partnerships are summarised below:

- Federal Railway Administration (FRA), Department of Transportation USA – Memorandum of Cooperation
- Rail Safety and Standards Board (RSSB) UK – Memorandum of Understanding
- International Union of Railways (UIC) – Member
- International Rail Research Board (IRRB) (Part of the UIC)
- International Association of Public Transport (UITP) – Member

6 Building upon these strong first steps

Despite these positive first steps, more is needed if Australia is to maintain parity with even the lower half of OECD nations' investment in innovation, let alone to catch up to those leading the way. ACRI is restricted in what it is able to do by itself, as the current operating model attracts no federal resources, and all funding received from industry and the states must be directed towards domestic research through the ACRI Agreed Work Programs.

This focus, while beneficial to Australian innovation, leaves very little resource to build upon the strong first steps towards international collaboration that ACRI has taken. With a small team managing a diverse, complex and extremely busy research portfolio, ACRI, while ideally positioned, is insufficiently resourced to develop the initial engagement and collaborations into a more **formalised and professional international hub for innovation exchange**. However, the potential is there, within an organisation that is already well established and has demonstrated the ability to deliver against a challenging remit within a short space of time.

7 Options to expand on this potential

A. A new International Collaboration Hub through ACRI

Now proven and trusted within the sector, ACRI is ideally placed to formalise the initial steps already taken towards international cooperation, through the establishment of an International Collaboration Hub. This Hub could operate on the same basis that ACRI's initial collaborations with the UK RSSB have taken, in that a free exchange of innovation be sought with those nations who have aligned interests and innovation priorities. While initially focused on Transport, this operating model could then be expanded to other sectors where collaborative exchange would benefit Australia, all administered by a small central team within ACRI's existing governance structure. The potential benefits from such a formalisation would be numerous, but the fundamental driver would be to ensure Australia maintains or catches up with other OECD nations in research and development, thus accelerating the rate of domestic innovation.

B. Infrastructure Project-Specific Research Programs

An identified issue with infrastructure investment, is that frequently, due to the scale and length of major infrastructure programs, potentially desirable innovations are identified too late in the construction project to be developed and incorporated prior to completion. This means that a 10 year infrastructure project, might be unable to capitalise on the latest developments due to its inability to commission R&D to coincide with construction timeframes. Through its established delivery model, ACRI is already well setup to deliver the innovation that may be required for major infrastructure projects, with specialist geotechnical, structural, human factors and civil already engaged and contracted. What is proposed here is the creation of specific research and innovation working groups through ACRI to partner major Australian infrastructure projects. This would enable the project engineers to identify problems or inefficiencies during planning and delivery that need to be urgently addressed and incorporated prior to project completion. A specific research and innovation group created alongside each major infrastructure project, administered impartially by ACRI, would enable a responsive approach to ensuring the latest innovation can be incorporated into new infrastructure.

C. An Expanded Domestic Research Program

Having proven already that ACRI has the ability to deliver research outcomes in a tightly controlled, efficient manner for both industry and the states, the expansion of the work programs to deliver research directly for the federal government would enable an immediate and rapid increase in transport innovation within Australia. New programs could be quickly established to target key government transport priorities as well as those of industry and the states, captured through the existing governance model that is currently operating within ACRI. The benefits of this would be numerous, not least the ability to directly deliver against a federal agenda.

With each of the options outlined, resource constraints are the only thing preventing Australia from amplifying the benefit of an independent transport research entity such as ACRI, that is already established and working to bring new technology and innovation to Australia.

8 Recommendations

The Australasian Centre for Rail Innovation (ACRI) recommends:

1. that the Joint Select Committee on Trade and Investment Growth inquiry into Australia's Future in Research and Innovation, consider recommending resources are directed to one or all of the options (A-C) presented above, to build upon the activity already underway at ACRI to improve Australia's research and innovation capability;
2. that members of the Joint Select Committee on Trade and Investment Growth consider granting ACRI an audience to further present our organisation and provide the opportunity for Committee members to raise questions or discuss issues they may have in relation to ACRI's operating model and how this can benefit innovation in Australia;
3. that the Joint Select Committee on Trade and Investment Growth, as an agent of government, acknowledges the work ACRI has undertaken, without funding, to date towards international collaboration and the betterment of Australian research capability. Where opportunity presents itself, promotion of ACRI's capability will serve to bolster external investment in innovation and ACRI believes the public endorsement of federal government would go a long way towards supporting this goal.

To respond to this submission or discuss further requirements for the delivery of innovation to Australia, please contact the CEO of ACRI, Vicki Brown by email at vicki.brown@infrastructure.gov.au, or by telephone on 02 6274 7405.

APPENDIX A – ACRI Participants

The following organisations are current **Participants** of ACRI:



The following organisations are current **Strategic Participants** of ACRI:

