

Inquiry into Australia's Future in Research and Innovation

Prepared for

The Select Committee on Trade and Investment Growth



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Introduction

The Australian Road Research Board (ARRB Group Ltd) has a 55 year history as the national road transport research organisation of Australia. Its member agencies include federal, state and local government bodies responsible for managing the nation's transport and road networks.

Research at ARRB covers the whole range of road transport related topics including asset management, road construction and maintenance, road safety, network and traffic management, transport economics and transport policy.

ARRB Group is pleased to present this submission to the Inquiry into Australia's Future in Research and Innovation. Our submission concerns the need for innovation into the provision and management of road transport infrastructure and the potential social and economic benefits available from improved transport outcomes.

The transport task is complex, incorporating many modes and users. Improving transport involves all modes and understanding the interactions between them. Our expertise and responsibilities lie primarily in land transport, particularly road based transport, and that will be the focus of our submission.

Road Transport in Australia

Transport is vital to the economic and social well-being of Australia impacting every aspect of life. Because of its central role transport has been identified as a research priority for Australia by the Chief Scientist and the National Science Council.

The economic impact of road transport is estimated at nearly 4% of GDP and the value of the road network is estimated at over \$200b. The Australian road network consists of over 900,000 kilometres of road with less than 40% sealed. It carries over 200 billion tonne kilometres of freight (40% of all tonne km) and moves nearly 1300 million tonnes (55% of total freight) per year. Roads also dominate passenger travel with 300 billion passenger kilometres travelled per year.

Australia has one of the highest ratios of road length to population and road freight kilometres to GDP in the developed world. It has the highest ratio of freight tonne-kilometres carried by road to GDP in the OECD. These ratios mean that there is a real imperative in Australia to build, maintain and operate infrastructure as cost-effectively as possible, whilst still ensuring safety and sustainability.

Both the direct and indirect costs associated with road transport are considerable. Recent estimates suggest all levels of governments invest nearly \$20b per year. in the maintenance and construction of road infrastructure, while the cost of congestion has been estimated at over \$15b per year and the total human and social cost of road crashes is approaching \$30b per year.

Research and Innovation in Road Transport

Road transport research involves a range of research disciplines. There is no transport problem that can be solved by just one discipline. Transport needs economists, civil engineers, mechanical engineers, psychologists, geologists, planners, mathematicians, sociologists, environmentalists, designers, medical specialists, materials scientists, epidemiologists, statisticians and many others.

Combining these skills means that a wider range of solutions can be explored, but also reduces the chances of support from traditional research sources, which are heavily focussed on directing funding to established disciplines.

Infrastructure is overwhelmingly publicly owned and operated. This means that the benefits of innovation in road transport will be widely distributed. Improvements in the management of the network and cost reductions in construction and maintenance will result in cost-savings to the network owners (all levels of government) but will result in much greater benefits to the wider transport industry and all those using the network to move people and goods.

Research in road transport has been shown to produce high benefit-cost ratios. Evaluations of road research programs and projects from around the world have found BCRs as high as 3000 for some research projects and demonstrated positive BCRs for all the programs evaluated.

Australia has a history of successful transport research, with major successes in developing low cost pavements, reducing the road toll and managing the urban network. For example, Australian work on traffic signal design is considered world leading and was independently assessed to have produced a BCR over 15 and savings of about \$20m per year.

Australian researchers work in a global research community and have close ties with many countries. However while application of any international research needs to take into account the properties of the Australian road network and vehicle fleet, ARRB is not funded to actively participate/ collaborate in the major relevant EU and USA research projects

The Australian network is huge, including many vital links carrying relatively low volume and 90% of our sealed roads consist of a sprayed bitumen seal over an unbound crushed rock base, a low cost design used in very few countries. Roads in Australia also need to allow for extremes of climate and increasing frequency of major natural disaster events, increasing traffic and heavier trucks. Meanwhile even the chemistry of bitumen is changing with oil production and refining changes putting low costs for existing repairs and maintenance at risk.

The Australian vehicle fleet is also different to that in many developed countries. Freight movements require large and complex trucks and for light vehicles we have a highly diverse new vehicle market, with more models available in Australia than in the USA or China.

The particular needs of Australia make it vital for us to have a strong domestic research capability. This is needed to both carry out our own targeted research and to be in position to identify the opportunities from international work and adapt it for our needs. Australia also has a role as a research leader in our region, especially in the management and operation of road networks.

Funding of Australian Road Research

It is not possible to accurately establish the total investment in road transport research in Australia due to its fragmented nature and different definitions of research used by

different organisations. However, it is possible to identify the major funders and estimate their contributions.

The majority of public investment for research into road infrastructure is made by Austroads and its individual member agencies. Austroads is the association of Australasian road transport and traffic agencies. It has been estimated that Austroads and its members invest about \$10m per year in road infrastructure research and about half that amount in road safety research.

The two major national research funding agencies, the ARC and the NHMRC, invest about \$200,000 per year into road infrastructure and considerably more into road safety research. Other organisations including compulsory third part insurance providers, agencies concerned with occupational health and safety, motoring clubs and industry associations provide funding for road safety research bringing the annual budget to about \$20m.

Opportunities and challenges

There are many opportunities and challenges facing the managers and users of the road network. Some of these opportunities have the potential to fundamentally change road transport and there are ongoing challenges in providing a safe, sustainable efficient road transport system.

- The biggest changes over the next decades will almost certainly come from the opportunities provided by new technologies such as driverless vehicles and intelligent roads. Innovation is required to ensure Australia is able to provide the infrastructure, legal framework and social acceptance necessary to take full advantage of these major opportunities.
- The road freight task is increasing and leading to the use of bigger vehicles and heavier loads on potentially inadequate infrastructure. Innovation is required to provide a transport network (including all modes), which supports the high productivity vehicles required for Australia's economic well-being.
- The community is demanding a new approach to transport with emphasis on active travel and public transport. Research and innovation are needed to safely achieve these aims and balance conflicting community demands.
- Congestion is growing in the major capital cities with associated costs of delays and frustration to road users. Research is required to assess and develop a range of solutions including changing travel demands, changing travel modes including motorcycles, cycles and public transport, optimising spending on infrastructure and new approaches to transport and land use planning.
- All state, territory and the federal governments have agreed that deaths and serious injuries are not acceptable on our roads and are committed to moving towards Vision Zero. Research is needed on how to achieve this goal in a time of increasing community demands for transport and falling budgets.

Summary

Road transport research is fundamental to the economic and social well-being of Australia. Road transport contributes nearly 4% of GDP and our governments build, own and operate a huge network spanning vast areas with great variation in demand, geography, geology, demographics and climate.

At this time road transport has many opportunities to support growth in national productivity and safety outcomes. It needs innovation and research to ensure Australia is able to realise the benefits available. Successful research will need to include experts from many different disciplines collaborating together to develop a range of solutions, optimised for Australia.

Although Australia can learn from overseas we need a strong domestic capability to understand the unique characteristics of the Australian road transport system. We need the capability to adapt solutions from overseas and to develop our own solutions which we can in turn export to a wide variety of countries. In some areas we can be world leaders and in others, leaders for our region.