

Leveraging R&D

for the Australian
Built Environment



Sustainable
Built Environment
National Research Centre



The Sustainable Built Environment National Research Centre (SBEnrc)

is the successor to Australia's CRC for *Construction Innovation*. Established on 1 January 2010, the SBEnrc is a key research broker between industry, government and research organisations for the built environment industry.

The SBEnrc is continuing to build an enduring value-adding national research and development centre in sustainable infrastructure and building with significant support from public and private partners around Australia and internationally.

Benefits from SBEnrc activities are realised through national, industry and firm-level competitive advantages; market premiums through engagement in the collaborative research and development process; and early adoption of Centre outputs. The Centre integrates research across the environmental, social and economic sustainability areas in programs respectively titled Greening the Built Environment; Developing Innovation and Safety Cultures; and Driving Productivity through Procurement.

Among the SBEnrc's objectives is to collaborate across organisational, state and national boundaries to develop a strong and enduring network of built environment research stakeholders and to build value-adding collaborative industry research teams.

About this project

Leveraging R&D for the Australian Built Environment

Essential to SBEnc achieving its goals is this core project *Leveraging R&D for the Australian Built Environment*. The overarching goal of this project is to maximise the benefits of R&D to Australia's infrastructure and building industry through better matching funding strategies to industry needs.

The research aims to build new understandings and knowledge relevant to R&D funding strategies, research team formation and management, dissemination of outcomes and industry uptake.

The four phases and related outcomes of this project are:

Project phase	Outcomes
1. Audit and analysis of R&D investment in the Australian built environment since 1990 – access publicly available data relating to R&D investments across Australia from public and private organisations to understand past trends.	<ul style="list-style-type: none">i. An audit and analysis of R&D investment in this sector through interrogating Australian Bureau of Statistics, Australian Tax Office and Australian and state-based data.ii. A strategic assessment of the above inputs to inform the following project phases.
2. Examine mechanisms of research and innovation and impact on public and private organisations – investigate specific R&D investments to determine the process of realising research support, direction-setting, project engagement, pathways to adoption and impact.	Case studies of specific themes of investment will highlight lessons learned, success criteria and critical challenges. Case studies will be on: <ul style="list-style-type: none">i. construction safetyii. green buildingsiii. CADD, BIM and integrated project delivery.
3. Develop a strategic roadmap for the future of this critical Australian industry – assess the likely future landscapes that R&D investment will both respond to and anticipate.	<ul style="list-style-type: none">i. A comprehensive industry foresighting report for Australia's built environment, updating the CRC for <i>Construction Innovation's</i> landmark Construction 2020 report published in 2004.ii. An industry R&D roadmap, responding to likely future scenarios and recommending research priorities.
4. Develop policy to maximise the value of R&D investments to public and private organisations – through translating project learnings into policy guidelines.	A set of strategies to encourage public and private sector organisations to more profitably engage in research to secure business and policy impact.

Phase 1

Audit and analysis of R&D investment in the Australian built environment since 1990

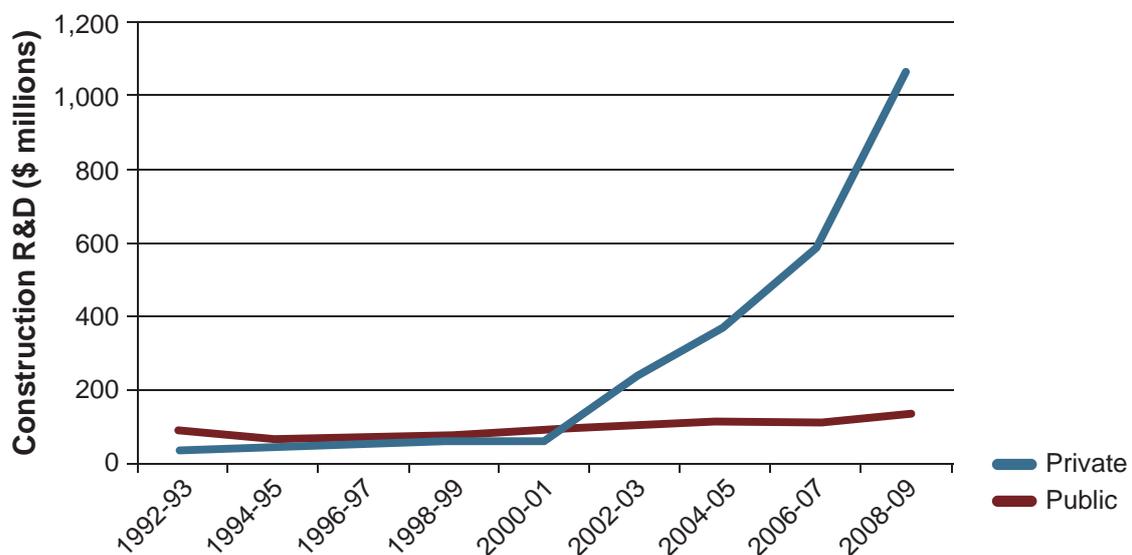
The Barlow Report (2011): R&D Investment Study: 1992-2008, commissioned for this project, identified and reviewed data from Australian government sources, the private sector and the Organisation for Economic Co-operation and Development (OECD) to provide a snapshot of current R&D investment trends in construction¹.

As Figure 1 highlights, there was a substantial increase in private sector investment between 1992-2008, while public sector investment over this same period decreased as a percent of total spending. In the early 1990s, Australian public institutions were spending 3 times more

on construction related R&D than Australian businesses did. Yet by 2008, Australian businesses were spending 8 times as much on construction-related R&D as public research institutions. Figure 1 below illustrates this dramatic reversal.

Additionally, a greater percentage of 'construction' research is being undertaken within the construction sector when compared to total business R&D (Figure 2).

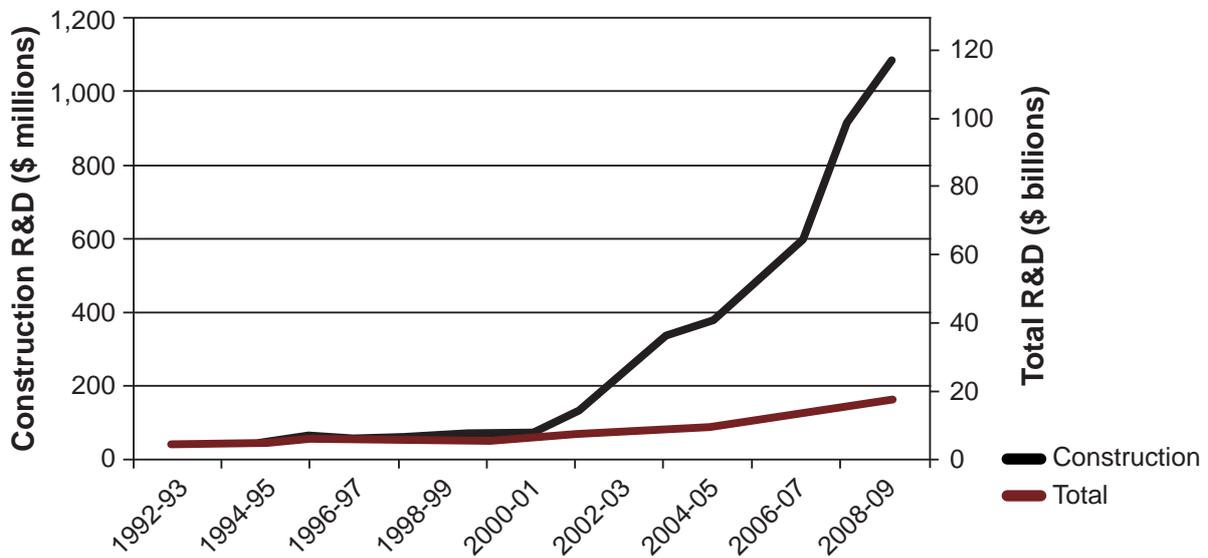
Figure 1 - Private versus public R&D on 'construction'



Note: (i) Derived from ABS 8112 and Barlow 2011. (ii) Shows R&D expenditures by sector focused on the socio-economic objective 'construction' (iii) 'Public R&D' counts R&D from the university sector and from state and federal government agencies.

¹ As defined by the Australian Bureau of Statistics, the construction sector includes building construction, civil and housing engineering construction and construction services.

Figure 2 - Growth in 'construction' R&D relative to total business R&D

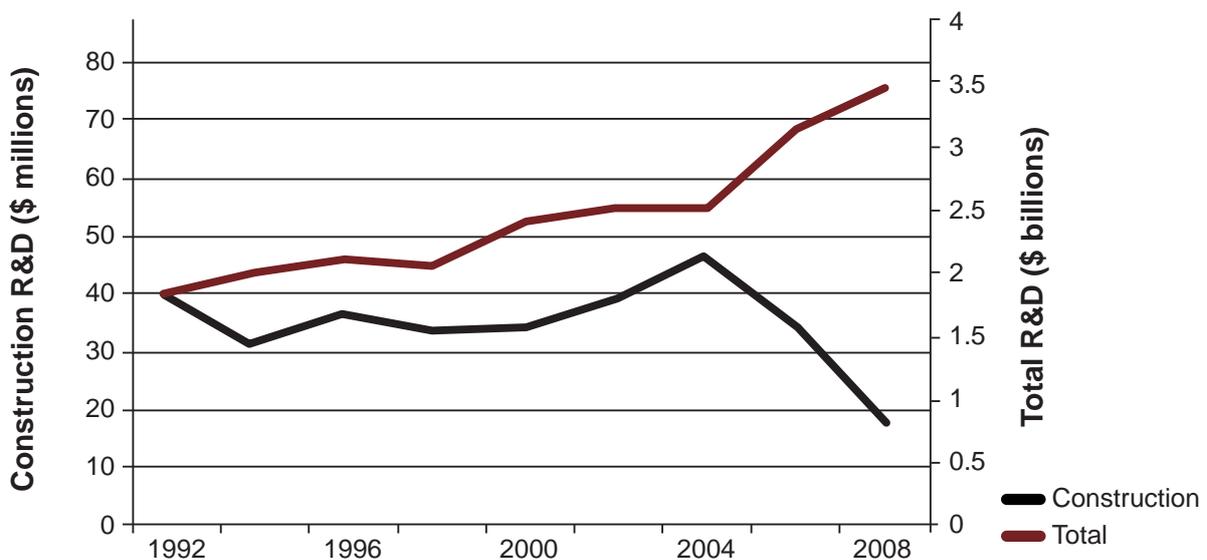


Note: (i) Derived from ABS 8109. (ii) Compares business R&D expenditures focused on the socio-economic objective 'construction' (left axis) with total business R&D expenditures (right axis). (iii) The right axis has been adjusted so that the growth-rates of both curves from 1992 are comparable

Disturbingly, it is also the case that the Australian government has reduced its emphasis on construction R&D as a proportion of its total spending. Between 1992 and 2008, government

agency spending on construction R&D fell from 2.2% to 0.5% of total government sector R&D expenditure. This decline is evident in Figure 3.

Figure 3 - Government agency R&D focused on 'construction'



Note: Derived from ABS 8109 and Barlow 2011. (ii) Compares government intramural R&D expenditures focused on the socio-economic objective 'construction' (left axis) with total government intramural R&D expenditures across all objectives (right axis). (iii) The right axis has been adjusted so that the growth-rates of both curves from 1992 are comparable.

R&D activity servicing the Australian construction industry has grown in comparison with selected other OECD nations. Over the past decade, Australian businesses have dramatically increased their share of global construction R&D. Figure 4 shows comparisons including US and Japan, with Figure 5 excluding these two

leaders, emphasising Australia's performance in comparison with other similar-sized OECD countries.

Interestingly, Australia now outperforms other OECD nations when it comes to construction R&D, especially given the increased investment from the private sector (see Figures 4 and 5).

Figure 4 - R&D in construction industry as a share of 16 OECD nations

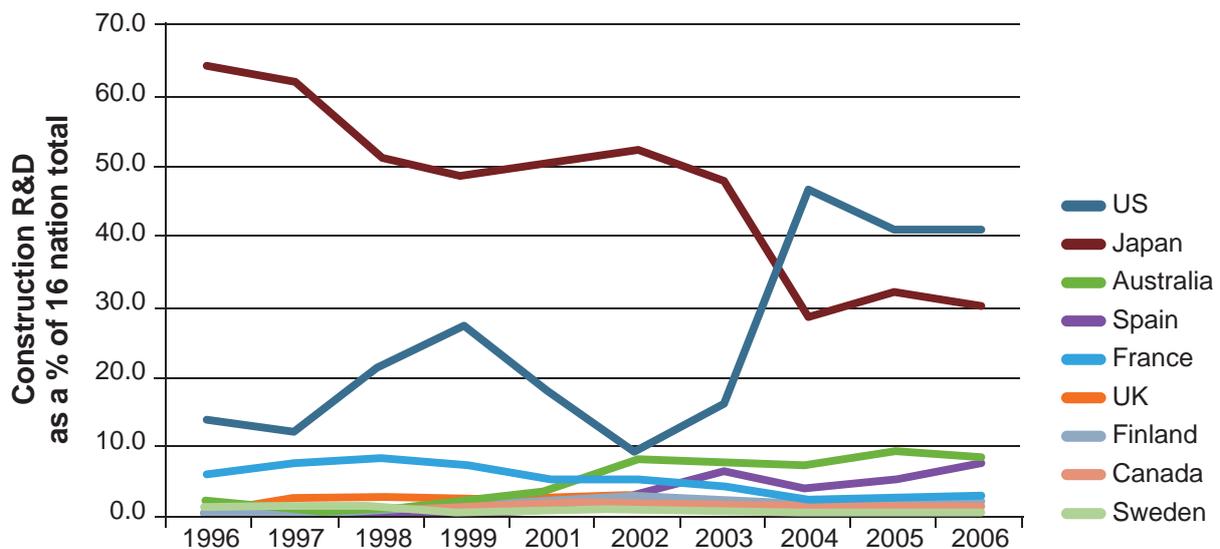
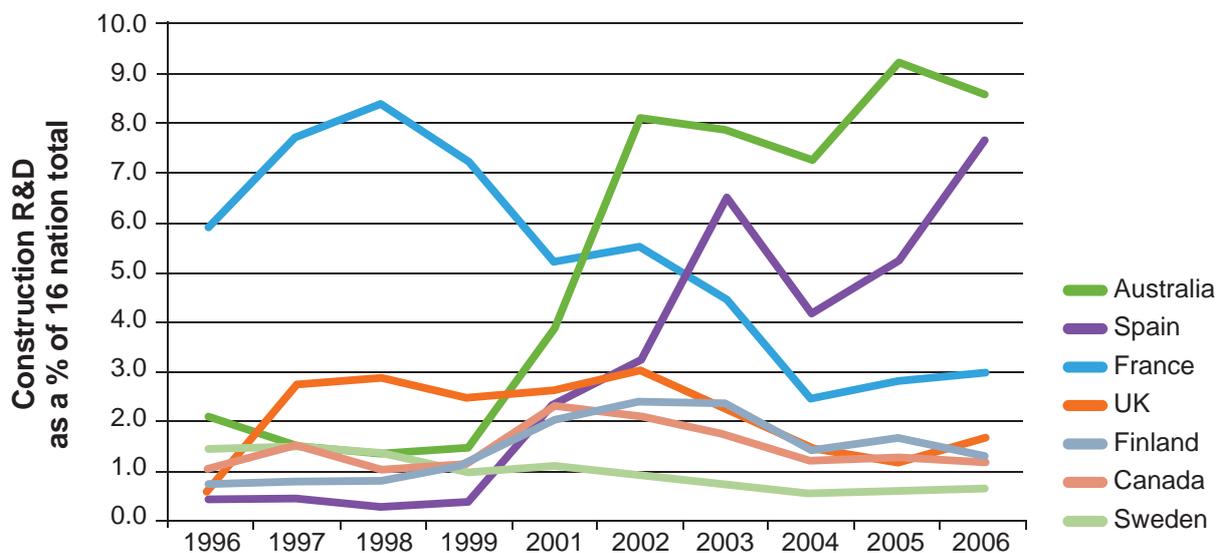


Figure 5 - R&D in construction industry as a share of 16 OECD nations (excluding USA and Japan)



Note: (i) Derived from OECD STAN. (ii) R&D expenditures in the construction industries are shown as a % of that of 16 OECD nations combined: Australia, Belgium, Canada, Denmark, Finland, France, Germany, Italy, Japan, Netherlands, Norway, Spain, Sweden, Turkey, UK, and the US.

Phase 2 & beyond

A series of case studies will be developed during Phase 2.

Researchers will look at specific investments in R&D – construction safety, green buildings, and CADD, BIM and integrated project delivery – with the aim of determining the impact of R&D to industry practice. Mechanisms of engagement and diffusion will be examined in this phase.

Researchers are now also considering investigating the role played by the CRC for *Construction Innovation* (2001 – 2009) and R&D tax concession arrangements in the post-2001 growth in construction R&D. Understanding the significant increase in construction R&D in Australian industry from 2001 could provide very useful insights for policy makers interested in stimulating R&D investment in other areas of industry.

Phases 3 and 4 will include a process of national industry consultation to develop an R&D roadmap for the construction industry and a set of strategies to allow the industry to maximise the value of R&D investment to respond to future drivers of change.



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This research wouldn't be possible without the ongoing support of our industry, government and research partners:



Project endorsed by:

Australian Built Environment Industry Innovation Council (BEIIC)

Project informs international Task Group:

CIB (International Council for Research and Innovation in Building and Construction), TG85: R&D Investment and Impact



**International Council
for Research and Innovation
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