

# B R I T E

## Innovation Survey

### Executive Summary



# 1 Introduction

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***“ The BRITE  
Project - Building,  
Research, Innovation,  
Technology and  
Environment”***

***“ innovation may  
be technological or  
organisational, and  
new to the world,  
or just new to the  
industry or business”***

This report summarises the findings of an innovation survey of the Australian construction industry undertaken by the BRITE Project of the CRC for *Construction Innovation* in 2004. The *BRITE Innovation Survey* can be viewed in full at [www.brite.crccci.info](http://www.brite.crccci.info).

The objective of the BRITE project is to improve the incidence and quality of innovation in the Australian construction industry. Many stakeholders in the industry are sceptical about the potential for innovation and its likely benefits. Many also lack the linkages and capabilities required for successful innovation. The BRITE Project is redressing this situation through demonstration and benchmarking activities.

The term ‘innovation’ is defined as a new or significantly improved technology or advanced business practice. Innovation may be technological or organisational, and it may be new to the world, or just new to the industry or business concerned. The definition includes the adoption of existing advancements developed outside a particular business.

The survey sample was drawn from 3,500 businesses in the road/bridge and commercial building sectors in New South Wales, Victoria and Queensland, covering main contractors, trade contractors, consultants, suppliers and clients. One-third of this population was sampled and a response rate of almost 30% was achieved. The survey collected information about respondents’ perceptions of innovation determinants in the industry, comprising various aspects of business strategy and business environment.

<b>Number of Businesses in Population</b>	<b>3,476</b>
<b>Number of Businesses Surveyed</b>	<b>1,317</b>
<b>Number of Respondents</b>	<b>383</b>
<b>Response Rate</b>	<b>29%</b>

## 2 Innovation Activity

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The ‘new-to-industry’ rate of technological innovation was 18%, which can be compared with an economy-wide rate of 17% for a recent New Zealand study. Overall, 25 respondents (6%) reported ‘new-to-the-world’ technological innovation, 17 of whom were consultants.

Research and Development (R&D) is a key indicator of technological innovation. One-quarter of the industry *invests* in R&D, while R&D *performance* in the industry is very much lower. Only around 200 businesses do R&D, which is less than 1% of the industry. The industry relies on R&D done by organisations lying beyond its formal boundaries: principally CSIRO and Australian universities, increasingly through the CRC for *Construction Innovation*.

Although one-quarter of businesses fund R&D, the industry has a very low successful claim rate (15%) against the Commonwealth Government’s R&D tax concession, and the majority of businesses are uncertain about their eligibility. These findings may reflect lack of knowledge, high compliance costs and/or concerns about R&D activity meeting the strict program guidelines.

Most industry analysts focus almost exclusively on R&D and technological innovation. Nevertheless, organisational (business practice) innovation was shown to be of equal value to businesses, and linked to success in technological innovation.

The industry’s organisational innovation was measured by the adoption of a range of advanced practices. Only 30% of 20 advanced practices listed in the survey are currently used by more than 50% of the industry. Indeed, a comparison with a recent Queensland study of the road sector shows lower adoption rates for the BRITE study. On a more positive note, comparison with a recent Canadian study of the engineering sector shows substantially higher adoption rates for the Australian industry. These comparisons were limited to selected practices for contractor activity only. The results seem to suggest that commercial building contractors and/or contractors in New South Wales and Victoria have room for improvement in the important area of organisational innovation.

**“ 25 respondents (6%) reported ‘new-to-the-world’ technological innovation”**

**“ 25% of businesses fund R&D, but the claim rate against the R&D tax concession is much lower”**

**“ organisational innovation is just as important as technological innovation”**

# 3 Innovation Determinants

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## Business Strategies

Business strategies are a key determinant of innovation outcomes. The results show a significant positive relationship between the number of business strategies employed by businesses and the number of advanced practices adopted (organisational innovation). The results also show a positive relationship between the use of formal evaluation programs to monitor innovation value and success in both technological and organisational innovation, however only 15% of the industry relies on such programs. Another area of concern is the relatively low adoption of R&D strategies. Constrained industry profitability is likely to play a part in this.

The importance of transferring project learnings into continuous business processes is also ranked relatively low. This prioritisation needs to be turned around, given the high cost of knowledge losses between projects.

A final problem is the relatively low proportion of businesses with formal systems to encourage staff to share ideas, given the reported importance of such systems in the literature.

On the up side, the industry appropriately ranks knowledge and human resource strategies above marketing strategies, as the former are likely to play a greater role in sustaining long-term competitive advantage.

## Innovation Drivers and Obstacles

The desire for efficiency/productivity improvements drives just over half of all innovation undertaken by the industry; this and 'customer needs' are the two key motivators.

Two other drivers – technical performance and quality – are more important to the industry than 'cost' (although 'cost' is still ranked a respectable '5<sup>th</sup>' out of eight drivers). It seems that the increasing attention paid by Australian public-sector clients to value-driven tender selection is encouraging cultural change in the appropriate direction.

Although the desire to reduce business/client costs is not paramount in sponsoring innovation, the high costs of developing many innovations is the dominant obstacle to innovation, along with insufficient time. These findings underline the need to improve industry profitability, to ease resource constraints on innovation.

*“ the use of formal evaluation programs to monitor innovation value leads to higher levels of innovation”*

*“ the importance of transferring project learnings into continuous business processes is undervalued”*

*“ the desire for productivity improvements drives just over half of all innovation”*

Different industry groups can also act as innovation drivers or obstacles. The survey found that large/repeat clients, architects and manufacturers were the key groups driving innovation in the industry, and that government regulators, insurers and funders were the key groups inhibiting innovation. Interestingly, there was a strong distinction made between repeat clients and one-off clients, with the latter featuring as a key innovation blocker. This suggests the need to educate one-off clients.

***“ high cost is the dominant obstacle to innovation, along with insufficient time”***

## **Sources of Innovation Ideas**

Another view of innovation drivers is gained by considering sources of ideas. Indeed, a significant positive relationship was found between the number of sources of ideas nominated by respondents and the number of advanced practices adopted (organisational innovation).

***“ clients, architects and manufacturers are key innovation drivers, while regulators, insurers and funders are key blockers”***

‘In-house staff’ were revealed to be the key source of innovation ideas, nominated by 68% of the industry, highlighting the dangers of out-sourcing and underlining the importance for businesses of maintaining strong internal skill-sets and attracting creative employees. ‘Previous projects’ ranked as the 4<sup>th</sup> most important source of ideas out of 14, drawing attention to the need for businesses to have effective mechanisms for knowledge transfer between projects.

***“ businesses need strong internal skill-sets and creative employees”***

## **Knowledge of the CRC for Construction Innovation and International Competition**

Given the mandate of the CRC for *Construction Innovation* to promote the industry’s performance through innovation, the survey sought to determine the reach of the CRC in the first three years of its operation. Overall, 20% of the industry had heard of the CRC prior to receiving the survey. Clients and consultants were more likely to have heard of the CRC previously, while contractors and suppliers were less likely, compared to what would have been expected given the sample distribution.

***“ businesses need effective mechanisms for knowledge transfer between projects”***

In view of the industry’s increasing exposure to international competition, the survey also asked about respondents’ views of the industry’s global standing. Most of the industry thought the Australian industry was sufficiently innovative to cope with international competition, although evidence provided by industry analysts suggests this may be a misconception.

***“ is the Australian industry sufficiently innovative to cope with international competition?”***

## 4 Innovation Impacts

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***“ innovation improves business profitability”***

***“ profitability is maximised via three key strategies”***

Overall, 93% of the industry reported a positive impact on profitability arising from their most successful innovation over the past three years.

The most common impact on profitability was a ‘moderate improvement’, which was experienced by nearly half the industry. Given that the survey question related to the organisation’s most *successful* innovation over the past three years, it can be seen that the impact of a single innovation on profitability is relatively modest, with only one-in-five respondents recording a ‘significant or great improvement in profitability’. It is likely that profitability impacts are augmented by other positive business outcomes, such as increased market share.

It was found that businesses may be able to improve their profitability by (1) adopting a larger number of advanced practices, (2) implementing a formal innovation strategy, or (3) employing a greater number of knowledge strategies.

# 5 Characteristics of High Innovators

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The BRITE team constructed an innovation index to robustly differentiate between high and low innovators as another means of reviewing innovation drivers. The representation of different industry sectors in the high innovator group was largely in line with expectations given the sample distribution, except for clients, who were over-represented. High innovators were defined as those businesses that:

- developed innovations with higher degrees of novelty
- developed innovations yielding higher levels of profitability
- adopted a higher number of advanced practices
- invested in R&D.

The BRITE team defined high innovators along these dimensions. The team then looked for business features that were associated with high innovators. High innovators were more likely than low innovators to:

- place significant value on employee, technology and knowledge strategies
- use a broad range of sources of innovation ideas
- have a formal innovation evaluation program
- rely on research institutions for innovation ideas
- recruit new graduates
- capture project learnings for ongoing reference
- reduce clients costs
- have heard of the CRC for *Construction Innovation*
- have successfully claimed the R&D tax concession
- monitor international competition.

Businesses wishing to improve their innovation performance should consider adopting these ‘high innovator’ behaviours.

***“ businesses wishing to improve their innovation performance should consider adopting the behaviours of high innovators”***

## 6 Sectoral Differences

The report compared the overall performance of five industry sectors by looking at their representation in the high innovator group. They ranked from most to least represented as follows:

- clients
- consultants
- suppliers
- main contractors
- trade contractors.

*“ clients dominated the high innovator group”*

Clients were significantly over-represented in the high innovator group.

The following chart gives an indication of each sector's performance according to the four measures that underlie the innovation index, which defines high innovators.

**Table 1:**  
**Sectoral Performance by Key Innovation Indicators**

Innovation Indicator	Clients	Consultants	Suppliers	Main Contractors	Trade Contractors
Number of Advanced Practices Adopted	Good	Reasonable	Poor	Reasonable	Poor
Degree of Technological Innovation Novelty – ‘New to World’	Reasonable	Good	Good	Poor	Poor
Degree of Technological Innovation Novelty – ‘New to Industry’	Good	Poor	Reasonable	Reasonable	Good
Innovation Profitability Level	Good	Reasonable	Poor	Poor	Good
R&D Investment	Very Good	Good	Good	Poor	Poor



# 7 Conclusions

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The survey results suggest that there are relatively simple strategies available to businesses in the Australian construction industry to improve their innovation performance. Despite the industry's innovation rate being respectable compared to New Zealand standards for 'new-to-industry' innovation, data that is soon to be released by the Australian Bureau of Statistics is expected to confirm expectations that for lower levels of innovation novelty ('new-to-firm' innovation), the industry needs to do better. The incentive to improve innovation performance is underscored by survey findings that innovation leads to increased profitability.

Findings from the survey indicate that businesses wishing to improve their innovation performance should consider:

- A1 Enhancing in-house skill levels by employing new graduates and providing employee training programs, rather than relying on recruiting experienced employees.
- A2 Focusing on reducing clients' costs.
- A3 Actively monitoring inter-industry and international developments.
- A4 Developing formal systems to (i) integrate project-based learnings into ongoing business processes and to (ii) encourage staff to share ideas.
- A5 Adopting procedures to formally evaluate their success in adopting advanced technologies and practices.
- A6 Investing in R&D, possibly utilising the R&D Tax Concession and/or Australian Research Council Linkage Grants to subsidise costs.
- A7 Growing linkages with universities and other research institutions.
- A8 Implementing a broader range of the technology, knowledge and human resources strategies listed in the *BRITE Innovation Survey*.
- A9 Consulting a broader range of the sources of innovation ideas listed in the *BRITE Innovation Survey*.
- A10 Adopting a broader range of the advanced practices listed in the *BRITE Innovation Survey*.

***“ there are 10 key recommendations for businesses wishing to improve innovation performance”***

## 7 Conclusions *cont*

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Commonwealth and State government agencies interested in improving the environment for construction innovation should consider:

***“ there are five key recommendations for government”***

***“ we need improved regulation, education and training”***

***“ industry profitability needs to be improved to ease resource constraints on innovation”***

- B1 Implementing programs to assist skill development within industry associations, given the central role the associations play in providing ideas to low innovators.
- B2 Reviewing the value and accessibility of the R&D Tax Concession Scheme for small and medium-sized enterprises within the construction industry, given the industry's low rate of access.
- B3 Reviewing the effectiveness of programs aimed at promoting industry awareness of international competition, given that a quarter of the industry is unsure of Australia's ability to cope with it.
- B4 Stronger resourcing of education and training programs, given that the construction industry relies more on organisational innovation than the manufacturing industry, and therefore is less able to gain value from other government initiatives such as the R&D Tax Concession.
- B5 Improving regulation of the construction industry to reduce its negative impact on innovation, in part by improving national consistency and moving more rapidly/fully from prescriptive to performance-based approaches.

The above recommendations reflect the overarching vision of the Australian construction industry, as reported in a recent national study, *Construction 2020* (at [www.construction-innovation.info](http://www.construction-innovation.info)). That vision stresses the need for an improved business environment, particularly in relation to regulation, education and training.

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Further, both *Construction 2020* and the *BRITE Innovation Survey* point to the importance of profitability levels. Attention to the above recommendations should improve innovation rates, however, the fundamental structural problem of inadequate firm-level profitability limits the potential of the entire industry. Although the industry appears responsive to key innovation drivers, such as the need to reap efficiency improvements to meet client needs, resource constraints born of low profit margins impede their efforts. Key industry stakeholders are already aware of the need to improve industry profitability as a means of improving industry performance. The survey results underscore the urgency of these changes by drawing attention to resource constraints on better innovation performance.

Further research is required to better understand the impact of constrained profitability, especially in relation to risk-reward relationships associated with industry innovation. Under-utilisation of the R&D tax concession also needs to be investigated. More generally, it would be useful to map innovation activity over time as an input into business decision making and government policy making. Finally, the survey revealed 26 world-first innovators in the industry and future research could usefully examine their activities in detail, as a means of drawing lessons from this element of best practice.

***“ it will be important  
to map the industry’s  
innovation activity  
over time”***

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*CRC Construction Innovation Vision ...  
'to lead the Australian property and  
construction industry in collaboration  
and innovation'*

2005