Being the #1 Best.

Talking with highly innovative contractors

THE BRITE PROJECT

CRC Construction Innovation
BUILDING OUR FUTURE

Businesses Consulted

The following highly innovative contractors were interviewed for this report:

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Contents

TABLE OF FIGURES

CRC Construction Innovation
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Foreword

Being the Best investigates the ways in which highly innovative contractors sustain their market leadership. The businesses consulted are quoted extensively, as a means of sharing their insights. This report is intended as a resource for contractors that want to improve their innovation outcomes and business performance. Readers interested in similar resources are encouraged to visit www.brite.crcci.info.

Being the Best was prepared by the BRITE Project of the Cooperative Research Centre (CRC) for *Construction Innovation*. The BRITE Project is headed by Karen Manley from Queensland University of Technology (QUT) with a project team comprising Dale Gilbert, Wendy May-Taylor and Julia Willis (Queensland Department of Public Works), Richard Hough (Arup), Mary Hardie, Steve Kajewski and Lindy Spindler (QUT), Sam Fernando and Mike Swainston (Queensland Department of Main Roads) and Steve McFallan (CSIRO).

Construction Innovation is committed to leading the Australian property, design, construction and facility management industry in collaboration and innovation. We are dedicated to disseminating practical research outcomes to our industry – to improve business practice and enhance the competitiveness of your firm. Developing applied technology and management solutions, and delivering education and relevant industry information is what our CRC is all about.

Abbreviations

ABCB	Australian Building Codes Board
ABS	Australian Bureau of Statistics
AIC	Australian Institute for Commercialisation
ARC	Australian Research Council
ATS	Australian Technology Showcase
AWA	Australian Workplace Agreement
BRITE	Building Research, Innovation, Technology and Environment
CAD	computer-aided design
CEO	chief executive officer
CER	closer economic relations
COMET	Commercialising Emerging Technologies
CPR	contractor performance report
CRC	Cooperative Research Centre
D&C	design and construct
DOC	Department of Commerce (NSW)
ECI	early contractor involvement
EMDG	Export Market Development Grant
EPA	Environmental Protection Agency
HR	human resources
ICIP	Industry Cooperative Innovation Program
IP	intellectual property
IT	information technology
IXC	IXC Australia Limited, trading as the InnovationXchange Network
MR	Queensland Department of Main Roads
NSW	New South Wales
PPP	public–private partnership
R&D	research and development
RRIF	Regulation Reduction Incentive Fund
SA	South Australia
SBEP	Small Business Entrepreneurship Program
SBFO	Small Business Field Officers Program
SME	small- and medium-size enterprises
WA	Western Australia

Executive Summary

This report is based on interviews with 20 of Australia's most innovative construction contractors. The aim of the research was to understand the management behaviours that contribute to their successful innovation outcomes, thus providing lessons for contractors seeking to improve their own performance. The report covers four areas: employees, innovation, government initiatives & clients.

Employees

'For innovation to happen, it is obviously better to put more heads together, even if they are fish heads!'

The most innovative contractors in Australia:

- provide a wide range of performance incentives to staff, including social rewards and team incentives
- have advanced training schemes, often customised and delivered by external consultants
- have strategies to ensure they are perceived as an employer of choice by potential employees
- are responding to the shortage of skilled employees by ramping-up internal training efforts
- have a history of deep respect for staff and staff empowerment, that has endured through previous downturns in the building cycle
- emphasise employee satisfaction above any other corporate focus
- find that long-term employees are an important element of a successful innovation policy
- value the loyalty and innovation ideas provided by a stable, ongoing, in-house workforce, over the apparent cost benefits of reliance on subcontractors or casual labour hire
- take risks to promote innovation, within the context of a 'no-blame' organisational culture and appreciate the learning opportunities represented by mistakes and failures
- use 'toolbox', 'pre-start' or similar meetings over the course of a project to ensure an innovation-active culture over the project's life, and use project reviews, 'wash-ups', or 'blame-free autopsies' to gather learnings from employees on projects and enter them into knowledge databases.

Innovation

'When projects have something special about them, it tends to drive innovation. The challenge is to get innovation into the "meat and potatoes" projects.'

'We wanted more organisational innovation which usually carries the bigger fruit than technical innovation.'

The most innovative contractors in Australia:

- maintain active networking relationships with industry associations and universities, in part to get ideas for innovation
- adopt a 'long look forward' to identify potential ideas for innovation
- see their own employees as their main source of innovation ideas
- manage a strategic innovation process over the long term, rather than simply relying on innovation driven by immediate site-based problems
- apply innovative ideas in three main contexts: within tender documents, on construction sites and/or within the company
- maintain knowledge bases containing learnings from previous projects, and constantly upgrade ease of access to promote usage rates
- undertake innovation management as part of their risk management procedures
- put considerable effort into understanding client needs, as early as possible, as a means of enhancing innovation opportunities
- build time for innovation into project plans, particularly in the handover from estimators to constructors, and may assign an innovation sponsor to projects.

Government Initiatives

'So the support mechanisms are out there, it's just knowing where ...'

The most innovative contractors in Australia identified the following government initiatives which support their innovation programs:

Innovation

- research and development (R&D) tax concession
- university research
- innovation grants
- Australian Technology Showcase

Employment

- industrial relations changes
- skills-shortage policies
- training initiatives
- technical colleges
- school-based education programs

Business Development

- loans and grants
- business development seminars
- export market development initiatives
- technology parks
- international agreements
- government advisors
- active parliamentarians

Regulation

- environmental legislation
- safety legislation
- building standards
- approvals and licences
- income tax

Overall, it was found that large contractors were more likely to access government initiatives, and more likely to be happy with them, than small contractors. Small contractors where inclined to find the application processes too onerous to justify the potential reward.

Clients

'That's my wish list. A more deep and enduring cultural change. A deeper relationship with clients.'

The most innovative contractors in Australia:

- seek work with highly competent, repeat clients
- prefer to work with client organisations that have strong internal technical capabilities
- value clients that equitably allocate risk, welcome new ideas and that respect contractors' intellectual property (IP)
- focus on relationship-building with clients in pursuit of negotiated contracts
- have long-standing relationships with their main client, ranging from between 10 and 60 years
- appreciate difficult client requirements as an important source of innovation ideas
- see the private and public sectors as offering similar profit margins
- consider that repeat public sector clients are the main driver of innovation in the industry, but also find that probity requirements create unnecessary constraints on their performance
- prefer the following types of contracts: alliances, early contractor involvement contracts, the NSW (New South Wales) GC21 Contract, and private–public partnerships.

Key Findings

The research reported here sought to investigate the behaviour of high-level innovators, and has focussed on an important industry sector – contractors.

The most important findings in this report relate to:

- employee development
- R&D activity
- client relationships

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- client relationships.

Highly innovative contractors learn from employees, R&D and competent clients. They use these learnings to generate ideas for innovation and to achieve successful implementation within their businesses and on construction projects. High-level innovators are also marked by strong profitability. The discussion here may assist contractors wishing to improve their innovation performance and ongoing viability.

Employee Development

Nearly all the interviewees described an organisational culture very supportive of employee development. The most impressive initiatives involved breaking down the owner–employee divide through profit sharing and share allocation schemes. A wide range of more typical rewards were also offered by all interviewees in relation to project team performance, safety history, personal achievement, apprentices, end-of-year bonuses and social events to reinforce loyalty. There was a preference for group rather than personal awards and this seemed to effectively reinforce team spirit.

Training was another crucial tool of employee development, covering an array of initiatives, often run by highly professional external consultants, in relation to leadership, productivity, personal issues, personalities, emotional intelligence, 360° performance reviews, mentoring and further education. High innovators also typically have large permanent workforces to promote staff loyalty, as well as to ensure certainty of outcome for clients. Such staff typically work within a 'no-blame' organisational culture which promotes idea generation and diffusion. Other means to enhance learning from employees include comprehensive daily toolbox meetings on construction sites, and end-of-project reviews attended by a broad range of senior company representatives.

Although staff suggestion schemes are often promoted in the academic literature as useful for innovation performance, none of the interviewees operated a formal scheme at the time this report was compiled. This appeared to reflect both the construction context, where employee suggestions are an integral part of both the bid preparation and construction processes, and the boom conditions in Queensland and WA (Western Australia) that have constrained the development of non-essential management programs. Indeed, many interviewees said they intend to introduce or resurrect staff suggestion schemes in the future.

In order for contractors to attract the human resources they need for future growth, they need to be seen as an employer of choice. Offering performance incentives and an extensive range of top-level training opportunities certainly helps here, while profit or share schemes appear to create even greater loyalty. These measures also promote innovation which helps the contractor to grow market share. The opportunity to learn from employees, in the pursuit of innovation opportunities, is maximised when employee growth is supported and they are treated well.

R&D Activity

The 2004 survey reported that only 37 contracting companies in Australia were registered with the Australian Bureau of Statistics (ABS) as undertaking R&D. The current study has investigated the behaviours and attitudes of 18 contractors undertaking R&D. R&D is a very important input to innovation processes, and all the interviewees undertaking R&D were aware of the Commonwealth Government's tax concession, although many thought the compliance costs did not justify the reward, unless R&D investment levels were very high. The incidence of R&D investment and performance among contractors is very low and this needs to be addressed if overall innovation rates are to be improved. Contractors implement innovations that are, in part, put forward by other sectors. If they are to do this effectively they need strong internal innovation competence, and R&D skills are an important component of that competence.

The findings of this report indicate the following means to increase the incidence of R&D investment and performance among contractors:

Recommendations for R&D policymakers:

1. Reduce the paperwork requirements for small and medium-sized businesses for the tax concession scheme.
2. Improve the eligibility criteria of the scheme so they more accurately reflect the type of R&D undertaken in the construction industry, thus making qualification easier.
3. Improve marketing of the scheme to the construction industry.

Recommendations for construction clients:

4. Provide incentives for innovation by being prepared to share the benefits gained with contractors, so they will be more willing to share their intellectual property.
5. Improve respect for contractors' intellectual property.

It would seem that clients' actions are likely to have the most immediate impact on innovation levels, and indeed some of the interviewees noted that some clients were already improving IP recognition and the distribution of innovation benefits. Of the policymaker recommendations, the Commonwealth Government, via AusIndustry, is likely to have the biggest and most immediate impact by launching an advertising campaign aimed at the construction industry. This would help to improve awareness of assistance schemes and encourage investment. In fact, the interview-survey uncovered low levels of understanding of other government programs aimed at innovation and business development. Any advertising campaign should include not only the R&D tax concession, but also grant schemes and marketing assistance. Government business development initiatives have traditionally focussed on the manufacturing industry, largely bypassing or alienating potential innovators in the construction industry.

Client Relationships

The quality of client relationships was of critical importance to the interviewees. They were inclined to form long-term relationships with their principal clients. The contractor's commitment to these clients was driven by the client's competence which facilitated well-run contracts, the flexibility for innovation, and a reasonable return to the contractor. This reasonable return combined with a measure of security to create the scope for long-term innovation. Trust was very important to the interviewees in their relationships with clients, and was seen to be driven by client competency, culture and requirements.

Client competency was seen to be improving, particularly in public sector agencies where internal upskilling is a priority. The interviewees also noted more use of advanced and customised contract types to engage with contractors earlier. On the whole, interviewees thought complex projects were being better managed by clients. These client behaviours were valued by the interviewees as they were seen to drive innovation on projects, but probity restrictions and risk allocation practices were noted as constraints.

Clients' behaviour was seen to be changing, in that they now place more emphasis on internal upskilling, advanced and customised contract types, earlier engagement with contractors, and better management of novel or demanding project requirements. These behaviours were valued by the interviewees as they were seen to drive innovation on projects. However, the impact was seen to be diminished by lack of progress in improving probity restrictions and risk-allocation practices.

Innovative contractors rely on trusting long-term relationships with competent clients. Contractors wishing to improve their performance are encouraged to build these sorts of relationships. Although the demanding requirements of competent clients can create a sense of discomfort for the contractor, they are also very likely to lead to innovation and associated improvement in margins and market share. Relationship building advice is provided in a related publication *Innovate Now*, available at www.brite.crcci.info.

Finally, there were two recommendations made by interviewees that warrant special mention here. The first concerns innovators struggling to have their technologies, materials, components or equipment accepted by clients. Interviewees' advice for such innovators is to conduct independent trials and prepare documentation to meet the requirements of organisations such as the Australian Building Codes Board (ABCB) and Austroads. This assists in encouraging client adoption, but innovators will still need to be doggedly persistent in negotiating the unclear path to success. Finding the right decision-makers within a client organisation, together with long and convoluted approvals processes, can be frustrating. These difficulties are, however, currently an unavoidable part of the innovation process that need to be accepted with good grace. At the same time, interviewees made an impassioned appeal to clients in different jurisdictions to accept the results of trials in each other's jurisdictions and those of organisations such as the ABCB or Austroads. Sometimes duplicated trials may reflect the special needs of individual clients, but it seems that this is not always the case and that often new trials are technically unnecessary.

The second recommendation concerns the Australian Tax Office and possible tax evasion by sole-operator subcontractors. There appears to be a need to review this situation as it could be creating an unfair competitive disadvantage for contractors that rely on permanent staff and therefore pay the appropriate tax burden.

This report examines the learning behaviours and opinions of highly innovative contractors serving the Australian building and construction industry. It provides an industry-focussed picture of their activity and thoughts, based on interviews with 20 contractors of varying sizes that were assessed as the most innovative in Australia.

The report covers four topics: Employees, Innovation, Value of Government Initiatives, and the Role of Clients. The end of each section contains a checklist for contractors to assess their performance against the best-practice benchmarks described here.

Main Report

1. Employees

The way in which highly innovative contractors manage their employees to ensure maximum learning and growth is investigated according to the following subsections:

- Incentives Provided
- Staff Suggestion Schemes
- Impact of Current Market Conditions
- Organisational Culture
- Treatment of Mistakes
- Methods of Engaging Site Staff
- Tool-box Meetings and Project Reviews

Incentives Provided

An incentive is a reward that is advertised prior to action; a bonus might reward good performance, but if it is not advertised prior to action then it cannot have acted as a direct incentive. Both incentives and unscheduled bonuses were routinely employed by the interviewees.

Incentives were provided to incite greater effort by staff. They were used by interviewees to reward employees beyond their regular pay, in appreciation for achievement in terms of project milestones, length of service, recruitment assistance, extra hours, weekend work, superior quality and ideas provided for innovation.

The incentives provided to staff took many forms, including profit-sharing schemes and share-allocation plans, along with more common incentives such as:

- project-based recognition schemes
- safety competitions and awards
- cadet and apprentice-of-the-year awards
- 'most improved' awards
- end-of-year bonuses designed to reward loyalty.

The use of financial rewards was in many cases dwarfed by the use of social rewards such as boxes at football events, cartons of beer, tickets to horse races and family holidays. The most intensively used bonus was work barbeques, often planned as a regular event, such as once a month, and sometimes held during working hours. The BBQs were typically viewed as an opportunity for informal mingling between management and siteworkers, during which staff feelings and ideas could be more effectively elicited than through more formal channels. Several interviewees noted that on occasions the families of staff were also invited. These social events were seen as a reward for loyalty, which is increasingly an important performance criterion given current human resource shortages.

Team incentives were seen as more valuable than individual incentives: '… team incentives are more important than individual — there is a fundamental belief that people come to work to do a good job, and providing them with the environment and the encouragement to do that is just as important as individual incentives'.

Many interviewees also interpreted training and other professional development initiatives as incentives. Along with traditional training programs, the following more unusual professional development approaches were adopted:

- leadership and productivity courses run by specialists
- externally provided personal development programs, such as 'Open-Up' run by organisational psychologists dealing with personal issues, personalities and emotional intelligence
- 360° performance review (by the individual, peers and managers) for *all* staff, annually, with follow-up and coaching
- appointment of critical external consultants to the company board
- mentor programs for new staff
- proactive and broad-ranging further education policies
- specialised development of 'young guns' and 'leaders of tomorrow'
- offering apprenticeships to mature-age unskilled site labourers who show promise.

Many of these programs appeared to be very advanced; for example one contractor described an externally run professional development course thus:

'… we run everyone through it, we grab the last ten we employed and they go through this program. It is interesting, it requires someone to think about themselves and how they operate as a human being, what are their drivers and what makes them push and pull in the world, how they interact with others and how they impact upon others as individuals, so it is quite a lengthy course, it takes about six months, and about 30 hours of work time. They have to come up with an agreed team goal, and then they research it and develop a presentation for the executive management team and that is usually something innovative that needs to be changed in the organisation. We usually have two or three groups going through at any one time …'

Staff Suggestion Schemes

Despite the researchers' expectations, many of the high-level innovators interviewed did not operate formal staff suggestion schemes to stimulate ideas for innovation. Instead, most interviewees fell into one of two main groups — those who had used suggestion schemes in the past, and those who planned to implement them.

In the former group, one interviewee noted that they had wanted their suggestion scheme to result in strategic organisational innovation. They were disappointed to find that even with a European convention trip as a reward, they had low levels of interest, and mainly received tactical, reactive, technical innovation ideas: '… we wanted more organisational innovation which usually carries the bigger fruit than technical innovation, which might only involve using one as opposed to two screws'.

Analysis of the interview transcripts suggests the dynamic around defunct suggestion schemes often operated as shown in Chart 1.

Chart 1

Doomed suggestion schemes

company suggestion scheme established

↓

limited management buy-in

↓

poor employee interest

↓

management scraps program

The interviews revealed that against this backdrop of failed suggestion schemes, many companies are now considering greater resource commitment for suggestion schemes to create procedures that compellingly engage employees. It was noted that, at the very least, employees need to see that their ideas are acted upon and valued, otherwise they will stop making suggestions and systems will fall into disuse: '… if employees think they have hit a brick wall, they don't bother'. Having strongly promoted a suggestion scheme, the challenge for management is to have the resources to process a high volume of suggestions and to track and communicate outcomes.

The drivers to re-examine employee suggestion schemes, and those behind companies currently using such schemes or considering their use for the first time, include increasing client/user pressure for project innovation and environmentally friendly outcomes, combined with a need to be seen as an employer of choice in an employee-limited market. Despite a resurgence of interest in incentive schemes, it can still be '…very, very hard to get high-quality, honest and open debate and feedback … there are always going to be some people who are always pushing for a better way and there are always other people who are more inclined to be told how they should do it. You know, that is a personality trait, rather than a cultural one.'

Impact of Current Market Conditions

The flip-side of employee shortages is the very rapid growth in size of many employers, especially the innovative contractors who comprised the sample for this study. One contractor had grown in size from turnover of $50m per year to $350m per year, in five years. All the contractors in the study have

experienced greatly accelerated growth over the past few years, especially the smaller companies, and the speed of change has been such that many organisational systems are lagging in their development.

The volume of work on the books of contractors is such that a very short-term focus is engendered, leaving few resources for strategic planning and incentivisation. Nevertheless, many interviewees are currently actively engaged in a major overhaul of their systems. This is driven by need — the need to be seen as an employer of choice in order to attract the people needed to fuel future growth.

The key system being addressed by the contractors at this time is training, especially occupational health and safety. Many companies are increasing training — in part 'playing catch-up' given years of very rapid growth; in part due to the need to upskill internal staff, given the acute shortage of skilled staff available in the market; and in part responding to, or driving a 'zero harm' health and safety program.

One medium-sized contractor has recently introduced a safety culture course for all direct staff, involving a three-day intensive component, plus ongoing modules in various safety competencies. The program will run over several years and approximately 9000 days of training will be undertaken in that period, with every direct employee receiving between 5 and 18 extra days of training through the program. Another large, national contractor reported that 10 per cent of the time of their staff was spent in training, while another stated that '…we train more than any other contractor, certainly in Western Australia'. A rapidly growing family contractor reported that, unlike most contractors who only do induction and pre-start training for hire labour and subcontractors (as opposed to more comprehensive training), their company saw no separation in the classes of their workers and provided these groups with similar opportunities to their permanent staff.

An interesting by-product of current market conditions is the rapid growth in the human resources departments of many contractors, from large to small. One small contractor, with approximately 150 direct staff, has a ratio of 33 employees per human resource professional, whereas the experience of one very large contractor reflects that of their peers, when they note '… our HR [human resource] group has grown immensely in recent years'. The interviewees considered such attention a form of incentive to attract workers.

Innovative contractors and organisational culture

'The most innovative thing we do is around our people …we have development sessions right down to our labourers who have been here for three months … we communicate about what's coming up, our turnover gets talked about … all aimed at people having ownership of what they do.'

'Building up the self-esteem of employees is important, to enable them to feel proud of themselves.'

'You need to look to the future, when there will be fewer construction workers around; we want to understand what will make the next generation want to work for us; what are their values? … we want to create a compelling culture …'

'We've got a family atmosphere, so we would rather keep the family growing and if we don't have work for them, that is the procurement people's job, to get them work …'

'A lot of people are stuck on the technical building project and the commercial outcome, to the neglect of the people, so we say if you get the people end of it right, happy, motivated and supported, then the rest follows.'

'All our books are open, if you are an employee of ours, you are one of us and we trust you.'

Organisational Culture

Organisational culture is a key focus to improve innovation for many of the interviewees, especially in people management. This is evident in the incentive initiatives listed earlier, as well as in the general comments made by interviewees.

The very strong emphasis on retaining good employees and investing in HR development is currently being reinforced by labour-scarce market conditions. When questioned about this and whether interviewees thought that high standards would endure through recession conditions and labour surpluses, it appeared that a genuine strengthening of the principles of employee respect may have taken place through these boom times — one that may endure through the building cycle. Certainly some interviewees could point to their historical performance of keeping their staff employed through periods of work scarcity.

This emphasis on employees above any other corporate focus was emphasised most strongly by the small private companies in the sample, all of whom used the family metaphor to express the way they treat their people. A number of structural advantages were seen to exist for small private companies:

'… it's a privately owned company, it's a small company, so that the individuals can speak directly to the owner of the company, and from that point of view there is always an understanding that any issues that do come up are acted upon and feedback is given directly to the individual.'

'… if there is a major problem right now, within two-to-three hours everyone in the business will be tutored on that problem.'

The nature of organisational culture varied greatly according the type of interviewee. Small private companies are more easily able to communicate their cultural messages and can more naturally achieve an informal, relaxed, open environment, which supports information exchange and hence innovation. Although better placed to finance innovation, the larger multi-division companies had more difficulty in establishing a culture supportive of spreading innovative ideas. The systems they employ to break down the 'silo' mentality and encourage free-flowing communication need to be *formally* expressed given the large scale of operations. It is this formality that tends to work against them achieving the environment they seek to create. Some of the leading companies in the sample appreciated this contradiction and were exploring new organisational forms that would retain the benefits of size while minimising the costs.

Another problem for larger companies is that they are inclined to have higher staff turnover than the smaller 'family'-centred contractors: '… you can have the best systems in the world, but the best way [to innovate] is to have people working in an organisation for a long period of time', and that is difficult in a stop–start, project-to-project industry like construction, and possibly more difficult for very large companies, compared to the small family-company model which tends to inspire greater loyalty. The argument often touted that employee transience can increase the flow of ideas between organisations is less persuasive in the construction context, where there is plenty of opportunity to pick up external ideas through different project partners and contexts, without needing to suffer the loss of knowledge associated with high staff turnover.

Treatment of Mistakes

All interviewees, regardless of size, noted that their company encouraged a 'no blame' culture. Overall, there appeared to be a high tolerance of mistakes and problems.

Nevertheless, management's tolerance of mistakes, perhaps even their appreciation of them for the learning benefits they provide, is not always well understood by the workforce:

'… workers certainly are encouraged to say something, but again by human nature if somebody makes a mistake, they quietly go and fix it up.'

'… it has always been a hard one … people are sensitive about performance …'

'In the past the contractor was in an adversarial defensive position with the client — when the slightest thing went wrong, workers would cover it up — some people still aren't comfortable with sharing such things.'

'… younger people seem to be less sure that it is OK to make mistakes … '

Interviewees were also asked how their company treats 'failure'. This is a similar line of investigation to that of 'mistakes'. This question was, however, deliberately provocative to elicit unguarded comment. The responses tended to support the theme evident above: that mistakes and failure are best interpreted as learning experiences. However, it was clear that the interviewees found the question confronting, eliciting many humorous responses, for example:

'There has never been a night of the long knives!'

'We shoot people and pour them in concrete!'

'… besides ritual sackings …?'

There was also a strong tendency to deny that failure happened, and certainly the overwhelming message was that 'if there

Innovative contractors and mistakes

'Mistakes are a learning curve … an opportunity for growth.'

'Our strength is in developing young people … we understand that young people are going to make mistakes and we empower them to make them.'

'We have a culture of no surprises, so if somebody has got a problem, we encourage them hard to talk about it as soon as they find out about it, so that we're not surprised by something that we could have potentially done something about. Someone would be chastised more strongly for surprising us with a problem or failure that they have known about but kept to themselves than for the failure itself.'

'We're at the cusp of new technologies in our area and we are continually making mistakes and we continually share these experiences with each other, taking them back to the original supplier as well.'

'We would probably prefer that people have a go and make a mistake and learn from it. The issue is learning from the mistake …'

'The "no-blame" concept formalises commonsense stuff that was always done intrinsically on good projects.'

'We accept that people think outside the square and may try something that might not work, and we are richer for the experience.'

'We spread responsibility for change, so that if something goes wrong there is no individual to blame.'

is a problem, it is solvable'. It was this 'solvability' that turned threats into opportunities — even if 'solvability' meant interpreting a negative project outcome as a learning experience to enhance performance on future projects — the solution was to do better next time. As one interviewee put it: '… construction is high risk, so you do get the odd financial failure (although rarely do we get design failure), but we don't let one bad situation ruin the whole future — we are here for the long term'.

Innovative contractors and project reviews

'Once a month, managers of each project from across the state come together for project wash-ups; everyone can talk about everyone else's projects … gives us an insight into trends … these project review forums are important to break down the silos between separate groups within the organisation.'

'One of the things that I have introduced, initially to everyone's horror, is the blame-free autopsy with our project managers who have had something go wrong on one of their jobs; now they hate doing it, so we have a bit of fun with it as well …'

'We have an end-of-contract review process, where we sit around with the key project team members, the estimators and the construction manager and just talk about how the job went, what went well, what didn't go well … how to improve management of subcontractors, suppliers and also getting information back to the estimating department about how their pricing structures went …'

'On each project we produce a project feedback report, which runs from between a few pages up to 80–90 pages.'

Methods of Engaging Site Staff

Among highly innovative contractors, the usual industry practice of relying on subcontractors and casual labour hire to fulfil project commitments is far less common. Most interviewees supplied at least 50 per cent of their average workforce requirements through direct, ongoing employment, with a quarter of the sample supplying 70 per cent or more in this way. Clearly the proportion of casuals and subcontracted labour on a project will vary significantly with the size and complexity of projects, with larger projects being more difficult to run with in-house labour. One of the large contractors — a company with a progressive and inclusive HR strategy — said they could run a $10m project with 100 per cent in-house employees, but on much larger projects, only 20–30 per cent of their work would be completed by in-house staff.

The smaller companies in the sample were more likely than the larger companies to have a strategy in place to significantly increase the proportion of work undertaken by direct employees: '… we want to take control over our own destiny.' Such sentiments are driven at least in part by pressure from clients, who are particularly nervous about certainty of outcomes in the current resource-starved environment.

Larger companies appeared to be less concerned — perhaps their long years of operation and dominant market position means they have more secure supply-chain relationships, or, at least, means that clients would have more confidence about certainty of outcomes. One of these companies was inclined towards the 'command and control' model of employee management:

' … we don't employ anyone anymore … now we have more subcontractors, on very watertight contracts … if they don't perform, you dismiss them and get somebody else … I think you have less control when you employ your own labour … this model works and suits us.'

This comment indicates the privilege of a dominant market position, which appears to afford easy labour options. It does not reflect the experience of the smaller companies interviewed, which is of the significant benefits that can flow from a loyal in-house workforce. Even the other large contractors were less confident about access to workers than this interviewee: ' … our biggest risk is access to good quality people. At one point last year, we had 500 vacant positions, we have been hunting everywhere, we sent expeditions over to South Africa, Europe and Canada, trying to recruit.'

Outsourced labour might work well for some large contractors, but one of the smaller contractors had recently been burned by labour hire companies: ' … never take their word that they are supplying qualified tradespeople — ask to see the trade certificates — we got caught out with unskilled workers — they could have killed somebody …'

Toolbox Meetings and Project Reviews

Across all interviewees, toolbox or pre-start meetings are a key method used to build up a culture supportive of innovation. These meetings are project-based and their primary function is to organise site work and ensure safety, but innovative contractors also use them to encourage innovation:

'We have a production and safety meeting every day on every shift, a big meeting where people talk about hazards and ideas — it's about delegating the work packages, safety, innovation, HR practice — I might talk about harassment or workplace bullying. The meetings can be from three minutes to an hour, depending on the job — most probably half an hour. They involve everybody — not just their representatives — including all "subbies" and hire labour — everyone signs in and a management record of the meeting is created and stored — sometimes our company directors attend the meeting. When we first initiated this, people didn't feel like making suggestions — workers and management were both reluctant to speak up, but we changed the culture, driven by the CEO [chief executive officer]… creating a better understanding between management and the people doing the physical work …'

After projects have finished, innovative contractors conduct a comprehensive project review, which may or may not involve meetings, but always involves a report of some kind, which often feeds into an ideas database which is accessible across the company. Frequent use of the database is encouraged, typically by building up a cultural expectation that this is how business is conducted, sometimes reinforced more formally through key performance indicators.

Benchmark Yourself Do You …

- ☐ 1. provide performance incentives for staff?
- ☐ 2. have customised training schemes for staff?
- ☐ 3. have strategies to ensure you are perceived as an employer of choice?
- ☐ 4. actively promote a 'no-blame' organisational culture?
- ☐ 5. actively communicate to employees your acceptance of mistakes and failures as learning opportunities?
- ☐ 6. use regular meetings over the course of a project to ensure an innovation-active culture over the project's life?
- ☐ 7. use project reviews to gather learnings from employees after projects finish?
- ☐ 8. take risks to promote innovation?
- ☐ 9. emphasise employee satisfaction above any other corporate focus?
- ☐ 10. fulfill your on-site responsibilities by using a stable, on-going, in-house workforce, rather than relying on subcontractors or casual labour hire?

2. Innovation

This section reviews the networking activity of highly innovative contractors, then examines how they turn ideas into innovation, before describing how they implement innovation.

Networking

This section covers the relationship between interviewees and both industry associations and universities, as these two types of organisation were revealed in earlier research as instrumental in providing innovation ideas to contractors.

Industry Associations

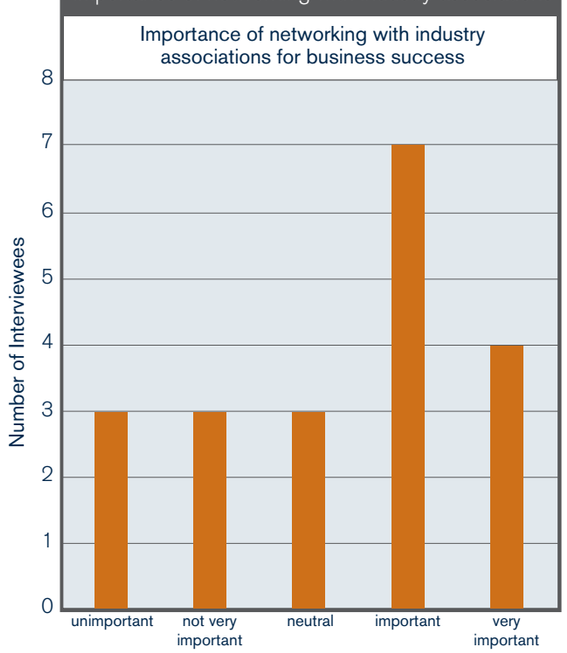
Just over half of the twenty interviewees considered networking with industry associations to be important or very important to their business success Interestingly three of the large contractors saw little value in their industry associations. Either they had some dispute with particular industry bodies or they felt that networking would happen more effectively through less formal processes. Some respondents suggested that associations were of more benefit to smaller contractors and that larger contractors operated through higher level networks of personal contacts.

Interviewees referred to ongoing relationships with between two and six industry associations. The associations most commonly mentioned were the Master Builders' Association, Civil Contractors'

Federation, Australian Constructors' Association and Engineers Australia. Several other more specialised associations were also mentioned. The most common frequency of contact with the associations was monthly, but a few respondents had much more frequent contact. Previous BRITE research indicated that associations would be important for providing innovation ideas and influencing policy. Indeed, the interviews showed that smaller contractors do place high value on their associations, while larger contractors are less dependent on them.

Chart 2

Importance of networking with industry associations



Universities

Most interviewees reported having relationships with universities in their home state. Often, the relationship was with the institution the interviewee had attended as a student. Sixteen different universities in all were named as being significant to the interviewees. Queensland University of Technology, University of Queensland and University of New South Wales were mentioned most frequently, but this is simply related to the location of the interviewee's head office. Universities in South Australia, Western Australia and Victoria were nominated by interviewees in their home state. Regional universities such as Deakin, Newcastle, Central Queensland, Southern Queensland and Ballarat were significant to interviewees in their catchment areas and beyond.

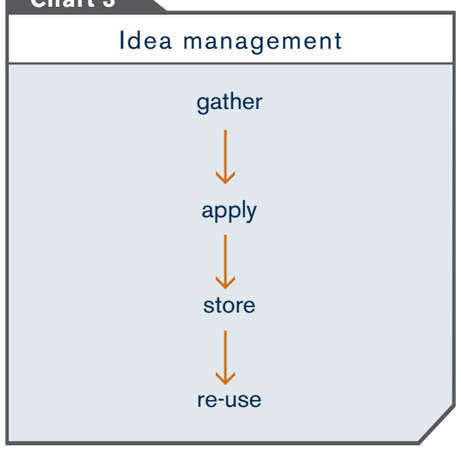
The nature and strength of relationships with universities varied a great deal. One contractor sponsors a professorial chair, while several others reported involvement in developing coursework. A couple had participated in research partnerships and most used their university connections to aid in recruiting recent graduates. Most relationships with universities had been maintained for several years. While a small number of contractors had no relationships with universities, most of these expressed an intention to pursue such relationships in the future.

Overall, universities were a key source of ideas and employees for the interviewees. In contrast to the findings about industry associations, it appeared that universities were a more important networking partner for large contractors than for small contractors.

Moving from Ideas to Innovation

Ideas are important because they are the basis for innovation. Once an idea is applied successfully, on a project or within a business, it becomes an innovation. Ideas are gathered from a variety of sources, assessed in terms of risk, cost and potential benefit, and then applied if appropriate. Then the learnings from the application are assessed and stored for re-use on new projects, or in the business itself. Ideally, an effective idea management system will have the features shown in Chart 3.

Chart 3



Each stage involves assessment and evaluation prior to progression to the next stage. It may be that '… the collection of ideas is relatively random and regional and that the processing and evaluation of ideas is relatively more structured'. Nevertheless, there are difficulties in this area: 'Every company that I've been involved with in the construction industry has struggled with the whole idea of first gathering new information, then storing it, and accessing it'.

Innovative contractors and strategic idea gathering

'We have a manager's forum where we meet every six months to try and predict where we are going to go.'

'The company uses integrated project planning to give oversight …'

'We are developing some formal systems around R&D in order to claim the tax concession and I hope that the process will lead to greater awareness of the value of ideas.'

'We actually run an R&D database, as an auditable trail to establish our eligibility for the tax concession, but it also collects our ideas. We will be launching the R&D database nationally soon so it will be available on everyone's systems.'

'We have reading folders sent around to all personnel … we attend a lot of conferences as well … it only takes one idea and it can pay for the conference very quickly.'

'We have an extended induction process that thoroughly familiarises new people with our quality procedures and invites their feedback. We held off getting a quality system until we could get one that suited us – not too regimented. It had to be user-friendly, so that now the guys are fully involved in it every second of the day, instead of a side thing … it generates ideas about what we need to do in the future.'

'We have a Roadshow where I [as an executive manager], go around the country collecting ideas for R&D and innovation – on an annual basis.'

Gathering Ideas

A strategic innovation process involves more than simple reactive project-based innovation. Maximisation of innovation benefits means adopting a 'long look forward' to identify where ideas might be sourced, then assessing which should be stored for diffusion on new projects or in later stages of the company's development, and then documenting them for the company's benefit. Employees as an important source of ideas have been discussed earlier in this report. One increasingly popular policy not already noted is the use of exit interviews between resigning staff and human resource managers, to provide ideas that will facilitate innovation in employee retention programs. In all respects employees are the most important source of ideas for companies. For nearly all interviewees, it seemed that the most effective way to regularly gather staff ideas was through toolbox or pre-start meetings held daily on project sites. Social functions, such as BBQs involving alcohol, were also seen as a good idea-collection tool: ' … you have to feed them beer, get their guard down, and then you find out about their ideas, whereas before there had been none; it's a bit like pulling teeth'.

It is also the case that highly complex projects offer challenges that fuel the imaginations of engineers. There is particular scope for creative satisfaction and innovation when clients call for expressions of interest on such projects when they don't have any firm ideas: ' … our engineers really enjoy that environment and get a lot more out of it [than with standard projects].'

Apart from gathering ideas directly from or for site-based work, most interviewees also had some kind of process to gather ideas to feed into strategic management initiatives — part of the 'long look forward'.

The resources devoted to this process have been squeezed in the current tight market conditions, and certainly ideas arising from tactical problem-solving imperatives were more keenly pursued. But some attention was given to longer-term considerations, especially by larger companies, as they tended to have more management resources. One interviewee noted that '… my role here is to create forums for people to think about the future … in ten years time there won't be many 30-year-olds in the workplace … what will we do when we have half the human resources to deliver projects? I am organising a forum for this, with a facilitator who is a futurist'.

The interviewees also discussed their treatment of the initiator of an idea. Several contractors noted that they try to keep the initiator involved through the innovation process, even though it might move beyond their skill-set. Individual initiators of ideas were typically given recognition, but not an individual reward; the relevant team was more likely to receive a bonus or award. It was also evident that there was typically no formal process to progress an idea — rather it was suggested that the initiator simply needed to '… yell loud enough to be heard — you've got to keep talking the talk and believing in what you are saying — persistence is the key'.

Applying Ideas

Ideas tended to be applied in three main contexts — within tender documents/project documentation, during site work, and across the company. The last context has the most potential for strategic innovation. The vast bulk of idea application, which is to say innovation, occurs in relation to projects, and it tends to be very reactive.

Estimators play a crucial role in applying ideas by identifying options for tender documents and assessing their viability in terms of risk, costs and benefits. When asked about idea management processes, most interviewees cited the role played by estimators: '… ideas are decided on during the handover from the estimating team to the construction team'. Overall, ideas were assessed and application decisions made by stakeholders such as clients, estimators and construction teams.

Storing Ideas

Regardless of the idea source and application context, the challenge for contractors, including the leading companies in this study, is to capture these ideas and store them in an accessible form, and to develop a system that compels employee use of the resource for every project as a number one priority regardless of time constraints.

In terms of storage methods, some of the smaller companies in the sample had been using internal newsletters, but in a number of cases these had fallen into disuse. The heat in the industry and limited human resources has meant that companies have had to retreat to a focus on core functions, with more strategic initiatives such as ideas databases suffering. Such companies indicated that the cost of not storing ideas is becoming increasingly apparent and that they intend to reinvigorate their newsletter activities, and in some cases move to electronic storage of ideas, in the near future. Larger companies in the sample tend to be improving their electronic databases, especially focussing on engendering an organisational culture that encourages use of the ideas database more extensively:

'There is an electronic database that the ideas are recorded on — an integrated technical library, which is a one-stop shop, so you don't have the same piece of information sitting on heaps of different laptops and drives. We are motivating people to use the database by making the database very accessible. We are developing a 'Google'-type of search engine that will minimise time and be really easy to use and will think a bit for you. The search ability will be so enhanced that when an employee uses it, they are going to get positive strokes because they will find what they need in an instant. We have the names of topic experts in the business pop-up, so you can phone or email them. You can do your job more efficiently, most people appreciate that …'

Re-using Ideas

In all cases, mechanisms to encourage use of existing databases were informal, typically relying on cultural imperatives, and improving ease of access, which saves time:

'We are establishing an intranet to improve communication and break down the silos between business units, using an integrated management system through Lotus Notes. We want to provide a better record … for people to retrieve information on our past projects, not just so that we can use it as the reference tool for new work, but also so that people can use it as a reference to ascertain where knowledge is within the company. The aim is to stop dropping and reinventing new ideas … wasting time. We are becoming more aware of the amount of innovation that goes on in the company and the fact that we don't necessarily pick that up and spread it around the company enough.'

The sticking point in most systems is in creating an organisational culture that actively and regularly supports the use of ideas and knowledge by all employees, to meet the company's strategic goals and to solve tactical problems. One large contractor is trying to promote the re-use of ideas by breaking down state-based and divisional silos through an intensive communication initiative driven by a new general manager. This has '… really connected us all across the country … I know people in other states better now and feel free to contact them and say "hey, I'm targeting a client on XYZ and I know you guys did something on this". The initiative has really encouraged dialogue.'

Implementing Innovation

This section looks at management structures created for effective innovation, approaches to risk management and the strategies adopted to successfully apply innovation on projects or within a business.

Structures for Innovation

The interviews revealed that smaller contractors are good at generating innovation ideas, but not so good at evaluating and implementing them, while the larger contractors had more trouble identifying innovation ideas, but tended to be better at evaluating them. Many contractors were attempting to access both advantages, by imitating a small well-networked company, while retaining the robust evaluation systems within large companies:

'… we actually work as a lot of little businesses, and their ideas feed into the central corporate economic evaluation process, which brings more rigour to the assessment [than if the ideas were assessed by a small independent company].'

'… we operate in many different regions, each with unique contextual innovation drivers, but we are also forming technology networks around the country, with teleconferences to share our experiences — this puts rigour into the ideas'.

Risk Management

When asked about methods for managing innovation risk, interviewees tended to respond with an assessment of their approach to managing project risk. Although this research found that formal innovation management programs were rarely evident, formal risk management related to projects was very evident. Given that both innovation and risk are about doing new things, there is an obvious overlap. It may be that a lot of innovation management activity is hidden within risk management procedures. Even if this is so, there is usually a reactive project by project focus, rather than a long-term proactive portfolio vision that promotes innovation.

Innovative contractors and risk management

We do a contract award review, where we sit down with our estimating staff and key management staff that will run that project and senior management to develop guidelines and also to identify risks and opportunities.'

'We have a formal risk and opportunity process as part of our project management system.'

'We use CAD [computer-aided design] systems to help us assess the risks.'

'We use independent consultants who will independently verify our plans.'

'On bigger more complex projects, risk is more tolerated; they call for an expression of interest and a lot of emphasis is placed on what the contractor can bring to the table as far as innovation goes … value management meetings help.'

'As a publicly listed company we need to manage risk very well … we do SWOT [strength-weakness-opportunity-threat] analysis and maintain risk registers; it is a structured process.'

'Early involvement is important; we were involved in the early feasibility stages and workshopped the design to address risk.'

'We have an authority-level policy which differentiates between business as usual and non-core business … we have a risk and opportunities register with the bids to help plan our strategy.'

'We have risk assessment in our project management plans prior to a project commencing, discussed at a pre-construction meeting.'

'Communication and demonstration can help overcome perceived risks to change, especially for staff who are set in their ways ...'

Application Strategies

Interviewees were asked about financing innovation and their responses tended to indicate that, mostly, innovation was only undertaken if it did not involve higher costs. There were some exceptions, with a smaller contractor, whose business was based on manufacturing activity and global patents, noting that they funded innovation from profits. The same contractor also noted that they usually developed new designs in response to clients' needs, and that quick turnaround was often required, but that they also did a limited amount of undirected long-term innovation. Another contractor emphasised the industry's reliance on incremental changes, which are seen to be, and probably are, more important to improving project performance than more radical innovations (partly because of the difficulties in 'proving' more radical changes in an industry where the costs of structural or design failure are very high). Application strategies for innovation were also influenced by the level of risk involved: '… low risk and we just go ahead and try it — high risk and we try to implement it in a small version first — testing in the yard or trials for major projects'.

Innovative contractors, innovation risk and clients

'You've got to have a client who is a risk-taker and you help them by providing an escape condition.'

'In the last three-to-five years, principally public clients, and some project clients like BHP Billiton, have started assessing innovation as part of the tender process and it has certainly given us some weighting and implies a greater risk tolerance.'

'The client has only agreed to it on the basis that there is no risk to him, entirely.'

The interviews revealed a number of steps that were important to successful innovation application. Firstly, it was considered important to put the client's need first. Talking at length with the client is valuable, but equally necessary is good communication with the client's engineers. Such communication demonstrates the contractor's interest in the client's project and enhances the contractor's reputation. Developing this relationship might also mean that the client's engineers take some ownership of ideas and therefore may find new ideas less threatening to their reputations.

Secondly, pre-tender meetings are often used to assess project risks and opportunities. The meetings appear to yield better innovation outcomes if they are broadly attended: '… all the estimators and project managers sit down together to discuss the project, even if the project managers aren't affiliated with that particular genre of engineering'.

Thirdly, significant IP was often invested in preparing a tender with built-in innovation (while taking steps to protect the IP). It may be that estimators have more time to focus on innovative ideas than the construction team has:

'… very often with contracts that are won, the team is just that focussed on getting the whole thing moving and getting onto site and starting the work that they often do not have the opportunity to spend the time thinking of clever ideas and innovations, whereas the estimators quite often do have the time'.

The quality of estimators is therefore crucial. Ideally, they come from a trade background, with lead estimators having 20–30 years industry experience, including an extensive history of site work. They need to understand the whole construction system. Equally valuable is a thorough handover process to the construction team:

'There is a part in that handover where the innovation or new techniques of building have to be fully explained and justified to the construction team so they can successfully take it forward and add value to it. That is both their jobs — the estimating team and the construction team — their whole life is about adding value to the project. It is not unusual for the site team to review the options again and choose a different option due to better knowledge of conditions on the ground. In some of the projects, the estimating team will stay involved through part of the construction to ensure that there is an absolute overlap of ideas.'

Fourthly, an integrated project plan was seen as helpful for formalising communications by spelling out required processes, which may include appointment of an innovation sponsor in addition to a project manager. Similarly, quality accreditation to ISO 9000 involves a project start-up system which helps to maximise innovation opportunities. For small contractors, simple strategies like getting prequalified for government work, becoming quality assured, and adopting third-party auditing, increase innovation opportunities and ensure rigor in processes.

The application ideas mentioned by respondents can be represented as follows:

Chart 4

Successful application of project innovation

get client on board

↓

search widely for ideas

↓

allow generous time in handover from estimators to constructors

↓

build innovation processes into the project plan

Benchmark Yourself Do You …

1. maintain active networking relationships with industry associations and universities?
2. adopt a 'long look forward' to identify potential ideas for innovation?
3. see your employees as your main source of innovation ideas?
4. manage a strategic innovation process over the long term, rather than simply relying on innovation driven by immediate site-based problems?
5. maintain knowledge bases containing learnings from previous projects, and constantly upgrade ease of access to promote usage rates?
6. maintain formal innovation management procedures?
7. put considerable effort into understanding client needs, as early as possible, as a means of enhancing innovation opportunities?
8. build time for innovation into project plans?

3. Value of Government Initiatives

Interviewees were asked about the value of Commonwealth and state government initiatives, which can influence innovation performance. This line of questioning produced the most marked differences between responses based on business size. Overall, large contractors were much happier with government initiatives than small contractors were. The range of initiatives raised by interviewees covered innovation directly, and indirectly via business development, employment and regulation initiatives. This was an open-ended question and these four categories were identified by the researchers after the interviews.

Chart 5
Government initiatives raised by interviewees

Innovation
- R&D tax concession
- university research
- innovation grants
- Australian Technology Showcase

Employment
- industrial relations changes
- skills-shortage policies
- training initiatives
- technical colleges
- school-based education programs

Business Development
- loans and grants
- business development seminars
- export market development initiatives
- technology parks
- international agreements
- government advisors
- active parliamentarians

Regulation
- environmental legislation
- safety legislation
- building standards
- approvals and licences
- income tax

Innovation Initiatives

Direct innovation initiatives mentioned by interviewees comprised the R&D tax concession, university research, innovation grants and the Australian Technology Showcase.

R&D Tax Concession

The Commonwealth Government's R&D tax concession was accessed by most interviewees. Large contractors tended to regard it very highly, while smaller contractors were more inclined to perceive the benefit as more marginal.

Small contractors, including those who used the concession and those who did not, were concerned about the compliance costs – particularly in terms of increased administrative requirements: '… the procedure is onerous and there needs to be a considerable amount of money involved before it is worthwhile'. There were also concerns from a small contractor about the difficulties in qualifying: '… we don't derive a great deal of value from that scheme because the hurdles to qualify are pretty high'. Not surprisingly, large contractors were more inclined to perceive the effort required to qualify as 'minimal'.

Among concession users, both large and small, there was a belief that in addition to the direct financial gain offered, the requirement to keep robust records helped to track activity and to better manage business processes. The concession was also seen to usefully make R&D more visible within large companies: '… the R&D tax concession focuses people … we note it under the bottom line against each of the operating entities, it makes senior managers more open minded about R&D'. One large user, spending '… a couple of million a year on R&D' was very impressed with the scheme and had transferred R&D into Australia from overseas operations to take advantage of the concession, commenting that it was '… a really good platform'.

Those not using the concession may lack initiative: '… we don't use the incentive, but it does say more about us than it does about the government', and '… we just don't really see any benefit; there's no contact, nobody is asking us any questions …'. It would seem that the tax concession is employed predominantly by the manufacturing and mining industries, and that marketing of the initiative to the construction industry has been non-existent, or at least, very limited. Certainly, in their 2004 National Innovation Survey of nearly 400 construction companies, the BRITE Project found very low levels of awareness that the concession existed.

Spotlight on the R&D Tax Concession

The R&D Tax Concession is a Commonwealth Government initiative to encourage more R&D to be undertaken in Australia. It is administered jointly by AusIndustry and the Australian Tax Office. This concession allows companies to deduct 125 per cent of eligible expenditure incurred on R&D activities from their assessable income when lodging their tax returns. A 175 per cent deduction is available for expenditure that exceeds a three-year rolling average.

The tax concession is certainly an incentive for construction companies considering investment in R&D activities. It impacts directly on the bottom line and is therefore very visible to senior management, so it generates a positive attitude and strategic approach to R&D, and certainly helps in short-term cost–benefit analysis of proposed R&D activities.

The R&D Tax Concession is not just for activities that fit the classic understanding of research – laboratories and people in white coats – it applies more broadly to innovation and the activities necessary to develop and test innovations.

To claim the R&D Tax Concession, a company must be incorporated in Australia, and have prepared and maintained an R&D Plan. To be eligible for the R&D Tax Concession, the R&D must involve systematic, investigative and experimental activities which:

- involve innovation (contain an appreciable element of novelty) or high levels of technical risk; and
- are carried on for the purpose of acquiring new knowledge or creating new or improved materials, products, devices, processes or services.

A company can also claim for support activities that are directly related to the undertaking of R&D.

Other requirements for eligibility are that a company must:

- maintain contemporaneous records to substantiate the R&D activities
- bear both the financial and technical risk associated with the R&D activities
- control the R&D project and effectively own the R&D results
- intend to exploit the results of the R&D activity on normal commercial terms to the benefit of the Australian economy.

If the R&D activities are for the development of computer software, the company must intend that this software is for multiple sale to non-associates of the company.

Details of how the R&D Tax Concession works are given on the AusIndustry website www.AusIndustry.gov.au under 'AusIndustry products'.

R&D Tax Concession information compiled by Gerry Shutt, Group Knowledge Manager, John Holland, in association with the BRITE Project of the CRC for Construction Innovation.

University Research

University research opportunities can also be difficult to access as they are tied to individual universities across Australia and tend to rely on 'who you know'. Having said that, it appeared to be relatively easy to contact local universities (for example, through the Head of a Construction Management School) looking for opportunities. It seemed that contractors are likely to be well received, particularly if they are prepared

to be persistent, as universities have a mandate to maintain strong links with industry and to undertake industry-relevant research. One small contractor interviewed formed such a relationship and joined a group of academics in a grant application to the Australian Research Council (ARC). From that involvement, the contractor worked with a postgraduate student on research relevant to the company. Such an approach involves a cash investment, which is matched by the university and the ARC.

The other approach revealed by the interviews was for a contractor to become a partner in a university research centre. This avenue of improving a company's innovation outcomes would involve a more significant cash investment than a joint university–industry grant application, and therefore is best suited to a consortium of small construction companies, or a large contractor. The interviewee involved in the research centre commented that as an industry we are '… somewhat reactive and very cautious about changing anything', and that we follow the logic that '… you can't be wrong if you follow the way you've done it before'. Such comments reflect an industry culture which emphasises 'blame'. He noted that this leads to 'horrendous inefficiencies'. He sees his company's involvement in the university research centre as being based on a more progressive and less risk-averse approach to improving the company's performance, and that of the industry generally. He believes that contractors can benefit from the research undertaken in universities, whether or not they are partners in the work — it's just a matter of seeking out the latest ideas: '… you've got to keep on moving on and keep up with what's available and consider what might fit into your business'.

Innovation Grants and Australian Technology Showcase

Interviewees accessed innovation grants including Commercialising Emerging Technologies (COMET) and Commercial Ready. Such grants are provided at Commonwealth level by AusIndustry, and by the state and territory governments, typically through their industry departments. Innovation grants and loans are particularly useful for construction companies that are developing and manufacturing unique plant, equipment or materials.

Some of the small contractors interviewed were also registered on the Australian Technology Showcase. The Australian Technology Showcase is a promotional and networking government program targeting small- and medium-sized Australian businesses with innovative, cutting-edge technologies. It aims to encourage exports and increase employment by promoting member technologies in domestic and international markets.

Business Development Initiatives

Business development programs provided by various government departments are usually targeted to small companies and cover a range of areas, including an emphasis on innovation. Interviewees accessed loans and business development seminars organised by AusIndustry, and export market development initiatives offered through Austrade. Technology parks were mentioned by one interviewee who bemoaned the fact that such facilities are not really set up for construction-related companies and that the alternatives were less than satisfactory — for example, having to pay commercial lease rates during the start-up phase of a technology company (in this case a specialist construction contractor/manufacturer). Technology parks support the growth and commercialisation of Australian technology companies by offering tenants reduced lease rates, advanced information technology (IT) infrastructure and an environment that supports information exchange and networking. Again, it appears that such opportunities need to be better marketed and tailored to high technology businesses in the construction sector.

One large contractor with international operations had recently started operating in Australia and had shifted R&D activity to this country. These developments had been assisted by the Australia and New Zealand Closer Economic Relations (CER) Trade Agreement. A couple of smaller interviewees had found government workplace advisors to be useful in explaining changing government regulations and the implications for contractors, particularly in relation to safety and industrial relations, for example, in giving information about right of site entry for union representatives. And finally, one small contractor noted the kudos created for his company when they hosted the visit of a parliamentarian under the Victorian Employer's Chamber of Commerce and Industry, 'MPs in Business' program. The program aims to improve the understanding of members of parliament in issues and changes facing the business community.

Overall there was very low awareness of government business assistance programs, and this would seem to reflect again the lack of emphasis on marketing to the construction industry. One interviewee noted that support probably was available, but that it was hard to find:

'I was talking to a company yesterday, at the Innovation Centre for SA [South Australia], that had just got a $2.5m grant to create business employment in the south of Adelaide. He said it was fairly onerous, but by and large, there are consultants and processes to work you through it. So the support mechanisms are out there, it's just knowing where …'

To try and redress this problem, the next section reviews key Commonwealth Government business assistance programs.

Selected Commonwealth Government Business Assistance Programs

The programs outlined here can all be accessed via the AusIndustry website http://www.ausindustry.gov.au/ under their 'Products' or 'Useful Links' sections. These and other business assistance programs, including those provided by state and territory governments, can be accessed via the InnovationXchange Network at http://www.ixc.com.au.

Australian Institute for Commercialisation (AIC) TechFast Program

The AIC's national TechFast program is funded by the Commonwealth Government Department of Industry, Tourism and Resources. Additional financial support comes from the Victorian, Queensland and South Commonwealth Governments. The program has been designed to help small- and medium-size enterprises (SMEs) locate and adopt new commercially viable technologies or innovative processes, by matching these SMEs with research organisations who possess such technologies and expertise.

Businesses that participate in the TechFast program can obtain funded services to offset the cost of assessing and adopting an innovative product or service from the public R&D sector. As well, the AIC appoints a designated TechFast project manager to work alongside the business, allowing the company to concentrate on running their day-to-day operations — an additional resource that is extremely valuable to these SMEs.

Link to TechFast Program information on the AIC website: http://www.ausicom.com/01_cms/details.asp?ID=82

Business Entry Point

The Commonwealth Government's Business Entry Point offers simple and convenient access to government information, transactions and services. It's a whole-of-government service providing essential information on planning, starting and running your business.

'How-to' guides, such as those listed below, can be accessed via the Business Entry Point: Thinking of starting a business: Readiness, planning, raising finance, writing a business plan.

Starting a business: Starting a new or home-based business, or buying a business or franchise.

Exiting a business: Succession planning, bankruptcy, deregistering your business and employee payments.

Business Entry Point website: www.business.gov.au

Commercial Ready

Commercial Ready is a competitive merit-based grant program supporting innovation and its commercialisation. It aims to stimulate greater innovation and productivity growth in the private sector by providing around $200m per year in competitive grants to SMEs between 2004 and 2005, and 2010 to 2011. A wide range of project activities can be supported, extending from initial R&D, through proof of concept, to early-stage commercialisation activities. Commercial Ready builds on, and replaces, the existing R&D Start Program, the Biotechnology Innovation Fund and elements of the Innovation Access Program.

Commercial Ready provides grants from $50,000 up to a limit of $5m for eligible projects of up to three years in duration. An eligible project must aim to produce, commercialise or establish the commercial or technical viability of a new, clearly identified product process or service.

Link to AusIndustry Commercial Ready Information: http://www.ausindustry.gov.au/content/

Commercialising Emerging Technologies (COMET)

COMET is a competitive, merit-based program that supports early-growth stage and spin-off companies to successfully commercialise their innovations.

It helps customers commercialise innovation through:

- raising capital from business angels or venture capital funds
- borrowing money
- licensing
- joint ventures or strategic alliances.

COMET has engaged private sector business advisers across Australia to assist successful applicants to become ready for commercialisation activities. A tailored package of support is provided in the form of business advice and merit based financial assistance. This program has been extended until June 2011, providing an additional $100m in funding.

Link to AusIndustry COMET Information: http://www.ausindustry.gov.au

Export Market Development Assistance Programs

Export Market Development Assistance Programs are provided by Austrade and include:

Events	**Self Assessment Tools**
Search and register for an event Upcoming trade events Education exhibitions	Check your export grant eligibility Calculate your provisional grant entitlement
Education Services	**Export Opportunities**
E-business education resources Event presentations Student and teacher resources Economist's corner	Industry/country market profiles Australian Suppliers Directory Export opportunities
Enquiry forms	**Free e-newsletters**
Australia/US Free Trade Agreement Export grants New Exporter Development Program	Export Update Trademark e-Marketservices EMDG Update
Other Austrade Services	
New Exporter Development Program Export Market Development Grants	Tradestart Export Assistance Offices Free Trade Agreements

Link to the Austrade Export Services Directory: http://www.austrade.gov.au/programs-services/default.aspx
Link to Tradestart office locations: http://www.austrade.gov.au/About-TradeStart/default.aspx

Export Market Development Grants (EMDG)

The EMDG scheme is the Commonwealth Government's principal financial assistance program for aspiring and current exporters. The scheme is administered by Austrade and is aimed at encouraging Australian SMEs to develop export markets by reimbursing up to 50 per cent of eligible export promotion expenses above a threshold of $15,000.

Austrade provides up to seven grants to each eligible applicant, for promotional activities for export products, services and intellectual property. Claims can be made for expenditure on specific export promotional activities undertaken during the financial year before the application period (or two years for the initial grant).

EMDG supports seven categories of promotional activities:

- overseas representatives and marketing consultants
- marketing visits
- communications
- free samples
- trade fairs, seminars, in-store promotions
- promotional literature and advertising
- bringing overseas buyers to Australia.

Link to Austrade EMDG information: http://www.austrade.gov.au/

Industry Cooperative Innovation Program (ICIP)

The ICIP is a merit-based grants program aimed at encouraging business-to-business cooperation on innovation projects that enhance productivity, growth and international competitiveness in Australian industries. The program has the particular focus of meeting strategic industry needs such as those identified through action agendas and supports projects that deliver industry-wide benefits.

The ICIP requires a consortium to be formed from a minimum of three entities to cooperatively conduct a project on behalf of an industry. Successful applications are selected on merit and compete for limited funds. The program has two streams that cover:

- project scoping or innovation mapping activities
- research and development, proof of concept, innovation demonstration and adaptation, and/or innovation implementation activities.

For both streams, eligible applications ranked as most competitive may be offered funding of up to 50 per cent of the eligible expenses for the approved project.

Link to AusIndustry ICIP Customer Information Guide: http://www.ausindustry.gov.au

InnovationXchange Network

IXC Australia Limited (trading as the InnovationXchange Network) provides a secure, managed environment for the connection of insights and opportunities between firms, universities and governments through the deployment of its world-first IXC Intermediary Service.

IXC intermediaries (specialist innovation, commercialisation and business development support staff) work inside member organisations under a strict code of ethics and unique confidential structure, to search for and create deep connections for business growth – without prematurely exposing sensitive internal information.

Under the confidential structure of their engagement, IXC intermediaries are able to access each member's IP and R&D bases in order to learn what they need and what they can offer. When an opportunity is established, IXC intermediaries help members engage directly.

InnovationXchange website: http://www.ixc.com.au/home.html

National Australian Technology Showcase (ATS)

The ATS is a national and international campaign designed to promote leading-edge Australian technology and the skills of the companies that produce them. The ATS presents member technologies professionally to likely business partners and markets around the world, securing benefits for member companies and, more broadly, for industry in Australia.

The showcase reaches across a wide range of industry sectors such as agriculture, building and construction, environmental management, information and communications technology, manufacturing, medical and biotechnology, and transport. The ATS is targeted at SMEs with innovative, cutting-edge technologies. It aims to encourage exports and increase employment, by promoting member technologies into domestic and international markets.

ATS website: www.ats.business.gov.au.

Regulation Reduction Incentive Fund (RRIF)

The RRIF aims to foster the growth potential and sustainability of small business, particularly home-based businesses, by streamlining regulatory and compliance requirements for business at the local government level. The Commonwealth Government established the $50 million RRIF, to provide local government authorities with incentives to press ahead with regulatory and compliance reforms that will benefit small business; for example, through a reduction in the impact of regulation and associated compliance costs.

This component of the RRIF is a competitive merit-based grants program targeted at local government authorities throughout Australia. Successful projects funded under the program have demonstrated sustainable reform of local government regulatory regimes and compliance procedures which will deliver measurable cost reductions to small and home-based businesses in their dealings with local government.

Link to AusIndustry RRIF information: http://www.ausindustry.gov.au

Small Business Entrepreneurship Program (SBEP)

The SBEP builds on the previous Commonwealth Government initiative, the Small Business Assistance Program, encompassing the Small Business Enterprise Culture Program and Incubators Program, and introduces the Succession Planning initiative.

The SBEP is a highly competitive merit-based grant program that aims to assist in fostering entrepreneurship, including the growth potential and/or sustainability of small businesses by supporting initiatives comprising:

- general skills development and mentoring services for small business owners and/or managers
- mentoring and skills development services for succession planning to help small business owners maximise the value and marketability of their businesses and to provide strategies to exit the business, while ensuring business continuity
- incubation services provided through small business incubators.

SBEP involves:

- business skills development, themed 'Young Entrepreneurs' (under 35)
- training and mentoring projects
- incubators
- succession planning, themed 'Business Continuity'.

Link to AusIndustry SBEP information: http://www.ausindustry.gov.au

Small Business Field Officers Program (SBFO)

Small-business field officers provide a referral and general advisory service to small businesses, particularly those in areas of unmet need, through a network of locally placed field officers. The service forms part of the Building Entrepreneurship in Small Business Program and is funded until June 2008.

The availability of this one-stop service allows local businesses immediate and direct access to the full range of government assistance programs, services and information, as well as advice on local small-business issues such as regulatory requirements.

Owners and managers of small businesses can be informed about topics including business diversification, preparing for export, home-based business, e-commerce, taxation and finance.

Link to AusIndustry SBFO information: http://www.ausindustry.gov.au

Employment Initiatives

The Commonwealth Government's industrial relations changes were not universally welcomed by the interviewees. Large contractors, especially those that tended to a 'command and control' model of employee relations, were very happy with the changes and felt that they now had greater flexibility and therefore greater scope for innovation and less time lost because of strikes. However, this was a minority response; the overwhelming majority of interviewees thought the changes had resulted in little impact on them, or that their own progressive IR policies had been overtaken and were no longer providing the competitive advantage that they once had. In this last case, two interviewees had moved to non-union certified employment agreements years ago, and had been reaping the competitive advantage of a non-unionised workforce and happy employees. Now there is potentially a more level playing field in this respect, and further, the early movers are now faced with delays in registering their Australian Workplace Agreements (AWAs): '… the office of the employment advocate are snowed under, we are waiting for months for AWAs to come through, so the changes haven't worked for us!'

The two early adopters of AWAs had undertaken the change under a self-imposed 'no disadvantage test' and within a culture that places employee satisfaction at the centre of their business success. Their actions were undertaken in the context of a very embracing employee culture, which was evident across most of the interviewees (see Section 1: Employees), so that adversarial employee–management dynamics are minimal.

The current skills shortage was also important for interviewees: '… we are more interested in training and how to employ people from overseas more easily'. Another interviewee thought skills shortage policies were already making it easier to hire workers from overseas: '… the flexibility is fantastic, the local council is even advertising for overseas workers'.

Another means to reduce the current skills shortage is to increase the number of workers being trained. A background paper for the Cole Royal Commission found that all states and territories except Victoria and the ACT had training incentives in place tied to government construction work. These initiatives typically involve a requirement that 10–20 per cent of total labour hours for a government construction project are undertaken by apprentices or trainees. WA and SA have these arrangements, and they have prequalification systems that emphasise training — WA Priority Access, and Upskill SA. These last two policies were mentioned by several interviewees as instruments that both usefully acknowledged their training efforts and encouraged greater effort due to the recognition they received.

The construction industry training funds which operate in different forms in a number of states were less well received by interviewees. A recent academic paper on training investment suggests that these funds are smaller than European equivalents and that Australian construction training is typically funded by a levy on employers of around 0.1– 0.25 per cent on building value. The funds have mainly been used to support apprenticeships in the industry. Overall, interviewees lacked confidence in the effectiveness of the funds, with there being '… a lot of suspicion about what happens to that money', and the academic paper similarly argued against their effectiveness (although for different reasons):

'It is difficult to [see] that the construction industry levy has been very successful in raising training expenditure … when repeated surveys have shown that employers in construction consistently spend less on training than employers in most other sectors.' (Smith & Billett 2006, p. 9)

Previous sections have shown that the innovative contractors interviewed put considerable resources into training, and with training levels of 10 per cent of time being reported, this cohort is unlikely to be among the under-spenders. The lesson here for the industry is that training is positively related to successful innovation and therefore business growth, and hence should be a priority for every company. For government, there appears to be a need to review current training policy arrangements. One interviewee noted the short-term, election-oriented perspective of Commonwealth Governments and how this impacts negatively and directly on training regimes, as well as influencing the scheduling of work, so that most public infrastructure investment happens at once, prior to the next election, which creates labour shortages and exacerbates the training crisis.

Another interviewee was being more proactive in trying to improve the training situation by working with local members of parliament to successfully locate one of 24 new federally funded technical colleges in their regional area. That contractor is also involved in secondary school education programs, taking trainee placements weekly. They see a lot of scope for state governments to improve apprenticeship and subsidy schemes. Another contractor thinks that the answer lies in improving the image of the industry so that young people perceive it to be an attractive place to work, while pay levels would also need to be more attractive.

There were also concerns expressed by interviewees about the length of apprenticeships: '… in some instances they are too long, I could see shortening bricklayers' apprenticeships …' Flexibility in apprenticeships was also an issue, there being too many distinct trades, and the pay and subsidy levels may be inappropriately low for training adults who support family members.

Regulation Initiatives

In open-ended questions, the interviewees nominated a number of types of regulation that they thought impacted on their ability to innovate and to effectively conduct business. These included environmental legislation, safety legislation, standards, approvals, licences and income tax audits.

Environmental Legislation

The move to green leases for government tenants was seen to encourage adoption of energy-saving innovations developed by contractors. The Commonwealth Government's Green Lease Schedule reflects their desire to improve, and be accountable for, energy efficiency in buildings. According to the National Greenhouse Office, '… it is part of the wider policy of the Commonwealth of Australia reflected in the Commonwealth Government Operations Energy Efficiency Policy to reduce the environmental impact of government operations, and by so doing, lead the community by example' (http://www.greenhouse.gov.au/). There are new policies requiring government departments and agencies at federal and state level to only occupy buildings with a 5-star energy rating, as their leases expire and the opportunity arises. This direction is also being pursued by key private sector players such as KPMG and BHP. Through the requirements of tenants such as these, building owners are being pressed to take up energy-saving innovations, some of which are developed by the contractors interviewed. According to them, this green trend is rapidly picking up momentum and greatly encouraging innovation.

Safety Legislation

It was noted that the National Safety Initiative has forced the industry to improve its performance, while the same was said about recent changes at the Federal Safety Commission and the operation of the National Code of Practice. As a result of recommendations by the Cole Royal Commission, the National Code has been established, with the Commonwealth Government adding implementation guidelines which are a tool for changing behaviour in the construction industry, particularly in equity and safety. The new guidelines apply to any construction company doing work for the Commonwealth Government over a certain threshold in value, and require that all the company's work is compliant with the code. These changes are seen to be onerous for contractors, but are also seen to promote better safety outcomes and greater fairness across the supply chain. Nevertheless, one contractor complained that they had maintained compliance many years prior to the Commonwealth Government's crackdown, and as with the IR changes, this change was seen to reduce their competitive advantage, by improving the performance of all participants.

Another contractor had a different take on better industry compliance, suggesting that for complying contractors, the non-compliance of other contractors is actually a disadvantage:

'With safety everyone has to agree that this is a good idea, then a regulatory environment has to be instituted that forces all to comply, because otherwise the companies that are leading the pack have costs that they can't write off — if one company is acting unsafely then that's money on their bottom line — so that sort of stuff has to be applied to everyone — a consensus has to be reached.'

Even though some progressive contractors feel disadvantaged by more strictly enforced compliance measures, it is clear that such a policy will improve overall industry performance, particularly in terms of safety.

Building Standards

Interestingly, the Australian Building Codes Board was only briefly mentioned as being instrumental in driving innovation. With the move to performance-based codes in the mid-1990s, the academic literature would suggest greater scope for innovation compared to the old prescriptive system, although this did not emerge in open-ended questioning. The new system certainly has the potential to promote innovation by allowing greater flexibility, through permitting the use of alternative materials, construction and design. It is unclear whether contractors are taking full advantage of these performance-based arrangements, although previous work by the BRITE Project indicates that some best-practice companies are reaping the rewards (BRITE 2004). In any case, it may be that research into the consultants' sector would reveal greater impact of performance-based codes.

Approvals and Licences

Approvals processes were criticised by a large international contractor, who felt that the system for approval of new techniques in Australia was

inefficient and unduly time consuming. In particular it was felt that if one state jurisdiction has approved a new system, approval by other jurisdictions should not require further trials. Further, '… one of the difficulties is actually getting to the right people and talking to them and getting a decision made'. It was clear that this problem had significant negative impacts, and certainly previous work by the BRITE Project revealed many other frustrated innovators annoyed by apparently excessive retrialling of new technologies and practices by multiple jurisdictions. It was suggested that a national innovation management system could streamline processes for innovators and rapidly improve diffusion rates.

In a similar vein, approval bodies were criticised for delays on environmentally sensitive projects. These delays were seen to be a significant barrier to innovation:

'Lots of government departments and agencies are required to have input through a long and tedious process and if anybody puts up a change to the project that requires reapproval from those myriad organisations it could take years, and the developer just hasn't got time, so he says "mate, even if you are going to pass on substantial savings, I just haven't got time to get the approvals done, so just do it, the way it was". It quells innovation big time. A job that takes four weeks to do, could take three years to get approvals for. The EPA [Environmental Protection Agency], because they have staff changes and all these things that go on, are really hard to get approval from and then if you want to go and change the approval you just go through the same nightmare again, it's terrible, I would say it would be one of the biggest factors against innovation in Australia, the approval process. The planning as well.'

Overall, there were mixed feelings about approval bodies, and industry associations, with there being nearly equal measures of appreciation and frustration expressed. The feeling that 'if the staff in these agencies were any good they would be in the private market at the moment', was expressed directly once, and echoed by several other interviewees. This lack of confidence probably needs to be addressed.

Income Tax

In discussing the merits of in-house employees, in terms of the stability and innovation opportunities they offer to the industry, one interviewee was very agitated about the relative costs of maintaining a large in-house workforce. He compared these costs with the costs of using subcontracted labour. It was not the formal difference in costs that bothered him, for example ongoing leave and superannuation expenses. Instead, his concern was that tax fraud was providing his competitors, who rely on subcontractors, with an unfair cost advantage. His company is committed to maintaining a large, loyal in-house workforce, but he felt that 'there was an obvious advantage to this illegal, unethical and crafty situation [tax evasion], otherwise there wouldn't be so many "subbies" on most construction sites'.

Apparently the Australian Tax Office has cracked down on larger subcontractors, so that their tax affairs are largely in order, but it may be that individual subcontractors have escaped such scrutiny. It was alleged that such individuals make illegitimate deductions to reduce their taxable income and that this is a win–win situation for them and their employer, as it keeps costs down: '… there is a lot of tax fraud in this sector, it is not fair to salary earners who pay the right amount of tax, or their employers'.

Benchmark Yourself Do You …

- [ ] 1. have a formal process to regularly assess the range of government initiatives available to your company?
- [ ] 2. have a formal method of assessing the costs and benefits of applying for a particular initiative?
- [ ] 3. understand the relative merits of loans, grants, seminars, tax concessions, legislative changes, training subsidies, research institutions, and marketing assistance, as the key types of government support available to your company?

4. Role of Clients

The interviews also investigated the experience of highly innovative contractors with different kinds of clients and contracts. Overall, it was found that the interviewees sought work with experienced clients, and prioritised relationship-building in pursuit of negotiated contracts, rather than responding to open tenders. This was largely to be expected, but there were some interesting detailed observations. This section examines the characteristics of clients that the interviewees felt impacted on innovation opportunities and their thoughts about various types of contracts. It concludes with an outline of their recommendations for improved client performance.

Client Characteristics Impacting on Innovation

A very strong relationship focus emerged during discussion of client characteristics that drive innovation on projects. The quality of the relationship between the client and contractor, and trust between them, was seen to be mediated by:

- background
- organisation culture
- client competency
- client requirements
- sector represented
- probity considerations.

Background

Twelve of the 20 interviewees reported that most of their work, by value, was for the private sector with the remainder stating that government clients represented most of their work. Interviewees from the road and bridge sector were more likely to have the government as their major client. For the majority of contractors their single largest client represented between 10 per cent and 25 per cent of their total business, by value of work done. There were, however, two interviewees for whom one client represented 60 per cent or more of their total work; surprisingly these were both large contractors. Nearly all of the contractors had long-standing relationships with their principal client. The timeframes declared for this relationship ranged from 10 to 60 years.

Organisation Culture

The key elements of a client organisation's culture raised by the interviewees comprised: approach to contractors, risk management, openness to new ideas, and treatment of contractor's intellectual property.

One interviewee summed up the general feeling expressed during the interviews, which was that '… the biggest change in the industry has been that, predominantly, people are more interested in working together in achieving the benefits of being an integrated project team.' She felt there had been a cultural shift in the industry over the past 10 years, with clients now being more inclined to engage with contractors earlier, through workshops for example, to discuss project objectives. This desire from contractors for early involvement in projects was a consistent theme throughout the interviews. This interviewee suggested that contractors are seen less to be the enemies now, and more to be professional service providers.

The risk management issue raised by interviewees was typically expressed in terms of its impact on innovation opportunities. These best-practice contractors had the same complaints about client management of risk that are echoed throughout the rest of the industry. Despite the move to new contracting methods, there is still a perception that the balance of risk between clients and contractors remains onerous for contractors, diminishing innovation opportunities. In addition to the concern

with risk allocation in contracts, interviewees also talked about the clients' organisational culture and how, if this was marked by risk aversion, many innovation opportunities were lost. On the other hand:

'… if the organisation is headed by a change-agent, or someone who wants to take it in new directions, or wants to lead, we have found that those relationships have actually borne a lot of fruit; those are the sort of people that have supported our innovation; it helps with technology transfer. We are more open and feel more comfortable with an organisation like this. You tend not to find it very often, which is a shame. It's all about change and it comes back to attitude, it is a state of mind. Our experience is that you've got to have a bit of discomfort to move to the next level.'

Lack of openness to new ideas can be driven by risk aversion as described above, or by ego and reputation considerations. For example, when a contractor puts forward an idea, the client's designer or technical people may feel that their reputation is being threatened because they did not come up with the idea themselves. This was a major concern for several of the interviewees, with them suggesting that this ego/reputation issue was a significant barrier to innovation:

'… the design engineer is usually defensive, so that if the contractor comes up with ideas to save money, the engineer is worried about what the client will think, he gets a finger pointed at him by the client "why didn't you design it with that in it? Here is the contractor coming up with cost savings and I'm paying you to do that …", so the designer is not too interested in our innovations because it makes him look bad.'

'They don't encourage our ideas, if we come up with an alternative, they say, well you put up the design, and we have to go to another designer and pay for it, so there isn't a lot of incentive at all.'

'The clients' project managers might be keen, but when it goes back to their decision-making people, their technical people, they say it didn't come from them …'

It would appear that senior managers within client and consultant organisations need to better understand that innovation comes from the fresh perspective of outside organisations, such as contractors. This situation is of concern, as multiple perspectives have value in serving best-for-project outcomes. Indeed, the benefits of an integrated team approach, as opposed to action based on narrow vested interest, are increasingly being understood. Relationship-based contracts, including alliancing, which are rapidly becoming more common, are a good example. The issue may be that on large complex projects such integration is more likely, while innovation opportunities on smaller projects continue to be lost due to parochial interests.

There were also complaints about client treatment of contractors' intellectual property. One of the contractors interviewed has been active in the industry for over 20 years and currently spends over $1m per year on R&D. His main concern was about the treatment of IP in the industry. He believed that the approach to IP, and lack of respect shown by clients, made his company less trusting in their client relationships and less inclined to risk revealing their innovative ideas for fear of losing control of the IP and associated income streams.

This international contractor had put an innovation idea forward after the client offered a reward for such ideas. The client subsequently used the idea, but failed to pay the reward. The contractor is now much more cautious about revealing IP and says:

'We are worried about treatment of our intellectual property, it is a big issue. You have to implement innovation very cunningly and to your advantage, very quietly. Sharing ideas becomes a personal thing to some extent. We have some relationships with people that we don't mind sharing with, but as you go further up the tree and start talking more formally it is like going to court; the cloak goes on and it is very formal and you don't feel like you are getting anywhere and there is such a big labyrinth of people. We are nervous about putting our ideas in the public domain as they have commercial value to us'.

It seems that this problem about treatment of IP is exacerbated by the absence of clear procedures: '… it's hard when something is not part of a normal "spec" and there are no forms'.

Client Competency

Client competency was raised as an important factor in the ability of contractors to innovate on projects, and indeed just to run them efficiently. There was concern that some government agencies had been 'hollowed-out' and that one in particular was:

'… becoming less and less sophisticated and less and less understanding of the building process. Their in-house resources continue to get less, whereas once they did a lot of their own work with their own contractors, now we have to fill the void and give them extra input; it is very frustrating.'

Another client agency overseas was seen to have gone so far down the path of outsourcing that management of assets had suffered to the extent that the agency was once again building up its internal competency: '… there has been an adverse affect on the contracting industry – the client has to have core competency.' Another domestic government agency was congratulated by several interviewees for having maintained internal skillsets during the outsourcing boom of the 1980s and 90s. The message from the interviewees was that it is very much to their advantage to have a competent client that '… knows their own business very well.' It was felt that a knowledgeable client organisation was less likely to be risk-averse and more likely to be open to innovation (although the ego dynamic raised above would still need to be managed well). Indeed, the academic literature emphasises the importance of client competency in driving innovation across the industry (Manley 2006; Nam & Tatum 1997).

Client Requirements

One contractor summed up interviewee feelings about challenging client requirements and their relationship to innovation thus:

'The client may say "look I need this" for whatever reason – either it is early completion or a response to something or we have to build something without interfering with the business next door. Often what will start as a pretty painful and critical client demand will produce some really clever responses. I mean, you read the brief that says, well, you have got to install this by next week and you are not allowed to use concrete or whatever it is, and you think "Well OK, this is going to be hard" and you start on day one feeling that it is impossible, and by day 25, you think you have cured cancer!'

'You know you start that journey thinking this is impossible and our challenge is actually just going to be to talk our client out of this, and you finish the journey often coming up with a really clever idea and you know that is kind of rewarding, it is also often the difference between winning the job and not winning the job.'

Such challenging client requirements have been well documented as an important driver of innovation (Manley 2005; Manley & Blayse 2003). In some cases, the client's challenging demands are driven by new policies; at this time in Australia the move to green leases by government building owners and tenants has been a significant factor in promoting innovation that delivers improved energy efficiency. This particular policy was raised by several interviewees as providing promising innovation opportunities.

Sector Represented

Interviewees' perceptions about the role clients played in promoting innovation on projects varied markedly according to the sector in which the client operated, also taking into consideration size and experience.

When asked to compare private and government clients, most interviewees noted that this divide concealed great heterogeneity. Certainly when it came to discussion of budgets and focus on money, there was no consensus as to which type of client drove the harder bargain. However, when asked about which type of client was more inclined to promote innovation on projects, a clear majority of interviewees emphatically noted the lead role played by public sector clients, principally through experimentation with progressive contracts: '… the government no doubt, is the leader in that. The private sector tends to be a follower, in fact, I can't recall a private sector client ever taking any [contract] initiative in my entire [20 year] career.' Another large national contractor noted that '… the clients that have the most impact are the government clients because they have the assets, they command significant portions of the market – I mean look at Queensland for instance, it's a big, big client so they have a lot of influence in driving innovation.'

The innovation leadership provided by clients was seen to be related to their experience. The greater innovation leadership perceived to be demonstrated by public sector clients was partly driven by there being are larger number of experienced clients in the public sector than in the private sector. But even experienced private sector clients failed to match the government in the eyes of these contractors: '… they just copy government guidelines without really understanding them and they become a proxy for common sense.' The deciding factor appears to be client core competency.

Government clients were also perceived to have greater professionalism: '… private sector clients often haven't done their research well enough, you tend to spend more wasted time with them.' In a similar vein, another interviewee noted that when things go wrong with private clients it can be very nasty and personal, and that the government had more robust procedures and greater contract competency: '… some private sector clients are still locked into lump-sum contracting, they are going backwards in a way'.

Promotion of innovation through contracts and contract management professionalism were clearly viewed as mainly government traits, while 'openness to new ideas' tended to be viewed more as a private sector trait. As might be expected, the government was criticised for being '… not interested in commercial realities, too bureaucratic and inflexible; with representatives blinkered by the culture they work in'. On the other hand, the contractors interviewed noted that they shared the same type of culture with private sector clients and that this has helped in supporting relationships.

Leaving public–private comparisons aside, private clients in the mining sector were perceived to be very open to innovation by one interviewee, particularly in safety. It appears that there is sufficient innovation generated in Australia to warrant large-scale award events. At the annual mining industry conference, which attracts about 600 delegates, a session is dedicated to inventors to present their innovation ideas. The ideas are judged by a panel, with delegates also voting for the winners of various awards. Last year, ABC presenters of 'The Inventors' television program sat on the panel, the idea being to help get

mining innovations on to the program. Awards for innovation bestowed by industry associations are also quite common in the construction sector, although it did appear that this mining example was on a larger scale, with more attention to invention and innovation rather than just best practice as tends to be the case in construction. The mining example also appears to reveal a greater emphasis on commercialisation opportunities. In construction, the materials and equipment sectors produce the most easily commercialisable innovations, yet award programs run by industry associations probably lack the scale and professionalism achieved in the mining example.

Probity Considerations

Probity considerations principally involve the need to be seen to be acting honestly and with integrity. Such considerations are very important for government clients because they are accountable to government ministers as well as the general public, but they also have a big impact on the operation of publicly listed private sector clients because they are accountable to shareholders. For non-listed private contractors, honesty and integrity can often be assumed without the need for complex, and constraining, procedures. This is particularly true of small contractors, although there clearly remains scope for dishonesty.

During the interviews, probity was raised mainly in relation to government clients. The following negative points were made:

- Public servants are not able to make executive decisions because of probity considerations, and this is a barrier to innovation as it is time consuming for contractors to determine where and how decisions are made.
- Probity considerations encourage the award of contracts based on lowest cost as this is the easiest way to demonstrate value for money in an overt way, even though there may be very high subsequent variation costs.
- Even though contracts may in theory be awarded based on equal consideration of price and non-price criteria, the latter often have less weight because 'of fear of being taken to the corruption commission'.
- Flexibility is reduced because specific criteria for national audit must be met.
- The full value of community benefit is difficult to measure in a way that satisfies probity needs, leading to under investment.
- Probity concerns lead to risk aversion which works against the adoption of innovations: '… the country seems hell-bent on probity and there is an atmosphere of not trusting anybody'.
- There is an associated need not to be unfairly favouring any particular contractor, which can lead to inefficiency when the best contractor fails to win a job, simply because they have won a lot of work in the recent past.
- Private sector clients have more scope to look after their successful partners and form strategic alliances with contractors because they are less constrained by probity worries. One contractor suggested that '… airports are probably the best – develop something innovative with them and you will get a long-term relationship'.

These problems associated with probity were to some extent offset by some positive impacts, including that:

- '… a surety of payment is always there – government clients have rules and regulations that are exposed to public scrutiny'
- fairness in relation to variations is likely because government clients have robust systems in place to meet their probity responsibilities – variation outcomes from private sector clients were viewed as more problematic.

The probity impacts of publicly listed private sector clients were seen to be similar to those applicable to the government described above, although less extreme. Non-listed private clients were seen to have the greatest flexibility, which was highly valued, but were also seen to be problematic in other ways. For example, small 'get rich quick' developers were singled out as having little integrity: '… he has no systems, nor processes, he is looking for the slickest way in and out and he really doesn't care about creating an environment that encourages innovation because he is only there for the short haul'.

Assessment of Contracts

In open-ended questioning, the types of emerging contracts raised by interviewees as being helpful in promoting innovation on projects included alliances, early contractor involvement, NSW GC21 Contract, and public–private partnerships (PPPs).

Alliances

Most attention was focussed on alliances, as there was significant support for this type of contract. Interviewees were very firmly in favour of the pure alliance approach, where the client negotiates a project cost estimate with one team, as opposed to two or more teams under competitive alliances. The arguments contractors put forward in support of pure alliances included that:

- using the resources of two or more teams in the months leading up to the contract award is '… an awful waste of resources in the current market'

Innovative contractors and alliances

'In the SA market, alliances and early contractor involvement are becoming more common, especially in the last three to four years – these approaches are changing the way we look at projects; we are now trying to win the project at concept or expression-of-interest stage.'

'We are setting up a relationship contracting group of specialists within the company and they include engineers, psychologists, and they go around assisting our various businesses, by mentoring people throughout the company to help us win alliance contracts.'

'The resources that are required for the bigger alliance projects and the different disciplines that might be required lend themselves to joint ventures and they end up sharing quite a lot of innovation in totally integrated joint ventures.'

'Alliances involve a completely different dynamic and I think the clients that have been involved in that process really understand the value they are getting from that.'

'MR has taken some initiative in including smaller companies in alliances.'

'MR are willing to sit down with contractors and have meetings prior to the formulation of new contract ideas.'

'MR are encouraging smaller contractors to get involved in alliances by forming a consortium, and offering longer project duration. One project, they wanted done in a specific period of time and then they realised that the smaller contractors couldn't get involved because they wouldn't be able to finance that sort of money over that period of time, but if they took it from a three-year contract and moved it to a five-year contract, then the smaller contractor could get involved, so I think MR are to be patted on the back for their efforts in trying to encourage a smaller contractor.

The last one we looked at was about $48m, but over four years, that's not a big contract.'

Benefits

'Under the alliance, the job took two years and cost $50m, whereas without an alliance it could easily have cost $70–80m and it would have taken four years.'

'But I think alliances really do foster innovation because the client is on-side as are the engineers and various consultants. To get an innovation up which requires a design change on a smaller construction job is very difficult.'

Limitations

'They are talking about delivering smaller projects via alliances, but you have got to jump through a lot of hoops; the majority of these jobs are road building jobs, it tends to [be] Leightons and their subsidiaries and a couple of their competitors that benefit from the alliancing approach.'

'Alliances have a beauty contest at the start where everybody has to say why they are the best people to be an alliance partner; it's very time consuming; there's an extensive and exhaustive process of selection which involves a third of the time of several key team members, so it's a big overhead to put up; with multiple teams, it's a big resource drain for the one-in-three chance that we'll get a go.'

'The question is how do you get the benefits of alliances down to smaller projects and local government?'

'Alliances do advance innovative opportunities, but it is hard for smaller companies to get their foot in the door, although MR are talking about changes.'

- the use of multiple teams breaks down the trust associated with the pure model, discouraging free discussion of IP and constraining innovation: '… competitive alliances stifle innovation because they make you have to keep your cards really close to your chest because you are competing'
- the supposed financial benefits of competitive alliances are undermined '… when the winning team supposedly wins on the lower price, but then renegotiates the contract to a higher price to sign up — which does happen'
- the open-book process associated with pure alliances ensures value for money, especially because external auditors are involved.

In addition to dissatisfaction with competitive alliances, the main themes raised by interviewees about alliances were: access for small contractors; cost of bidding, skills required to win, and scope for innovation. Although alliance contracts currently tend to involve large contractors, key government clients are looking at involving smaller contractors in alliances by extending the duration of projects to ease financial pressures, and also by encouraging consortiums to reduce the costs of bidding and expand skillsets to promote innovation. Such clients have also developed related contract forms that retain some of the benefits of alliances, without the high costs. One of these is the early contractor involvement (ECI) contract, which suits smaller projects better. One contractor noted that such contracts '… allow great innovation — no-one is hiding their ideas because it is in everyone's interest to bring them out'. The next section outlines this very new form of contracting designed by the Queensland Department of Main Roads.

Early Contractor Involvement Contract

The ECI contract can offer advantages over traditional road construction contract delivery methods and the more relationship-based alliance method, and achieves the constructability benefits of a design and construct (D&C) approach. The ECI is a two-stage process. The client engages a contractor/designer through a simple non-price process which involves high involvement of the client in building up and negotiating price, design and risks in stage 1 in an open book alliance-style environment. The client's role in stage 2 reduces to one of surveillance.

In contrast, a traditional D&C also gets the builder involved in the design process as early as possible, but may have three teams of contractors/designers producing three costed designs (up to 80 per cent complete) to tender for work. In a market where there is a high demand for new infrastructure and a shrinking resource base to carry out the work, the D&C process can tie up excessive resources in the bidding stage. The ECI contract significantly reduces the tendering costs and resources of both the contractors and the contractor's designers. Also in a D&C, the extent of the client's input into the designs is generally through an initial brief, with very little interaction with the client during the tender period. In comparison, the client's input during stage 1 of an ECI is far greater than in a traditional D&C contract.

The ECI has the benefits of a project alliance during the first stage without the intense client resources required throughout the whole of an alliance project and those of a D&C contract during the second. It essentially involves putting additional resources into the crucial early planning phase in order to maximise the benefits and cost savings that can be achieved during construction. Innovation is mainly driven by the interaction between client, constructor and designer during stage 1. Strong relationships and understanding of the project risks develop which carry through to stage 2.

Another new contract favoured by smaller contractors is the NSW GC21 Contract. The excerpts below from the General Conditions of Contract (July 2003 including revisions to 12 September 2006) show why the contract might be well received by contractors.

GC21 (Edition 1) General Conditions of Contract

Preface

> The GC21 Contract reflects many of the initiatives outlined in the NSW Government White Paper Construct New South Wales. It has a strong emphasis on co-operative contracting and enhanced communication, which has proven to be highly effective in previous editions of this Contract.

Clause 46 Innovation

> This clause provides an incentive to the Contractor to improve its service to the Principal by innovation. If the Principal accepts the Contractor's proposal, the Contractor benefits by retaining immediate savings in its costs; the Principal benefits from the added value to the Works, reduced operating or maintenance costs, or similar savings. Alternatively, if stated in Contract Information item 42, the parties agree to share the savings in costs derived from an innovation.

One contractor was excited about the opportunity to have creative ideas adopted and to share in any saving:

'The innovation clause encourages people not to put their heads in the sand, and instead to come up with ideas which can assist the whole project. The innovation clause is getting used a fair bit. You put in a price for a project and you know that it is going to be over their budget because we get the state government budgets, and you think, this is double the amount of money that they have allowed. Nine times out of ten the government has got their budgets a bit wrong.

With the Best Practices Scheme, and particularly under the GC21 Contract, there are incentives for us to offer ideas to get their price down. … I always look for alternatives in government tenders, I use smart innovation I suppose. I network with some of the serious structural engineering companies and designers and together we come up with good ideas to win work.'

His experience was that savings from innovation were typically shared 50–50 between the contractor and the client. Another interviewee also emphasised the critical importance to his company of successful registration under the Best Practices Scheme. Such registration had significantly improved the reputation of the company and led to more work, directly and indirectly. The scheme is summarised below (DOC website 2006).

NSW Best Practice Accreditation Scheme

The New South Wales Government's Best Practice Accreditation Scheme is managed by the Department of Commerce and has been extended since its initial introduction in 1996. The Scheme encourages contractors to commit to long-term continuous improvement to achieve outstanding performance on construction projects in return for increased business opportunities and longer-term relationships through cooperative contracting. The objective of the scheme is to promote initiatives and business practices by construction contractors, that lead to a more competitive, innovative, productive and safe industry that is also socially and environmentally responsible. Contractors must demonstrate the application of:

- continuous improvement in project outcomes
- cooperative relationships with clients, subcontractors, suppliers and other project stakeholders
- ethical business practices throughout the organisation.

Accredited contractors receive:

- preference over non-accredited contractors for selected tendering opportunities
- a recommended reduction in the value of the GC21 Contract Completion Undertakings to three per cent of the contract price for all contracts based on those contract conditions
- a letter from the department stating that the contractor is accredited.

To achieve successful accreditation, contractors must:

- be prequalified with the Department of Commerce to tender for works valued over $2.5m
- demonstrate consistent good performance as head contractors and must achieve a minimum average weighted score of at least 60 percentage points for all contractor performance reports (CPRs)
- have evidence from independent third-party auditors that a satisfactory standard has been achieved during the preceding three years for occupational health and safety management, quality management and environmental management systems for projects over $6m
- allow an external financial assessor to assess their financial capacity
- have a satisfactory record of compliance with the NSW Government Code of Practice for Procurement
- have a satisfactory claims record, determined by the manner of settlement
- electronically tender for work arranged by the department or undertaken using the department's procurement system
- be accredited in terms of the NSW Government's Environmental Management System Guidelines
- have full certification to AS/NZS ISO 9001:2000 quality management systems
- have a corporate occupational health and safety management system accredited by a NSW Government construction agency that is consistent with the NSW Government's OH&S management systems guidelines
- have contract experience and management systems that have led to superior project outcomes, client satisfaction, business management systems, and ethical business practices.

The interviewee who highlighted the scheme also felt it encouraged innovation by better facilitating the assessment of alternative ideas: '… the Best Practices arena allows two-way conversation between us and the client without other tenderers getting upset; we can talk to the client and come up with new ideas'.

Public–Private Partnerships

Very large contractors were more likely to talk about PPPs as an interesting new contract approach, although one contractor noted that they were very expensive to bid on: '… it cost us $1.2m to bid and we came second, so we won't be doing it again soon – it's also the time it takes you to do it.' Nevertheless, another contractor noted that '… our desire for appropriate risk models has meant we have pulled out of hard dollar contracts and are pursuing negotiated PPPs'. Indeed, there was a strong preference for negotiated work over 'hard dollar' approaches: '… we try to negotiate one-on-one, that's the ultimate – we try to get what we call "soft dollar" work'. Negotiated contracts can make the difference in a project actually getting off the ground. If the project is too expensive under traditional arrangements, innovative contracts can be employed to facilitate the delivery of important infrastructure. However, negotiated projects can involve drawbacks for contractors, for example: '… if bank finance is involved you may spend two or three weeks negotiating contracts'.

Overall, the interviewees felt that the new forms of contract were promising in terms of project outcomes and industry sustainability. It was also observed that there was better matching of project and market conditions with appropriate contract forms: '… we are seeing greater customisation of contractual arrangements, sometimes that produces a greater sense of cooperation'.

Interviewees also talked about an overall improvement in project conditions and how these changes were related to the booming construction markets in Queensland and Western Australia. They emphasised the associated resource shortages. Mostly, contractors felt that the improvement in relations between contractors and clients, and improved contract conditions, would endure during any lean times in the future. Despite this positive majority view, some contractors were not so sure they were getting a fair deal now, let alone in lean times:

'In the current boom conditions, if you don't get the people and don't get the job finished, you could be facing $10,000 per day in damages – the contract conditions at the moment have gone absolutely berserk, so we are now employing an in-house lawyer to help us stay on top of the contracts we are putting in – the risk is being transferred more and more to the contractors.'

Innovative contractors and boom conditions

'Clients are struggling with the sheer volume of work they need to deliver, with diminishing staff because they are losing people to the private sector.'

'Negotiated contracts are very much driven by lack of resources, so people are almost forced to think of cleverer ways of doing things.'

'I think there is also a lot more interest from clients in working with contractors in some sort of closer relationship, like an integrated project team, so as to avoid the duplication in a tight market. Normally you would have a client team, and then you have a consultant team and then you have a contractor's team, and there would be significant overlap there. The idea of an integrated project team is where you have one team and you avoid all the duplication out of that process which is quite a good way to go about it.'

'Government clients are struggling with the same issues we are and hence they will have less staff to deliver projects in the future; so contract conditions will not deteriorate when the boom ends, as they are not going to want to make their lives any harder – they want to ensure that they get value for money, but also that we survive as an industry – they'll still be looking for better and different ways of contracting.'

'We have seen distinct changes recently from tendered work to negotiated contracts, but when the heat comes off a little bit, then people will be going back to tendering.'

'We've delivered value in an overheated market and our clients will respond by giving us value in lean times.'

Interviewee's Recommendations for Clients

Interviewee recommendations for improved client performance were in nearly all cases directed to government clients rather than private clients, possibly reflecting the fact that government clients represent a more homogenous group, with clearer shortcomings. Their recommendations fell into three broad areas: communications, culture and contracts.

Communications

'They need to open up communication channels more to their contractors; they're not actually changing some of the things that need to be changed. They need a research person to go out and research the innovation that's coming forth.'

'I would suggest that the one thing they need to do is to have greater involvement in seeking feedback – rather than just asking us to respond to a statement, an open forum would be better; enabling the parties to come together.'

'They need to be more open to new ways of doing things – they need to relax.'

Culture

'Government client employees are under the hammer all the time and everything they do is under scrutiny so what possible incentive is there for anyone to go outside of what they know is safe? That's what needs changing.'

'Government engineers just want to make all the decisions, I don't think they have really got to the point where they want to be the client.'

'We are professionals, ready to deliver complex projects, and I think they are beginning to get that, because they are not treating us as if we're the mafia and criminals out to rip them off.'

'In Australia's federation, getting approval for new systems and equipment is very frustrating, we shouldn't have to do the same trials six times – there should be a standard Australia-wide system.'

Contracts

'We are a very large contractor, but we are not a massive organisation. We get caught in the middle of projects that suit big companies and the ones too small for us.'

'Increasing the early involvement of contractors would help with trust, especially between government organisations and contractors.'

'Alliance processes should be shortened and simplified.'

'The industry needs a better risk profile on government contracts. For bridges, government clients should have innovation in their mindset.'

'There are not enough non-price criteria in tender selection.'

Although the contractors had many complaints about client behaviour, they also felt that there had been significant improvement in contractor–client relationships and that key clients were continuing to focus on exploring tomorrow's best practice. Their recommendations do not appear to contain any groundbreaking ideas; instead they tend to reinforce the current direction of change.

Benchmark Yourself Do You …

- [ ] 1. undertake most of your work with highly competent, repeat clients?
- [ ] 2. work with client organisations that have strong internal technical capabilities?
- [ ] 3. seek projects with difficult client requirements, so as to access more opportunities for innovation?
- [ ] 4. work with any of the following types of advanced contract: alliances, early contractor involvement contracts, GC21 Contract (NSW) or private–public partnerships?

Appendix: Research Background

The need for this work arose from the results of earlier research conducted by the BRITE Project of the CRC for Construction Innovation. That research involved a national innovation survey of the Australian construction industry in 2004. The data obtained from the survey enabled a broad-based picture to be drawn of the characteristics of highly innovative industry stakeholders. The quantitative methods employed to analyse the data gave a good overview of activity. This analysis also indicated the areas that most differentiated high- and low-level innovators. However, each area was only sketchily described. The qualitative interview-based work described here is intended to provide a more richly nuanced understanding of the characteristics and opinions of high innovators, in the key areas indicated by the survey work. These areas are:

- employees
- innovation
- government initiatives
- clients.

The specification of these topics arose from discussion of the survey results by members of the BRITE Project Team, notably including key government clients, for whom these areas were of interest. The project team also felt that the research should focus on the contractor sector of the construction industry. Innovation in the contractor sector is important but not well understood. Hence this report focuses on contractors and their relationships with other industry participants, such as clients, consultants and suppliers.

Companies were the unit of analysis, rather than projects, following the same approach as the 2004 BRITE survey. This company-level focus complements the bulk of BRITE's previous work which has had a project-level focus through the production of 12 innovation case studies. Having decided to conduct in-depth interviews with innovative contracting companies, a method to select participants needed to be established.

The team wanted to ensure that the companies interviewed were the most innovative possible. This was achieved by using the National Innovative Contractors Database that had been set up by the BRITE Project. Construction of the database was a very substantial exercise and in part was the result of feedback from the industry, wanting a 'yellow pages' of innovative contractors to help innovative industry participants find appropriate networking partners within the contractor sector. Invitations to apply for registration to the database were advertised extensively throughout Australia in June and July 2006, through newsletters of the Master Builders' Association, Civil Contractors' Federation and other industry associations, together with direct email invitations from key government client agencies.

At the time of writing (January 2007), 107 Australian contractors have applied for registration to the database, with 80 successfully qualifying. To apply, businesses completed a form asking them questions about their innovation activity. The answers were scored, and only those companies with an innovation score greater than the cut-off appear on the database. The cut-off score is based on results from the first large-scale construction innovation survey conducted in Australia (the BRITE 2004 Survey). The cut-off score delineates the top quartile of the 383 respondents to that survey, based on an innovation index; the same index is used for the database.

If all Australian contractors applied for registration on the database (rather than just those who thought they had a chance of successful registration), 25 per cent would be expected to qualify. In this case, the invitation process for the database focussed on those who might have been expected to qualify, explaining the 74 per cent success rate at this time.

The innovation score measures the:

- degree of novelty in technological and organisational innovations
- impact of innovation on profitability
- adoption rate of existing advanced technologies and practices
- importance placed on investing in research and development.

These indicators were drawn from the questionnaire for the BRITE 2004 Survey. The database was lodged on the BRITE website (www.brite.crcci.info) on 1 November 2006, and it will be part of a national seminar program in 2007. It is constantly being updated.

The database was employed by BRITE to obtain the best interviewees for the current study.

Selecting among the top 40 ranked contractors in August 2006, BRITE sought a mix of interviewees representing the general and specialist contractor sectors, urban and regional locations, large and small operations, and all Australian states. Diversity across these characteristics was achieved among the 20 contractors that agreed to participate in the study (drawn from negotiations with 25 contractors).

One senior management representative for each contractor was interviewed. These representatives were typically chief executive officers, managing directors, executive managers or senior project managers. In all cases, the representative was expected to be in a good position to knowledgeably discuss the interview topics, and this expectation regarding their capability was confirmed by the interviewers. There were two interviewers, who designed semi-structured interviews around a common set of questions about the four topic areas. The structured questions were formulated through discussion within the project team, based on results from previous survey and case study work. The two interviewers had backgrounds in construction innovation. Each interview ran between one and two hours, and all were conducted in August 2006. Difficult logistics and/or high cost precluded personal interviews in six of the 20 cases.

Each interview was transcribed and the transcriptions were used for identification of recurring themes and significant findings. Given the manageable size of the database, and the need to get close to the data, analysis was conducted by manual coding, without the use of computer programs.

Size, sector and location of interviewees

Discussing contractor size in terms of full-time direct employees can be misleading. For example, some nationally dominant companies have very small in-house workforces, while commanding a large market share. Size has, therefore, been determined according to estimated market share, as shown in Chart A1.

Chart A1: Size of contractor by market share

Size by market share	No. of companies
Very large nationally dominant companies	4
Other large companies	7
Smaller independent rapidly growing companies	9

All contractors were drawn from the building or civil construction sectors in Australia. Chart A2 summarises the types of contractors interviewed, by scope of activity.

Chart A2: Type of contractor by scope of activity

Type of contractor	No. of companies
General	13
Specialist	17

In Chart A3, location is shown by Australian state. The Australian Capital Territory, Northern Territory and Tasmania would have been covered if sufficiently innovative companies had responded to the invitation and registered on the National Innovative Contractors Database.

Chart A3: Location of contractor by state

Location of contractor	No. of companies
Queensland	7
New South Wales	4
Victoria	4
Western Australia	3
South Australia	2

Chart A4 shows that four of the 20 companies interviewed were in the regional areas of Gold Coast, Toowoomba and Goondiwindi in Queensland, and Warrnambool in Victoria.

Chart A4: Location of contractor by region

Location of contractor	No. of companies
Capital cities	16
Regional areas	4

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