

IMPACT OF CONTRACTOR INTERNAL TENDERING PROCEDURE GOVERNANCE ON TENDER WIN-RATES: HOW PROCEDURES CAN BE IMPROVED

Stephen Urquhart¹ and Andrew Whyte

School of Civil and Mechanical Engineering, Curtin University, Kent Street, Bentley, Perth, Western Australia, 6102, Australia.

Construction contractors normally, though not always, pursue tenders with the expectation of winning and subsequently making a project profit. Corporate governance (CG) constraints, risk appetite, and selected tender strategy impact contractors' tendered prices and any associated qualifications. Therefore, failure to win may not constitute 'failure' in senior executive's eyes. Increasing CG within some jurisdictions has led to more complicated contractor internal tendering procedures (ITP) with layers of management reviews and risk committee sign-offs. The question arises as to whether these changes make any difference to tender win rates and subsequent project outcomes. A series of qualitative semi-structured interviews were undertaken with 25 high-profile Australasian based construction contractors (11, either directly or via parent companies, operate internationally - Europe, Africa, Asia and North America), providing a mix of publicly listed and privately owned companies, as part of a wider research program investigating the efficiency and effectiveness of contractors' ITP. Moving beyond previous research limitations of smaller contractors (often sub-AU\$100m turnover) this qualitative research looks at much larger contractors. Content analyses of the interview transcripts found that, while contractors talked equally about 'win' and 'lose', most did not see losing a tender as 'failure'. Only a quarter felt their changed ITP made a difference to their tender win-rate. Somewhat unexpectedly interview findings suggest that approximately three-quarters of contractors have ITP that do not formally require lessons learned (LL) from previous tenders nor projects to be inputs in subsequent tender pursuits. Larger contractors (over AU\$500m turnover) were twice as likely to discuss LL, indicating different governance approaches to tender outcome expectations. Informal LL approaches were applied to clients' reputations (particularly payment) in bid/no-bid decisions. Interviewee suggestions of processes by which contractors can improve resultantly their LL procedures, as part of their CG, are also presented.

Keywords: contractor, corporate governance, failure, lessons learned, tender

INTRODUCTION

Good corporate governance (CG) involves codes and voluntary practices designed to facilitate effective management towards company long-term success (BEIS 2017). Major publicly listed contractors must comply with and report against listing rules, eg UK's Corporate Governance Code (Financial Reporting Council (FRC) 2016) or the

¹ stephen.urquhart@postgrad.curtin.edu.au

Australian Securities Exchange's (ASX) Corporate Governance Principles and Recommendations (ASX 2014). Legislators are increasingly keen that similar CG requirements be adopted by significantly sized private companies to keep pace with business expectations (BEIS 2017). These rules require public disclosure of a contractor's risk management approach and viability (solvency and strategic planning for ongoing success). Contributing components of contractors' CG are their internal tendering procedures (ITP), as a board must determine "the nature and extent of the principal risks it is willing to take in achieving its strategic objectives" (FRC 2016: 5) and hence its internal control principles. An obvious question is whether a claim to causality may exist (Whyte 2015) between more elaborate ITP requirements and a contractor's tender win-rate, and subsequent project performance success.

Twenty-five semi-structured qualitative interviews were undertaken with major high-profile publicly and privately owned civil construction contractors operating in Australasia, to facilitate a more detailed quantitative survey into ITP efficiency and effectiveness. As 11 of these contractors also operate outside Australia, and/or are subsidiaries of international construction companies, the findings may be argued as being reflective of contractors facing similarly legislated CG requirements in other (wider 'commonwealth-of-nations') countries. Contractors' responses about how they addressed lessons learned (LL) within their ITP provided a few, somewhat, unexpected results that will require further investigation (under separate cover).

LITERATURE REVIEW

Increased CG has the potential to further increase contractors' ITP requirements. Major Australian contractors can spend more than 10% (some over 15%) of their tender hours addressing their tender review requirements (Urquhart *et al.*, 2017), significantly more than the 6-9% UK contractors were spending (Laryea 2013). Increased governance, such as the pending UK governance changes (BEIS 2017), may lead to similar tender review time increases, particularly for larger and/or publicly listed contractors, meaning improved efficiency in ITP processes is essential.

As civil infrastructure projects often experience cost blowouts (Flyvbjerg 2009; Whyte 2015; Love *et al.*, 2017) it is reasonable to assume contractors do not always get their tender prices right. With most construction companies delivering only 2-4% profit margins (Schleifer 1990) they are over represented in company failure statistics (Coggins *et al.*, 2016). Given contractors' greater dislike for losses than equivalent gains (Han *et al.*, 2005) their ITP are often more focused on not winning a 'loss making' project ahead of winning the tender (Urquhart *et al.*, 2017). Cost overrun risk does not vary by project type or contract value - it only diminishes for the contractor if it is contractually protected from the risk (Love *et al.*, 2015). With increased risk transfer to contractors, especially with growing bespoke contract use (Whyte 2015), ITP governance is more focused on tender project selection, especially given the high potential for wasting time and money pursuing the wrong prospects (Bagies and Fortune 2006).

Contractors may tender a project for strategic reasons other than to win (Drew and Skitmore 1997). Individual project pursuit decisions can significantly influence a contractor's short-term profitability and long term strategy and performance (Hillebrandt, as cited by Bagies and Fortune 2006). Contractor decisions on a tender position are developed through (attempted) rational decision making at short discrete review events within its management hierarchy (Smyth 2017). Resulting decisions still occasionally lead to contractors winning projects that lose money (Coggins *et al.*,

2016). As strategic decision making is dependent upon measurement of performance (Jin *et al.*, 2013), the question arises as to whether increased ITP governance, involving iterative decision steps through progressive management levels over a project pursuit life cycle (Urquhart and Whyte 2018a), makes a real difference to win-rates and project outcomes. Success depends on how effectively a contractor manages its internal and external knowledge (Switzer, as cited by Shokri-Ghasabeh and Chileshe 2014).

Delegations of authority and risk appetite statements (e.g. not accepting process risk or consequential loss) can be included within CG and ITP rules. ISO 9001 certified procedures are a form of rule based knowledge retention (Kieser and Koch 2008). However, given the humanistic nature of tendering (Urquhart and Whyte 2018a) ITP rules do not achieve the same repeatable success rates as process and manufacturing quality assurance (QA) procedural rules. Winning one in every five (Yean and Liu 2005) or six (Laryea and Hughes 2008) tenders while following its ITP are hardly repeatable QA success rates a contractor would want when, for instance, incrementally launching a bridge. Past versions of ISO 9001 were prescriptive in their tendering and contractual review processes requirements. ISO 9001:2015 adopts a less prescriptive risk focused approach and does not even mention “tender”. To be certified to ISO 9001:2015 contractors should be adjusting their ITP, and other procedures, to this risk-based approach. Common sense derived from experience and expertise, i.e. learning, can constructively inform decision making (Smyth 2017) and thus be included within ITP. However, LL benefits within QA rules may be overlooked. Brooks and Spillane (2017) suggested some contractors only obtain ISO 9001 accreditation to meet client imposed tendering pre-qualification requirements, arguing no significant correlation between ISO 9001 certification and business improvement.

The qualitative study undertaken is an early step in a wider program to address an identified construction contractor need for research into the efficiency and effectiveness of ITP (Urquhart and Whyte 2018), especially within countries experiencing increasing legislated CG controls.

RESEARCH METHODOLOGY

Semi-Structured Interview Process

Twenty-five contractors, with a predominant focus on infrastructure construction, were purposefully selected to be interviewed in an early qualitative data gathering stage of the wider research program. Purposeful selection enabled a cross-section of high-profile privately owned (Private) and publicly (or subsidiaries of) listed (Public) contractors, with a range of annual turnovers, to be involved. While 24 of the selected contractors are Australian based, seven also operate internationally and another four are subsidiaries of international contractors (these 11 covering Australasia, Europe, Asia, Africa, and North America). The interviews, lasting 1.5 to 2.5 hours and held between November 2016 and January 2018, consisted of three parts:

Part 1: Company and interviewee demographics (summarised in Table 1). Contractor selections were weighted towards very large companies by turnover, when compared to Shokri-Ghasabeh and Chileshe (2014) - their main response source (85.2% <AU\$100m pa) was reflective of a construction industry dominated by small contractors (Drew and Skitmore 1997) rather than companies captured by stricter CG requirements. Contractors selected for this study were more likely to be

representative of those subject to current or pending CG obligations (ASX 2014; FRC 2016). Table 1 uses contractor categories (Cat A to Cat D) for convenience in this paper only. The open ended AU\$10+b Cat A is presented to avoid possible contractor identification, as the category includes a number of the largest operating companies in Australia. Eighteen of the contractors secured 80-100% of their work by competitive tender and the other seven 60-80% competitively. Interviewees held positions from Chief Executive Officer/Managing Director to Pre-Contracts Manager/Estimating Manager. Importantly, all had direct knowledge of and experience in (Love *et al.*, 2015) their respective companies' tender development and review processes. Their industry experience ranged from 10 to 40 (average 23.8) years.

Part 2: Involved 'rating scale' and 'check list' questions (Fellow and Liu, 2008) regarding management and decision structures associated with tender selection and review approvals that are beyond this paper's current scope.

Part 3: Semi-structured discussions on aspects of the contractor's approach to, and opinions of, its ITP and wider tendering processes. After using general questions to develop a rapport with the contractor deeper probing questions, informed by a detailed literature review, were pursued (Fellow and Liu, 2008). Nineteen contractors agreed to their discussion being audio recorded, while only handwritten notes could be taken for the others. Typed interview notes or transcripts, as applicable, were returned to the relevant participant to review/approve, or if necessary adjust/correct (Fellow and Liu, 2008). Questions relevant to this paper's scope related to:

Timing of changes to their ITP; and, whether the contractor felt these changes improved tender win-rates and project outcomes - an opinion based assessment as none of the contractors had specific data to hand to suggest a causal link. The nature of their project outcomes was not asked, recognising there may be strategic reasons, other than profit, for pursuing/winning a project (Drew and Skitmore 1997).

How contractors addressed LL (internal and client feedback) from previous tenders and projects. No direct questions were asked about reporting, analysis, recording, retention, or how LL were applied to tenders, to avoid guiding interviewees on what was being sought - i.e. how LL feed into ITP efficiency.

Table 1 - Number and demographics of contractors interviewed by ownership and turnover

Contractor Category / Annual Turnover	Overall Numbers	Public Ownership (includes subsidiaries)	Private Ownership
Cat A – AU\$1 – \$10+b	6 (24%)	5 (20%)	1 (4%)
Cat B – AU\$500 - \$999m	2 (8%)	0 (0%)	2 (8%)
Cat C – AU\$100 - \$499m	9 (36%)	4 (16%)	5 (16%)
Cat D - <AU\$100m	8 (32%)	4 (16%)	4 (16%)
Totals	25 (100%)	13 (52%)	12 (48%)

Analysis of Interview Data

Returned transcripts were coded in NVivo 11 for content analysis on a systematic qualitative level, seeking progressive development of response themes, and a basic quantitative assessment, around specific word counts (Leedy and Ormrod 2013). Word counts were made on contractors' use of 'fail', 'learn', 'lesson', 'lose', 'profit' and 'win' and associated derivatives. Text surrounding these words was coded considered reflective of the different CG and tender outcome expectations. Coding analysis of word usage against contractor ownership and turnover categories enabled

identification of trends in ITP changes; views on how those changes impact tender/project performance outcomes; and, approaches to LL.

FINDINGS FROM THE INTERVIEW DATA

Contractors' Perceptions of the Impact of ITP on Their Tender and Project Results
 Cat D Private Contractors mentioned 'profit' the most, perhaps for survival, followed by Cat A Public, which may be a function of ASX performance expectations. All groupings had near equal usage of 'win' and 'lose' and rarely used 'fail' in their discussions. So no further conclusion could be drawn in that regard. An indication of the frequency at which contractors were changing their ITP could be obtained from qualitative statements made (it was not a specific quantitative survey question) (see Table 2). Twelve (48%) of the contractors made ITP changes within the last three years, while six others (24%) were making changes. Public contractors showed a higher propensity to make changes, often to address CG including delegations of authority. Of the remaining seven (28%), several had not changed their ITP in five years. While not asked at the time, reasons may include their ITP already reflecting ASX's third edition of CG requirements (ASX 2014).

The 18 contractors indicating they recently (<3 years) had made, or were making, changes to their ITP were asked if their changes improved tender win-rates and project outcomes. One of the other contractors also provided an unsolicited comment in this regard. Responses, extracted from the transcripts, are presented by contractor category in Table 3. Responses of 'no difference' or 'could not tell' were considered to reflect the same position, i.e. 'no discernible difference'. While not asked, five contractors (4 Public, 1 Private / 3 Cat A, 2 Cat B) stated it was the people involved, not the ITP that really made the difference. The humanistic issues of tendering are investigated further in Urquhart and Whyte (2018a). Contractors with more stringent CG obligations (i.e. larger and Public) were the ones more likely to comment about the importance of people on tender results. As the impact of people over ITP process was not an interview question (though now identified for the later quantitative survey), the number of contractors holding this opinion is considered a lower bound - the others may hold similar, but unstated, views.

Table 2 - Timing of contractor changes to ITP

Made ITP changes	Totals	By ownership		By annual turnover			
		Public	Private	Cat A	Cat B	Cat C	Cat D
Changing now	6 (24%)	4	2	1	1	2	2
<3 years	12 (48%)	6	6	3	1	4	4
>3 years	7 (28%)	3	4	2	0	3	2
Totals	25 (100%)	13	12	6	2	9	8

Fewer contractors made comments on whether their ITP changes led to improved project outcomes. At the time, this was not investigated further but noted to be included in the later industry quantitative survey on contractors' views on the impact of ITP and people on tender win-rates. It cannot be concluded there is causality between ITP changes and tender win-rates - tender teams may not always comply with their ITP as they seek time efficiency (Love *et al.*, 2016) during constrained tender periods, where limited information may be available.

Table 3 - Perceived impact of ITP changes on tender win-rates and project results

Impact of ITP changes on	By ownership		By annual turnover			
	Public	Private	Cat A	Cat B	Cat C	Cat D
Tender win-rates						
Made a difference	3	2	1	0	3	1
No discernible difference	5	9	2	2	5	5
Project outcomes						
Made a difference	3	3	2	0	2	2
No discernible difference	4	3	2	0	3	2

Representative responses of divergent views obtained during the interviews are:

You can have the best system in the world but if you have inexperienced people it will never work. Public, Cat A

Where we have undertaken mid-tender reviews that has definitely improved our bid and come up with solutions that helped win the bid. Public, Cat D

I think often the win rate would be more dictated by market constraints. Often the procedures would lower our win rate because they are designed to get us to a position where we understand the risk. Private, Cat C

Contractors' ITP Requirements for Inclusion of Lessons Learned into Tenders

During the interviews, contractors were asked how they addressed LL from previous tenders and projects. Content analysis of interview transcripts indicated most contractors operate either informal LL structures or, at best, a low level of formally documented LL retention (see Table 4, where turnover groupings are >AU\$500m and <AU\$500m due to the limited meaningful responses). Only three contractors (two Public) specifically mentioned linking LL to tendering, while three others (1 Public, 2 Private) considered LL in bid/no-bid decisions - e.g. clients and payment reputations. This was despite many others recognising the need for better treatment of their LL. Word counts, normalised by category, indicate contractors with turnovers >AU\$500m were twice (1.9 times) as likely to mention LL as those with turnovers <AU\$500m.

Table 4 - Contractor comments on their approach to lessons learned and its use in tenders

Approach to LL	By ownership		By annual turnover	
	Public	Private	>AU\$500m	<AU\$500m
Formal procedures in place (2)	1	1	1	1
A documents form applies with varying rigour (7)	6	1	3	4
Informal use, especially for input to tenders (5)	2	3	3	2
Number of meaningful responses (14)	9	5	7	7

Of the 14 contractors that provided an outline of their approach to LL, only two had a formal LL procedure while seven (6 Public, 1 Private) claimed a less formal documented approach. A further five (2 Public, 3 Private) operated an informal approach. While a number of the contractors did not raise/discuss LL it does not mean they do/do not have or operate formal LL procedures. Discussion was not be drawn out to avoid indicating surprise that expected levels of formal LL incorporation into ITP were not occurring, and it was not the original research focus. However, this low use of LL procedures is consistent with Shokri-Ghasabeh and Chileshe's (2014) findings that, despite contractors believing LL were important, only a third actually retain such information and use it when selecting subsequent tender opportunities.

Representative views on the importance, or otherwise, of LL are:

Best practice would be absolutely having a lessons learned feedback loop and a system that demands that lessons learned being captured at the end of each project. Public, Cat A

It is a great buzzword and everyone wants to do lessons learned but it is how you implement that into the next tender. Public, Cat A

Past lessons can often be rationalised out..... It is not commercially competitive to add money for the past lesson of what may have gone wrong. Private, Cat A

Some lessons learned will be documented, though the majority of lessons learned remain in heads. Public Cat D

Another problem in the industry is that sometimes lessons get hidden in the top levels of management Private. Cat D

These responses reflect an industry dominated by personal past experiences: Where word of mouth prevails over structured learning (Maqsood *et al.*, 2006); and, important project knowledge often remains only in the minds of the key people involved (Kazi and Koivuniemi 2006, cited in Shokri-Ghasabeh and Chileshe 2014) and not fed back to contractors' tendering teams. While the temporary nature of project teams may be argued as a contributing reason for restricted learning (Jin *et al.*, 2013), contractors' tendering teams are more permanent. Structured LL retention and re-use for tenders should be possible.

With consistent structured incorporation of LL seeming to remain an industry failing/challenge, contractors' suggestions (see quotations below) on how they sought to improve LL capture are worth considering. However, none of them proposed a governance directive that formal LL procedures be applied as part of their ITP. This suggests long ITP review processes involving layers of management in sequential events (Urquhart and Whyte 2018a), while being of questionable value, may remain in favour. From a tendering efficiency perspective, if contractors fail to evaluate whether their actions are yielding their sought after results, then, like other strategic plans, they will merely expend tender teams' time and energy (Simu 2017). Organisational learning must capture individual knowledge (a challenge on highly transient major projects), retain it and then transfer/re-apply it when needed (Argote 2011) on later tenders. Effective LL information should be progressively captured, not left until job closeout reports, which are invariably rushed or not completed as the project team member's move onto their next project(s).

Monthly project reports now include a section on innovations and lessons learned. Public, Cat D

[Proprietary customer management system] enables lessons learned to be captured. Private, Cat B.

[A] refresher that you do once a year and can be tailored so that if you are doing road projects you can learn the current issues and trends. Public, Cat A.

Perhaps drawing from Cummings (2004), who suggested external knowledge sharing within structurally, rather than demographically, diverse groups provides for greater performance improvement, some contractors were actively seeking LL from competitor sources. They visit projects lost at tender to compare construction methodologies the winning tenderer is using with the methodologies they based their losing tender on, e.g. use of incrementally launched rather than precast bridges.

From these interviews it was clear that for most contractors LL is still not a mandated formal activity within their ITP. High-profile/status contractors that do not have LL

procedures within their ISO 9001 certified quality management systems are unlikely to adequately embrace LL and incorporate them into subsequent tenders.

CONCLUSIONS, LIMITATIONS AND FURTHER RESEARCH

There exists an identified need for improved efficiency in contractor internal tendering procedures (ITP) (Urquhart and Whyte 2018). As an early stage, to facilitate a wider ITP research program, this study draws on information gained from a qualitative assessment of data from semi-structured interviews with 25 Australasian based construction companies, of which 44% have international exposure through operations and/or parent companies. Of the interviewed contractors, 72% had made, within the last three years, or were making changes to their ITP to address increasing corporate governance (CG) obligations - a matter now facing larger UK based contractors (BEIS 2017). However, only a quarter of those 72% of contractors felt the changes resulted in better tender win-rates and even fewer thought they produced better project outcomes. This identifies a need for further research into whether ITP changes are focused in the right areas.

An unexpected finding from the interviews, given the high-profile nature of the contractors, was the indication that clear realistic capture, storage and subsequent re-application of lessons learned (LL) into later tenders remains an area requiring real attention within the industry. Improved LL should be a governance focus ahead of more bureaucratic multi-layered tender review processes that appear to commonly apply in larger construction companies (Urquhart and Whyte 2018a), especially as various contractors felt it was people, not ITP, who really made the difference.

This study was based on qualitative information. Future studies will pursue quantitative data to determine correlation, and perhaps later find causality, between greater governance led contractor ITP changes and improved tender win-rates and project outcomes. Need still exists for further quantitative studies on the true status of LL procedures, and their links to ITP, within larger contractors, recognising that Shokri-Ghasabeh and Chileshe's (2014) 'large' contractors were still relatively small compared to the contractors included within this purpose selected sample. Even major high-profile contractors do not necessarily have LL procedures within their ITP, despite the benefits identified by past research. As long as contractors fail to seriously consider and apply past 'lessons learned' when pursuing new tenders they are destined to repeat their mistakes, and so they will become 'lessons re-learned'.

ACKNOWLEDGEMENTS

The authors would like to acknowledge the contribution of an Australian Government Research Training Program Scholarship in supporting this research and the willingness of the 25 (anonymous) construction contractors interviewed as part of this research.

REFERENCES

- Argote, L (2011) Organizational learning research: Past, present and future. *Management Learning*, 42(4), 439-446.
- ASX (Australian Securities Exchange Corporate Governance Council) (2014) *Corporate Governance Principles and Recommendations 3rd Edition*. Available from <https://www.asx.com.au/documents/asx-compliance/cgc-principles-and-recommendations-3rd-edn.pdf> [Accessed October 24 2015].

- Bagies, A and Fortune, C (2006) Bid/ no-bid decision modelling for construction projects. *In: Boyd, D (Ed.), Proceedings 22nd Annual ARCOM Conference, 4-6 September 2006 Birmingham, UK. Association of Researchers in Construction Management, Vol. 1, 511-21.*
- BEIS (Department for Business, Energy and Industrial Strategy) (2017) Corporate Governance Reform: The Government response to the green paper consultation. Available from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/640470/corporate-governance-reform-government-response.pdf [Accessed 01 March 2018].
- Brooks, T and Spillane, J (2017) Lies, Damned Lies and Quality Management Systems: A Pilot Case Study. *In: Chan, P W and Neilson, C J (Eds.), Proceedings 33rd Annual ARCOM Conference, 4-6 September 2017, Fitzwilliam College, Cambridge, UK. Association of Researchers in Construction Management, 582-591.*
- Coggins, J, Teng, B and Rameezdeen, R (2016) Construction insolvency in Australia: Reining in the beast. *Construction Economics and Building, 16(3), 38-56.*
- Cummings, J N (2004) Work groups, structural diversity and knowledge sharing in a global organization. *Management Science, 50(3), 352-364.*
- Drew, D and Skitmore, M (1997) The effect of contract type and size on competitiveness in bidding. *Construction Management and Economics, 15(5), 469-489.*
- Fellows, R and Liu, A (2008) *Research Methods for Construction 3rd Edition*. Chichester, UK: Wiley-Blackwell.
- Flyvbjerg, B (2009) Survival of the unfittest: Why the worst infrastructure gets built - and what we can do about it. *Oxford Review of Economic Policy, 25(3), 344-367.*
- FRC (Financial Reporting Council) (2016) UK Corporate Governance Code. Available from <https://frc.org.uk/directors/corporate-governance-and-stewardship/uk-corporate-governance-code> [Accessed 1st March 2018].
- Han, S H, Diekmann, J E and Ock, J H (2005) Contractor's risk attitudes in the selection of international construction projects. *Journal of Construction Engineering and Management, 131(3), 283-292.*
- Jin, Z, Deng, F, Li, H and Skitmore, M (2013) Practical framework for measuring performance of international construction firms. *Journal of Construction Engineering and Management, 139(9), 1154-1167.*
- Kieser, A and Koch, U (2008) Bounded rationality and organizational learning based on rule changes. *Management Learning, 39(3), 329-347.*
- Laryea, S (2013) Nature of tender review meetings. *Journal of Construction Engineering and Management, 139(8), 927-940.*
- Laryea, S and Hughes, W (2008) How contractors price risk in bids: Theory and practice. *Construction Management and Economics, 26(9), 911-924.*
- Leedy, P D and Ormrod, J E (2013) *Practical Research Planning and Design 10th Edition*. Upper Saddle River, NJ, USA: Pearson Education.
- Love, P E D, Edwards, D J and Irani, Z (2012) Moving beyond optimism bias and strategic misrepresentation: An explanation for social infrastructure project cost overruns. *IEEE Transactions on Engineering Management, 59(4), 560-571.*
- Love, P E D, Edwards, D J and Smith, J (2016) Rework causation: Emergent theoretical insights and implications for research. *Journal of Construction Engineering and Management, 142(6).*

- Love, P E D, Sing, C P, Carey, B and Kim, J T (2015) Estimating construction contingency: Accommodating the potential for cost overruns in road construction projects. *Journal of Infrastructure Systems*, 21(2).
- Love, P E D, Zhou, J, Edwards, D J, Irani, Z and Sing, C P (2017) Off the rails: The cost performance of infrastructure rail projects. *Transportation Research Part A: Policy and Practice*, 99, 14-29.
- Maqsood, T, Finegan, A and Walker, D (2006) Applying project histories and project learning through knowledge management in an Australian construction company. *Learning Organization*, 13(1), 80-95.
- Schleifer, T C (1990) *Construction Contractors' Survival Guide*. New York: John Wiley and Sons.
- Shokri-Ghasabeh M, Chileshe N (2014) Knowledge management barriers to capturing lessons learned from Australian construction contractor's perspective. *Construction Innovation*, 14(1) 108-134.
- Simu, K (2017) How Do Project Based Organisations Develop, Implement And Follow Up On Strategies And Objectives? ARCOM Working Papers Compendium 2017. Available from <http://www.arcom.ac.uk/-docs/archive/2017-Working-Papers.pdf> [Accessed 15th July 2018].
- Smyth, H (2017) Developing Decision Making In Projects: Analyzing The Mobilization Of Bias And Non-Decision Making In Projects. In: Chan, P W and Neilson, C J (Eds.), *Proceedings 33rd Annual ARCOM Conference*, 4-6 September 2017, Fitzwilliam College, Cambridge, UK. Association of Researchers in Construction Management, 542-551.
- Urquhart, S and Whyte, A (2018) Contractor tendering research: Going beyond bid/no-bid and mark-up models. *Proceedings of Institution of Civil Engineers: Management, Procurement and Law*, 170(6), 255-262.
- Urquhart, S and Whyte, A (2018a) Rethinking the tendering frameworks of construction contractors in the context of a soft systems methodology approach. *Frontiers of Engineering Management*, (in press), <https://doi.org/10.15302/J-FEM-2018019>.
- Urquhart, S, Whyte, A and Lloyd, N (2017) The Development Of A More Efficient Internal Tender Procedure Framework For Australian Construction Contractors. In: Chan, P W and Neilson, C J (Eds.), *Proceedings 33rd Annual ARCOM Conference*, 4-6 September 2017, Fitzwilliam College, Cambridge, UK. Association of Researchers in Construction Management, 693-702.
- Whyte, A (2015) *Integrated Design and Cost Management for Civil Engineers*. Florida: CRC Press.
- Yean, Y L F and Liu, M (2005) Factors considered by successful and profitable contractors in mark-up size decision in Singapore. *Building and Environment*, 40(11), 1557-1565.