ANDREW RUNDLE, GRAHAM BREWER, THAYAPARAN GAJENDRAN

Implementing Electronic Tendering for Public Works Procurement – A Tasmanian Experience

ABSTRACT:

Information and communication technology (ICT) applications, including electronic tendering (ET), have been introduced into public and private sector organisations business operations increasingly since the 1990's. The uptake of ICT applications has extensively been based on the promise of streamlined business processes, increased competitiveness, and efficiencies in time and cost. As a Web based collaboration tool, electronic tendering processes have emerged in recent years as a procurement tool of great promise. The acclaimed benefits of ET are the ability to automate, streamline and enhance tendering processes, traditionally undertaken using paper-based methods. This paper reports findings from an exploratory study investigating the experiences of small public sector 'client' and 'contractor' organisations during the trial (pilot) implementation of electronic tendering in Tasmania. The study employed in-depth interviews as data collection technique. Findings indicate that, despite the promised benefits, some contractors and suppliers have not fully embrace the process and uptake has not been to the expectations. Some of the reported inhibitors and reasons for the slow uptake include technical, process and cultural barriers.

KEYWORDS: Electronic Tendering, E-procurement, Information and Communication Technology, Local Government, Contractors and Suppliers.

1.1 INTRODUCTION

Electronic tendering has been identified as an effective tool in the procurement of good and services and has been highlighted as an opportunity to match "buyers" and "suppliers" through purpose developed software and the WEB (Eden, et al, 2000).

The ET process encompasses a range of automated processes which facilitate communication and effectively uses ICT applications to replace "paper based" tendering processes. The use of ET has accelerated over recent years and there is much published research and opinion in respect to the benefits. Many benefits have been described and include increased productivity and efficiency, streamlined tendering processes, modernisation of business practices, improved commercial relationships, increased access opportunities, reduced costs and better value for money outcomes (CRC, 2003).

Australia's Construction Research Centre (CRC, 2003) for Construction Innovation has identified that e-tendering forms one of a number of e-activities that are expected to underpin future growth, productivity and efficiency across many industry sectors. In recent years there has been progressive uptake of ET processes by both the commonwealth and state governments. More recently local government organisations have implemented ET processes through co-operative shared arrangements with state government systems and through trusted third party (TTP) operated platforms and purchasing agencies.

This paper summarises findings from a research study into a pilot (trial) implementation of a third party electronic tendering platform within the state of Tasmania. Identified within the paper are the issues and experiences of some of the public sector client and contractor organisations who have participated in trial e-tendering implementation. The research study employed a qualitative research method and data was collected through semi-structured interviews. Data for this study was gathered through interviews from two local government client organisations (which had implemented and trialled a trusted third party operated electronic tendering process) and three contractor / supplier organisations

who engaged with the electronic tendering process.   The ET trial implementation extended over a three month period.

1.2 ICT AND ELECTRONIC BUSINESS IN THE CONSTRUCTION INDUSTRY

The development and the uptake electronic business applications through the World Wide Web (WWW) are a significant consideration and investment for private and public sector business operations.   It is widely reported that the internet and information technology applications present attractive value propositions and aid greater organisational efficiency, reduced costs, improved processing times and efficient communication (McIvor *et al,* 2004; Peansupap and Walker, 2005). The stimulus for government, industry and business to adopting electronic business applications is the possibility of wealth creation through global business (Lockley *et al*, 2002). According to Taylor and Murphy (2004, p280), Government around the world has become "besotted" with ICT and actively encourage both the public and private sector to engage with e-business applications to achieve knowledge based economies, delivering competitive advantages on an international platform and resulting in greater "value for money" outcomes.

Whilst there is plenty of positive support for ICT and e-commerce applications there are many situations where the implementation process has failed to deliver the efficiencies and benefits promised. The reasons are varied and complex. Some of the causes rest with management processes, organisational culture, staff and the technology capability of the organisation implementing the process. While in other circumstances the problems relate to the trading partners and customers, who either choose to engage with the process, or ignore it.

Kajewski and Wieppert (2004, p1) have researched ET from the construction industry's perspective and describe the industry as "information intensive". They argue that the Internet has "debatably" revolutionised the way information is stored, exchanged and viewed by business in general and the construction industry in particular. They claim that the IT revolution has impacted significantly on the industry and business and suggest that the e-tendering process raises "great expectations" in regard to improving business operations and globalisation of procurement.
However, despite the upbeat prospects of ICT and its many applications, Kajewski and Wieppert (2004, p8) contend that the construction industry has been slow to adapt and take advantage of the many benefits of ICT tools and the innovative solutions on offer. This view is also supported by Issa *et al* (2003, p15), who identify that the construction industry has a "conservative attitude" toward adopting new technology.

Jones *et al*, (2003), Lockley *et al* (2002) and Taylor and Murphy, (2004) all identify barriers to the successful implementation of ICT. These consistently relate to organisational culture and attitudes, ICT readiness and maturity. Other barriers to the uptake and participation in e-business are management support and the ability of individuals and businesses to embrace ICT applications including important factors such as ICT expertise, skills, and training (Peansupap and Walker, 2006). Jones et al (2003) extend this to include the need for financial resources to implement, operate and maintain electronic business applications and legal and security issues. There are also claims that ICT applications have been developed with large firms in mind and this has lead to smaller organisations not fully embracing new ICT processes (Koh and McGuire, 2004; Taylor and Murphy, 2004)

The Australian Procurement and Construction Council (APPC) (no date #1), highlight that the uptake of IT applications within the Construction Industry is hampered by a number of factors including (a) a limited awareness and understanding of the potential benefits (b) Limited tangible evidence of the benefits delivered by successful IT applications (c) the traditional "paper based "approach and (d) Legal and contractual issues. To overcome these barriers, APCC supports the promotion and wider use of ICT and applications relating to procurement and the need for Government agencies and the IT industry to work cooperatively to improve project delivery through the use of IT tools (APCC, no date #1).

1.3 THE UPTAKE OF ELECTRONIC TENDERING IN THE PUBLIC SECTOR

Electronic tendering is a logical and worthwhile progression of WEB based ICT development. Chen (2001) cites that governments have committed to the development of electronic tendering software as a means of "applying integrated automation of public services and implementing intra-and inter organisation information networks".   Private sector IT development has expanded into providing commercially operated third party ET platforms enabling electronic sourcing of contractors and suppliers for client organisations. Halaris et al (no date) describe the third party platforms as "Info- brokers",

whose role is to facilitate a range of automated tender activities electronically and ensure probity and security is maintained.

Government organisations in recent years are progressively and proactively implementing electronic procurement and tendering initiatives. It is recognised that government is typically the single largest purchaser in most national economies (Chen, 2001) and therefore it is logical that government leads the way in electronic procurement development and application. The Commonwealth and state governments of Australia have been at the forefront in the development and application of electronic tendering. There have been stated objectives at both levels of government to increase efficiency and cost effectiveness of tendering through innovative use of technology.

The NSW (State) Government undertook trials through the Department of Public Works and Services, and determined that E-Tendering achieved substantial savings in time and money, through processing of Tender responses lodged over the Internet (NSW Govt, 2001, p1). The government research is also supported by Vaidya *et al* (2004, p13) who have undertaken research into e-procurement initiates in the Australian public sector and concluded that "greater access" to e-tendering and ease of information flow are positive attributes which lead to more efficient purchasing through automated workflow process. In the UK, there are claims that UK public sector client organisations can generate cost savings of approximately 15% for e-Request for Tender (RFT), and up to 28% for full tenders through e-tendering compared to "hard copy" paper processes (OGC, 2005 p33). Most of the research in ET in public sector focused on large public sector clients.

Local government (LG) represents the smaller spectrum of public sector organisations, where total capital works expenditure and contract values are significantly less than the larger national and state counterparts.   The respondent organisations to the research project could be described as being small compared to many other ICT and electronic tendering research studies. In this context, the research was an opportunity to gain a greater understanding of the important ET implementation considerations and the effects on stakeholder engagement. The results will provide worthwhile insights for public sector organisations contemplating investing time and resources into the establishment of e-tendering systems.

1.4 LOCAL GOVERNMENT ORGANISATIONS IN TASMANIA

The Tasmanian State Government is acknowledged as a "champion' of ICT and a leader in promoting and encouraging ICT within Tasmania. The state government through its divisional agencies has promoted ICT as a strong enabler with the aim of improving services to the community, reducing costs and enhancing flexibility to meet future challenges (Australian Government, 2006).

The Tasmanian government has also been an active leader in the development of ICT programs and electronic services. One of the programs, "Trials in Integrated Electronic Regional Services" (TIGERS) was completed in 2003 and has been hailed as a development that places Australia as a leader in government online services (Australian Government, 2003). These and many other programs have set the scene in Tasmania for an ICT focus and culture that encourages and supports business and government venturing into ICT supported business activities. These activities include electronic tendering.

The cities, towns and communities of the state of Tasmania are represented by twenty-nine local government bodies. Each LG body has a dedicated web site which is highly functional and offer services which promote the efficient operation of local government and allow effective communication, interaction and beneficial relationships between the LG organisation and the community stakeholders. In providing the services to the community, local government has a significant need to procure goods and services from external providers. Therefore the application of ICT procurement initiatives such as electronic tendering is a likely opportunity to gain further benefits for the community.

1.5 PROFILES- CLIENTS, CONTRACTORS AND ET SYSTEMS

This study focused on five participating organisations in the electronic tending trail implementation in Tasmania. The relationship between the respondent organisations is summarised in Figure 1. In short, Client X and Contractor B engaged in an e-tendering trial through a trusted third party (TTP) electronic tendering system. Similarly, Client Y and Contractor A engaged in another e-tendering trial. A third Contractor (C) engaged in an e-tendering trial with a separate client organisation.
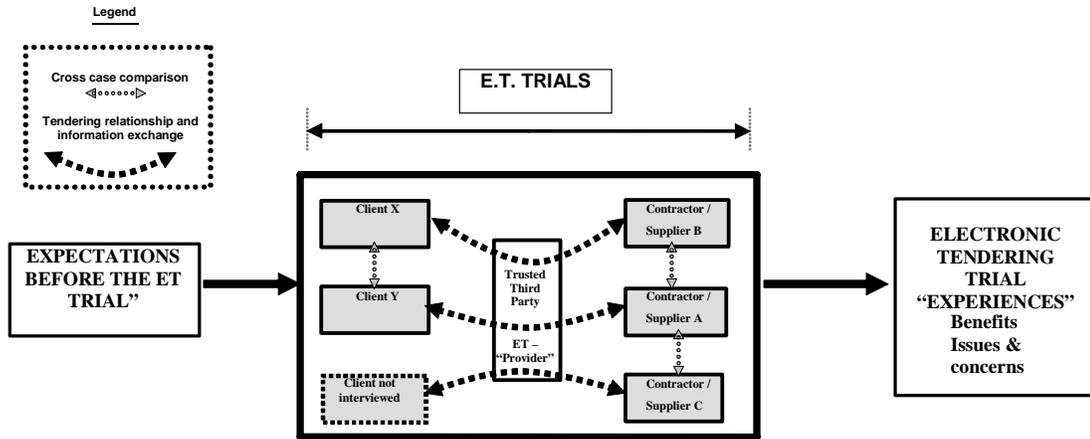
Figure 1. Electronic Tendering Trial– The conceptual relationship model

1.5.1 Profile of the Client Organisations

Summary profiles of the respondent local government client organisations are detailed in Table 1. The two respondent client organisations are representative of the larger local government client organisations within Tasmania. Each organisation has a structured contracts department / division responsible for most procurement decisions and activities required as part of the organisations operations.

Table 1- Client Organisations and Interviewee profiles

	Client Organisation X	Client Organisation Y
Organisation	Large (state comparative) local government organisation	Large (state comparative) local government organisation
Interviewee	Interviewee: Contract Manager, been in position approximately 10 years, Manages three staff.	Interviewee: Manager Contract Services , been in position approximately one year, Manages 10 contract & associated inspectorial staff.
Electronic Tendering (ET) Trial	Trial involved approximately 8 tenders / Expressions of Interest (EOI) consisting of mainly small civil infrastructure works with projects values ranging between $150,000 & $250000. One major EOI for a building project valued at <$20mil.	Trial involved approximately 20 tenders consisting of mainly goods and services and plant and vehicles. Individual project tender values <$100,000

1.5.2 Profile of the Contractor Organisations

A summary profile of the respondent contractor organisations is detailed in Table 2.

Table 2 Contractor Organisations and Interviewee profiles

	Contractor A	Contractor B	Contractor C
Organisation	Small – medium sized electrical contractor. Organisation consists of approximately ten tradesman and three office staff. Client base includes public and private sector.	Small – medium sized civil contractor Established 15 years and employs of approx. 20 staff. Tenders typically $20k - $1 million value. Client base includes local and state government and private sector clients.	Small – medium sized civil construction –contractor. Major clients are local and state government. Business established for 12 years and employs approx. 21 staff. Projects typically bridge construction / maintenance tenders up to <$3 million value (state government) and <$0.5 million value (local govt).
Interviewee	Manager / Director Contract Services, been in position approx. 19 year,	Estimator / Project Manager, been in position approx. six years,	Administration Manger, been in position approximately <10 years. Responsible for tenders and project administration functions.

According to a Holmes & Gibson (2001) research report into Australian business, the contractor respondents who participated in the research can be classified as "small" and are representative of a large percentage of Australia's SME's.

1.5.3 Profile of the ET Systems and Process

Both client organisations used an independent "off the shelf" third party operated electronic tendering system (refer to Figure 2) which offered a comprehensive range of integrated and collaboration tender process features. The ET features available on the 3rd party operated system included:

- Client / Purchaser upload of notice and / or invitation to Tender
- Automated Supplier / Contractor notification of notice / invitation   to tender
- Supplier / Contractor WEB based   review of tender documentation
- Supplier / Contractor download of tender forms and documentation
- Tender period updates and two way communications through WEB based system.
- Online identification and registration of users accessing the system
- Secure and confidential submission of tender responses.
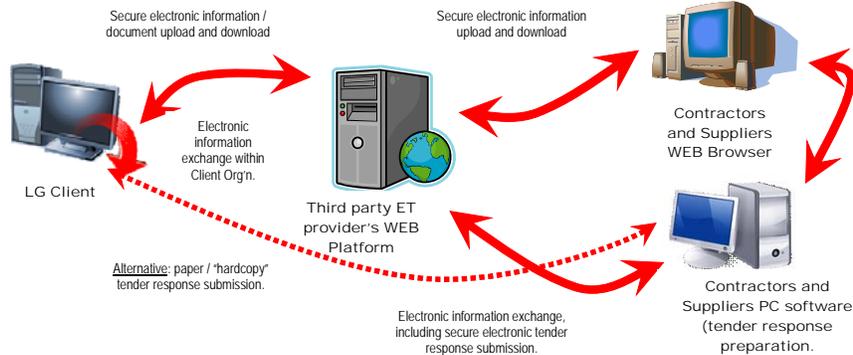

Figure 2 – Electronic Tendering Trial - Process

Client X chose not to use the electronic submission of tender response feature, preferring to maintain a paper based tender box in addition to the organisation's previously approved electronic e-mail tender submission method. The ET trials undertaken by each client organisation were conducted over a three month period, commencing late in the 2005 calendar year. Both client organisations conducted the ET trials and simultaneously operated a "hardcopy" paper based tendering process. The paper based process was maintained so as not to disadvantage any prospective tenderers.

1.6 FINDINGS OF THE RESEARCH

1.6.1 ICT environment within the respondent organisations

Client Organisations

It was evident from analysis that the client organisations had number of software applications in place to "automate" and "integrate" processes and deliver efficiencies to the organisation across a range of management operations and service areas. Also, ICT was used as an effective "communication" tool allowing interaction within and outside their organisation. Both client organisations have an established focus and supportive policies related to ICT adoption and use.   According to Asgarkhani (2005, p468) organisational support through "policies to promote effective utilisation of technology" is an important prerequisite to technology implementation in government. Analysis established that the client organisation exhibited a "comprehensive" and highly developed ICT culture and attitudes and following traits were observed,

- The client organisations had significant IT support staff and a culture that encouraged management and staff to investigate, introduce and adopt ICT applications, where it was seen to be beneficial to the organisation.

- Within the client organisations there was an extensive acceptance and "commitment" by staff to the use of ICT in undertaking their work.
- The client organisations maintained and regularly upgraded ICT to keep abreast of technology developments.
- Client Y clarified that the implementation and operating cost of ICT applications was measured and evaluated against the efficiencies likely to be gained by the organisation.

The qualitative analysis indicates that the widespread use of ICT applications and supportive culture and attitudes to ICT use. The characteristics support Moon's (2005) claim that larger and more managerially innovative government organisations are most likely to adopt ICT. The findings also match Reddick's (2004, p81) claim that positive resource and support characteristics encourage E-government growth in electronic applications, and are enablers which lead to 'ultimate success' of those applications.

Contractor Organisations

Contractors involved in the research have adopted a standard range of ICT applications to assist in the performance of business administration and communication processes. However, the contractor/supplier organisations did not demonstrate the same high level of ICT adoption and supportive ICT environment which was evident in the client organisations. In all cases the contractors did not have a specialised ICT department or a dedicated member of staff focusing primarily on ICT.

In all cases the contractor organisation's ICT planning and operational support was undertaken by staff in a part time capacity. The staff involved making ICT decisions usually had organisational responsibilities and a primary focus unrelated to ICT.

It was also identified that in general terms the contractor/supplier organisations have implemented and use "basic" ICT tools related to their business, finance and administration operations. The Contractor A respondent identified that the use ICT within that organisation extended to basic estimating applications and preparing quotations. The use of ICT was also identified by the Contractor B respondent as a "convenient means of communication", used to advantage to facilitate improved communication from remote or isolated locations. Contractor C clarified that his organisation only consider the acquisition of ICT applications which deliver "business efficiencies" and improved quality related to the organisation's information systems. It was apparent that the tendency to invest in other ICT applications by all Contractors is strongly influenced by efficiencies and cost saving considerations.

1.6.2 Perceived Benefits of Electronic Tendering

The client organisations reported a number of benefits that they experienced during the trial period of the electronic tendering system. According to clients the E-tendering system and process has "proven" to provide the following:

- Easy to use automation of tendering process which allowed convenient and efficient distribution of documentation / information.
- Time saving (to a limited extent under trial conditions), through faster document preparation and distribution.
- Secure information transaction environment that allows authentication of tender submissions, which are time stamped and logged.
- Maintains statutory compliance requirements through effective document audit trail features.

The perceived benefits and positive experiences encountered by the contractor/supplier organisations during the e-tendering trial process are summarised as follows:

- Improved efficiency and accuracy compared to paper based tender process including, automated e-mail tender notification of upcoming (relevant) tenders
- Allows easy / convenient access to download documents (provided broadband access is available)
- Satisfactory E-tendering security system.

In summary, there was significant consensus on the benefits of ET systems, among contractors, clients and the literature regarding the identified benefits and their positive experiences. Although the contractors indicated a positive view of the ET process, the enthusiasm shown (at least during the trial stage) was less positive than the clients' comments. Contractor A and B each shared a common belief that client organisations are very likely to introduce electronic tendering processes in the future and ET

would become a normal business process following future permanent implementation in Tasmania. Despite the overall positive perceptions of ET, there was also number of concerns about the ET system during the trail period, raised by both clients and contractors.

1.6.3 Issues arising from the e-tendering trial

Although there was a positive mood during the trail period of the ET system, it was evident some expectations of the clients and contractors were not met by system. Moreover, a number of issues were also identified by the client and contractor organisations which had negatively impacted the trial process. They are discussed below. Most of the issues raised by the participants in the process relate to Technical (T), Human (H) and Process (P) issues.

Technically Incapacitated Subcontractors and Suppliers (T)
- E-tendering is perceived to be challenging by some smaller contractors and suppliers:
  - not having the IT technical support/staff expertise within their own organisation.
  - who do not have broadband access or ICT technical capability to engage with the ET system.

Technical capacity limitations of the ET systems (T)
- The E-tendering process has not met the need and technical requirement for the client to upload large numbers or large size (e-memory) drawings.
- Downloading of drawing files to suitable application software and hardcopy printing of larger drawings (>A3) is perceived to be difficult for supplier and contractors.

Limitations posed by the multiple ET Systems (T & P)
- Client organisations need to adopt consistent e-tendering systems and practices to assist contractors / suppliers. Fewer e-tendering systems will demand less resources, for e.g. training

Unwanted information traffic due to Human processing errors (H & P)
- Incorrect ET registration details relating to organisational profile / classifications/ tender information are perceived to have resulted in:
  - unwanted, unsolicited and unrelated email tender notification to contractors and suppliers.
  - email tender notification not targeting the contractors and suppliers with the correct expertise and capabilities.

Difficulty in unlearning and relearning (H & P)
- The fact that contractors and suppliers are not adopting the process because "traditional" hardcopy paper based tender document access remains a "habit".

Hampered motivation (H)
- Smaller contractors and suppliers who do not have ICT literacy, training or skills are:
  - Not motivated, conditioned or "inspired" to interact with the e-tendering process (lack the "will") or
  - Not confident in interacting or engaging proficiently with the e-tendering system or process (lack the "way")

Lack of client leadership/support (H & P)
- Electronic tendering applications in local government are not widely understood by contractors and suppliers. The process and benefits have not been marketed properly by clients' (LG's) to the contractors and suppliers.

- A concern that local government client organisations are not actively promoting ET and assisting in providing training to contractors and suppliers to allow worthwhile participation / engagement.

Perceived unfairness (P & T)

- The subscription cost for electronic tendering document download following registration (with third party platform suppliers) is perceived to disadvantage smaller contractors and suppliers.
- A belief by the contractors that electronic tendering does not benefit contractors operating within a defined geographical market location or with a specific client focus.

Process fragmentation due to Legal environment (P)

- This is due to legislative requirements imposed on the LG client organisations. The E-tendering process has not met the "expectation" of increased efficiencies and reduced advertising costs from the client point of view. This is beyond the technical and process issues of the ET system.

1.7 DISCUSSION

It was evident from the analysis that client organisations have developed a reasonable ICT culture or an enabling environment for ET adoption. However, client organisations have identified a few issues that they need to address, including affordable platforms, enhancing the technical capability of ET systems, and addressing the process management issues which will allow effective outcomes from the ET process. Contractors/suppliers have mixed feelings about the ET process. Contractors and suppliers do strongly feel that ET is going to be the future direction of public sector procurement process in Tasmania. However, they perceive prior to full-scale implementation a number of issues need to be addressed.

The Client respondents have indicated that the ET has not achieved efficiencies or resulted in a reduction of resources expected by client and contractors. Whilst there were no measures of efficiency conducted through the ET trial, the client organisations believed that the need to maintain duplicated paper based tendering systems had adverse cost implications. Duplicated hardcopy paper based tendering systems have introduced an additional layer of document management and "communication" risk during the trial process. The hard copy documentation system was implemented in parallel to ET as a legal requirement, preventing discrimination against those contractors who are unable to engage with ET. Yet contractors feel that the ET system may give an unfair competition platform. This is due to the limited ICT capabilities of some contractors and the technical infrastructure (broadband) availability. Some contractors have difficulties with unlearning the past practices and relearning new practise. Furthermore, these issues have far reaching implication on contractors affecting the motivation to engage in web based tendering process.

Client organisations recognise a number of issues that impact on them and contractors. Client organisations indicated that they expect that the full implementation of e-tendering processes will include the following benefits:

- Improve technical features by further developing and enhancing the ET system including extra management and tender evaluation functions, to access all types of documents and flexible distribution of information. This will further reduce manual administrative tendering processes and achieve efficiencies in time, resources and costs. It was also stated by the client organisations that this would achieve improved communication between client and contractors / suppliers and reach a "broad audience".
- To work towards reducing the third party platform subscription costs to make ET prices revenue positive to contractors.
- Serve as a viable alternative to print media advertising of tenders and achieve greater market penetration and make ET a future direction of local government procurement and tendering processes.

The analysis indicates that the client organisations have some form of vision to address the issues faced in the trail implementation. The LG client respondents stated that some smaller contractor / supplier organisations are at an early stage of ICT maturity and lack the necessary ICT resources, skills and capability for immediate and effective engagement with ET processes. However, client organisations highlighted that local government has a leadership responsibility in embracing technology applications that allow effective interaction between itself and its external stakeholders. Also, the LG

client respondents recognise the need to encourage, support and facilitate contractor engagement when implementing procurement methods such electronic tendering systems. However, this was not evident in the trail implementation stage.

Research Limitations

A limitation of the exploratory private study is that it represents only a small number of the public sector clients and the contractors who engaged with the ET trial within the state of Tasmania. The conclusions are also limited because the respondent experiences are based on a short three month trial implementation involving fewer than 8 to 20 specific type tenders.

1.8 CONCLUDING REMARKS

The research findings indicate that Tasmanian local government client organisations are well placed internally (within the organisation) in terms of ICT readiness and technical capability. The client organisations have in place systems and management support to allow effective implementation of technology driven procurement applications. There is also a culture within LG client organisations, which supports new technology that delivers benefits such as improved business systems, operating efficiencies, competition and cost savings.

The local government client respondents stated an acceptance that paper based tendering practices need to remain available for a period of time, until contractor reliance on this method diminishes and electronic tendering processes can be established. They see a leadership responsibility toward the technologically weak participants in the ET process.

The Contractor respondents have also indicated a preference for local government client organisations to adopt a uniform electronic tendering system across all Client organisations. The expectation is that this will allow contractors and suppliers to confidently gain skills, familiarity and adapt to the chosen ET process. There is also a client expectation that the outcomes of greater efficiency and cost savings will ultimately be achieved when ET is fully established.

Finally, whilst the ET trial implementation resulted in some technical and operational difficulties, there was a general positive belief by both the client and the contractor respondents, that electronic tendering is a worthwhile ICT application. It is therefore anticipated that ET would ultimately deliver business efficiencies and opportunities to both the client and supplier organisations as ICT maturity grows and engagement with the process becomes accepted.

1.9 REFERENCES

APCC (no date#1) "Directions for IT in the Construction Industry", Australian Procurement and Construction Council, Guideline document, located at: http://www.apcc.gov.au/default.asp?PageID=32#category_48 accessed on: 10/2/2006

Asgarkhani M (2005) "Digital Government and Effectiveness in Public Management Reform- A local government perspective", Public Management Review, Vol. 7, Issue 3, pp465-487

Australian Government, (2006) "Adoption of information and communication technology within Tasmanian Government" Australian Government Information Management Office, located at http://www.agimo.gov.au/publications/2004/05/egovt_challenges/accountability/enterprise/tas_govt , accessed 29/8/2006

Australian Government (2003) "Improving the Efficiency and Effectiveness of Government, A Strategic Approach to ICT Sourcing among Agencies" Department of Finance and Administration 2004/05 Annual Report, located at: http://www.finance.gov.au/Pubs/annualreport04-05/chapter06_05.html accessed 16/3/06

Chen C, (2001) "An Empirical Examination of an Integrated Model of the Factors Affecting Utilization of Electronic Tendering Technology by End Users" Masters Thesis, located online at: http://etd.lib.nsysu.edu.tw/ETD-db/ETD-search/view_etd?URN=etd-0702101-115618 accessed 28/2/2006

CRC (2003)"Electronic Tendering: An Industry Perspective" CRC Australia, Construction Innovation Project Report 2001-008-C-07 located at: http://www.construction-innovation.info/index.php?id=54 accessed 20/8/2006

Eden J, Eng C, and McGeorge D, (2000)" Directions in Construction IT Strategies in Australia" University Of Newcastle Academic paper stored on Construction Informatics Digital Library, Located at: http://itc.scix.net/data/works/att/w78-2000-321.content.pdf accessed 10/2/2006

Halaris C., Bafoutsou G., Papavassiliou G., and Mentzas G., (no date), "A System for Virtual Tendering and Bidding", National Technical University of Athens, Greece, Unpublished paper located at: http://imu.iccs.ntua.gr/Papers/C52-Epy-SPP.pdf accessed 12/2/2006   accessed 15/3/2006

Holmes Professor S & Gibson B, (2001), "Definition of Small Business – Final Report", University of Newcastle for Small Business Coalition, 5 April 2001, located at: http://www.smallbusiness.org.au/sbc/publications/sbc004.pdf   accessed 14 October 2006.

Issa R., Flood I., and Caglasin G. (2003) "A Survey of E-Business Implementation in the US Construction Industry", ITCON, Vol. 8 pp 15-28.

Jones P, Beynon-Davies P, and Muir E (2003) "E-Business Barriers to Growth within the SME Sector", Journal of Systems and Information Technology Vol 7, Issue 1 pp1-25

Kajewski Stephen and Weippert Achim (2004) "E-Tendering: Benefits, Challenges and Recommendations for Practice" Conference paper Clients Driving Innovation International Conference 2004 (Aust.) located at: http://www.constructioninnovation.info/images/pdfs/conference_cd_2004/conference/Papers/Refereed%20Papers/142%20Kajewski.pdf   accessed 2 /3 2006

Koh S, and McGuire S, (2004) "Identifying the adoption of e-business and knowledge management within SMEs" Journal of Small Business and Enterprise Development, Volume 11 · Number 3 pp338-348

Lockley S, Watson R, Shaaban S, (2002) "Managing e-commerce in construction –revolution or e-business as usual?" Engineering, Construction and Architectural Management, Vo. 9 Issue 3, pp232-240.

McIvor R, McHugh M, Cadden C, (2004) "The potential of internet technologies: insights from the public sector", New Technology, Work and Employment, Vol.19, Issue1, pp63-74.

Moon, J (2005) "E-Government Management in State Governments: Diffusion of E-Procurement Practices and its Determinants", Journal of Public Procurement, Vol 5, Issue 1, pp54-72

NSW Government (2001) "NSW Government Electronic procurement Implementation Strategy", Information Report located at: http://www.construction.nsw.gov.au/e-procurement/docs/eprocurement-strategy.pdf   Accessed 3/3/2006

OGC,(2005) "A guide to e-procurement for the public sector", Office of Government Commerce (OGC) United Kingdom, located at: http://www.ogc.gov.uk/documents/cp0025.pdf accessed on: 5/5/2006

Peansupap V. and Walker D. (2005) "Factors Enabling Information and Communication Technology Diffusion and Actual Implementation in Construction Organisations, ITcon, Vol 10, pp193-218

Peansupap V. and Walker D. (2006) "Information and Communication Technology (ICT) implementation constraints- A construction industry perspective", Engineering, Construction and Architectural Management , Vol 13, No 4, pp364-379.

Reddick C, (2004) "Empirical Models of E-Government Growth in Local Governments" e-Service Journal, Vol. 3, Issue 2, pp59-74.

Taylor M. and Murphy A, (2004) "SME's and e-business", Journal of Small Business and Enterprise Development, Volume 11 · Number 3 · 2004 · pp. 280-289

Vaidya K., Callender G., Sajeev A., and Gao J., (2004) "Towards a Model for Measuring the Performance of e-Procurement Initiatives in the Australian Public Sector: A Balanced Scorecard Approach", A Paper prepared for the Australian Governance Conference, Melbourne, Victoria 14-15 April 2004. pp 1-3