

2018 SACQSP 10th International Research Conference

**31 August-01 October 2018, Rosebank,
Johannesburg, South Africa**

CONFERENCE PROCEEDINGS



Preface

Objective

Conference theme

The Quantity Surveying (QS) profession and the 4th Industrial Revolution

This conference sought responses to questions related to current conversations and debates on the impact of the 4th Industrial Revolution on the Quantity Surveying profession, for example:

- Building Information Modelling (BIM)
- Automation
- Innovation in construction technology

Acknowledgements

The local organising committee of the 10th SACQSP International Research Conference 2018 wishes to express their profound gratitude to the University of the Witwatersrand (WITS) and the South African Council for the Quantity Surveying Profession (SACQSP) for hosting the conference. Further gratitude is extended to the Universities which supported the conference by encouraging their staff and students to submit and present papers. The contributions of all individuals and organisations in various ways are greatly appreciated. The organising committee is indebted to the scientific and technical committee for the individual generosity and time which went into reviewing papers, providing positive feedback and editing. It is these acts of selflessness which necessitated the maintenance of high standards of the final papers included in the proceedings.

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Local organising committee's declaration

All the papers in the conference proceedings were double-blind reviewed at abstract and full paper stage by at least two members of the Scientific and Technical Committee as per the peer review process documented on the following page.

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Peer review process

A rigorous two-stage blind peer review process by at least two acknowledged experts in the field for each paper was followed in this conference. The peer review process was strictly adhered to in order to maintain the high standard of the conference proceedings and comply with the requirements for subsidy of the South African Department of Higher Education and Training (DHET).

As part of the review process, each abstract received was twice blind reviewed in terms of the following criteria:

- Relevance to conference theme and objectives;
- Originality of material;
- Academic rigour;
- Critical current literature review;
- Appropriateness of research methodology;
- Empirical research findings and robustness of analysis;
- Contribution to knowledge and to industry development;
- Overall presentation

Authors whose abstracts were accepted after the first stage of the review process were provided with anonymous reviewers' comments and requested to submit their full papers noting and addressing the comments received. The submitted papers were twice blind reviewed in terms of the eight criteria above. The final papers were only included in the conference presentation programme and the conference proceedings after evidence was provided of how the comments of the double peer-review process had been addressed with the aim of improving the papers. At no stage was any member of the Scientific and Technical Committee or the editor of the proceedings involved in the review process related to their own authored or co-authored papers. The role of the editor was to ensure that the final papers incorporated the reviewers' comments and arranged the papers into the final sequence as captured on the flash drive and book of abstracts. Of the 51 abstracts originally submitted, 38 were accepted. Regarding the full papers for publication, a total number of 33 papers were finally accepted for inclusion in the conference proceedings and 24 were accepted for oral presentation at the conference. To be accepted, papers were required to receive a minimum average score of 4 out of 8 allocated by respective peer reviewers during the final review process with one of the three recommendations namely:

- 4 – Accept with micro revisions (excellent)
- 3 – Accept with minor corrections (good)
- 2 – Accept provisionally subject to substantial revisions (average).

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SACQSP 2018**22. E-Procurement Implementation in the South African Construction Industry**

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Abstract

The conventional procurement process, which is known to be paper-based, is attributed to inefficiencies in the construction industry procurement practices. e-procurement is suggested to provide the opportunity for addressing the inefficiencies of the procurement process. However, its adoption and implementation in the South African construction industry has been reported to be relatively slow. This study aims to ascertain the need for e-procurement in the construction industry and the requirements for its implementation, to understand why there is a slow implementation of e-procurement in the South African construction industry. The study is based on information gathered from semi-structured interviews with four State Owned Enterprises in South Africa. Findings indicate that there is a need for e-procurement in the construction industry to cope with the challenges posed by the current paper-based procurement system, which is attributed with increase information miscommunication, dishonest tendencies, and human errors. Also, reliable IT infrastructure; access to computers and the internet, human capital capability and assurance of transparency and fairness in e-procurement system were reported to be the key requirements for successful implementation of e-procurement in the construction industry. The outcome of the study is useful in providing insights for effective implementation of e-procurement in the South African construction industry.

Keywords: construction Industry, e-procurement, South Africa

Introduction

There have been a series of innovative initiatives in the construction industry in recent years to improve the performance of the industry. One of such initiatives is the adoption of e-procurement. More so as the Conventional procurement processes in the construction industry are attributed with inefficiencies and challenges (Chan et al., 2003). This is because the conventional procurement processes, which are paper, based, are prone to manipulations; delays in approval; poor record keeping and results in wasted resources (Laryea, Ibem, Pagiwa and Phoi 2014). Similarly, Hore and West (2008) indicated that apart from the apparent inefficiencies of conventional procurement processes, the process is plagued with a high risk of errors and it is not uncommon to lose 25% of documents such as proof of delivery (POD) on construction sites.

Several studies have indicated the potential of electronic procurement (e-procurement) in addressing the inefficiencies of the current procurement processes. Pictet and Bollinger (2008) expressed that public e-procurement helps contest against corruption by minimizing face-to-face

interaction, where most appeals for bribes take place. According to Neupane et al., (2012), the e-procurement process offers more openness; availability and accessibility of procurement information to the public which increases the trust and better accountability as well as increases competition among bidders. Eadie et al. (2010) further classify the benefits to be achieved by implementing e-procurement as having a positive impact on cost, time and quality variables in an organization. Ibem and Laryea (2015) further concede that the three factors supporting the maximum positive encouragement on the utility of e-procurement technologies at the pre-award phase of construction procurement are the speed of transactions; lower transaction costs and ease of use of the technologies and tools.

Despite these benefits of implementing e-procurement to the construction industry, the use of e-procurement in South Africa has been reported to be limited and sparse, implying that the benefits are not being maximized to support economic growth and the industrial development. In an online survey, comprising of professional consultants, client organizations and contractors, 23 respondents gave an indication of the extent of their awareness and adoption of e-procurement in the South African construction industry, 70% of the respondents were aware of e-procurement but only 33% of them had actually used e-procurement (Laryea and Ibem, 2014).

The purpose of this study is to understand why there is a slow implementation of e-procurement in the South African construction industry. Firstly ascertaining whether there is a need for it in the construction industry, particularly in the public sector, and then determining the requirements for its implementation.

Related Literature

The conceptualization of E-Procurement in Construction

As there is no universal definition of e-procurement, to generate meaning and understanding on the concept, 11 definitions of e-procurement were reviewed from the literature as shown in Table 1. The common variables shared from the definitions of e-procurement in Table 1 are the 'use of internet' and 'use of electronic process'. These variables make possible the transformation from the paper base process associated with the inefficiencies of the construction industry to e-procurement practices. The e-procurement practice encompasses all procurement activities communications including tender notifications, collection, and submission of tender documents, tender evaluations, sourcing, ordering, commissioning, receipting and making of payments. Thus e-procurement involves the use of electronic processes to carry out all procurement activities in procuring goods and services with the aid of the internet.

Table 1: Definitions of E-procurement

| Author(s) | Definitions of e-procurement |
|-----------------------------------|--|
| Gunasekaran and Ngai, 2008 | e-business is the process whereby Internet technology is used to simplify specific company processes, improve productivity, and increase efficiency. |
| Hawking et al., 2004 | e-procurement has evolved into the use of electronic technologies to streamline and enable the procurement activities of an organization. |
| Moon, 2005. | e-procurement is defined as a comprehensive process in which organizations use IT systems to establish agreements for the acquisition |

| Author(s) | Definitions of e-procurement |
|-----------------------------------|---|
| | of products or services (contracting) or purchase products or services in exchange for payment (purchasing). |
| Oliveira and Amorim, 2001. | e-procurement can be defined as the process of electronically purchasing the goods and services needed for an organization's operation. |
| Davila et al., 2003. | An e-procurement technology is defined as any technology designed to facilitate the acquisition of goods by a commercial or a government organization over the Internet. |
| Cater, 2001 | e-procurement can cover many ways of using the Internet, including company websites with catalogs of products, perhaps with online purchase; aid agency websites with tenders inviting company bids via online forms or emails; web “portals” or exchanges that create markets by bringing buyers, sellers or both together; circulating information by email to potential buyers or suppliers. |
| Bausa et al., 2013 | e-procurement is the use of electronic communications and transaction processes to buy supplies and services or conduct tendering for works |
| Laryea and Ibem, 2014 | e-procurement in construction can be described as the use of electronic communications or systems to announce /notify/inform stakeholders about tender opportunities (soliciting for tender offers); exchange project information and data; conduct tendering; evaluate tender offers; award and manage construction contracts |
| Laryea et al. 2014 | e-procurement in construction entails the use of electronic communication to notify or inform stakeholders about tender opportunities, exchange construction project information and data, conduct tendering for works, evaluate tenders, award and administer contracts |

Some of the commonly used e-procurement tools in the public sector are e-Tendering, e-RFQ, e-Auctions, e-Catalogues, and e-Invoicing. These tools, including complete marketplace technologies, have been developed by the key players in the e-procurement market such as Ariba, CommerceOne, Oracle, and SAP (Vaidya, 2006). According to Neupane et al. (2012), the most common e-procurement systems include e-Informing, e-Sourcing, e-Tendering, e-Reverse auctioning, e-MRO, and Web-based ERP, e-Ordering, e-Markets, e-Intelligence, and e-Contract Management (see Neupane et al. (2012) for the description of these e-procurement systems).

Benefits of e-Procurement

Several benefits of e-procurement are reported in the literature. Based on the benefits of e-procurement, the UK government has set a target for all its procurement activities to be entirely electronic since 2005 (Eadie et al., 2010). Attaran (2001) classifies the benefits of e-procurement into:

- (1) strategic, which concerns organizational changes and market advantage;

(2) opportunity, which is mainly related to improved and explored relations with present or even new suppliers; and

(3) operational, which means cheaper and more efficient purchasing processes.

Oliveira and Amorim, (2001) indicate that e-procurement offers promising opportunities as regards the efficiency, transparency, and the opening up of public procurement, ensuring that public contracts are awarded to the bidder offering the best value for money. According to Raghavan and Prabhu, (2004), the reduced overall procurement cost provided by e-procurement is as a result of the following:

- Lower cost of ordering products and reduced purchase prices for materials and services by bringing more purchases under contract and taking advantage of volume price discounts.
- Shorter order processing and fulfillment cycles.
- Reduction in administrative costs resulting from a reduction in processing costs through the automation of manual processes.
- Improved strategic sourcing since it enables procurement professionals to redirect their time to more strategic tasks of procurement.
- Reduced inventory costs since it eliminates the need to stockpile supplies to cover the inefficiencies of a manual process.

In a study using administrative data accessible from respective government websites of 27 Indian states involving 30,578 packages and 35,610 associated contracts, Lewis-Faupel et al. (2016) analyze procurement practices between 2000 and 2009 in India. The results show that e-procurement allows firms from outside states to win contracts which increased the average quality of the roads in India by 12.3% indicating that the conventional procurement systems were not necessarily choosing the most efficient firms to perform works. Nevertheless, the study reported that e-procurement had no significant effect on the price of projects. Also, Bhatnagar and Singh (2010) assessed the impact of e-procurement of selected service delivery projects in India. The results show that e-procurement reduces travel time in order to get work done, which directly impact on travel costs; it saves processing time, as the electronic system does not involve any writing and copying of documents; and reduction in Waiting time by 30 – 60 percent as compared to the manual systems, as no time is required on waiting for any documentation. Other reported findings from the study are an improvement in quality leading to increases in productivity as errors and rework were minimized, offering more time to do the work; 50% reduction in corruption; and clear improvement in the fairness and transparency of the system.

Pictet and Bollinger (2008) expressed that public e-procurement helps contest against corruption by minimizing face to face interaction, where most appeals for bribes takes place. According to Neupane et al., (2012) the e-procurement process offers more openness; availability and accessibility of procurement information to the public which increases the trust and better accountability and rises competition among bidders. Eadie et al. (2010) further classify the benefits to be achieved by implementing e-procurement as having a positive impact on cost, time and quality variables in an organization. Ibem and Laryea (2015) further concede that the three factors supporting the maximum positive encouragement on the utility of e-procurement technologies at the pre-award phase of construction procurement are the speed of transactions; lower transaction costs and ease of use of the technologies and tools.

Research Methods

The qualitative research methodology was used to gather the empirical data on the need and requirements for e-procurement in the South African construction industry. The population for the study comprises of Supply Chain Management Departments of South African State Owned Enterprises (SOE's) mainly in the Gauteng Province. From a list of 169 registered SOE's, nine were purposively selected for this study, as these 9 undertake construction works. Invitations for participation in the study were sent via emails and follow up telephonic calls to the nine State Owned Enterprises. However, only four out of the nine accepted the invitation and participated in the study.

A semi-structured interview was used to elicit information from the participants in a face to face manner. The interviews were conducted with heads of supply chain management, involved in the planning and execution of construction procurement activities in State Owned Enterprises. The interviews were audio recorded to ensure that all information was captured during the interviews. Brief notes were also taken during the interviews to capture both verbal and nonverbal signals from the participants. The audio record was transcribed verbatim. The interview data were analyzed using content analysis.

Findings and Discussions

The need and requirements for e-procurement in the South African construction industry were investigated in this study. This follows reports of slow implementation of e-procurement by the construction industry in South Africa despite the benefits e-procurement has shown to deliver. The assumption is that it could be that the industry feels there is no need for e-procurement and that there are specific requirements for the successful implementation of e-procurement which are lacking in the South African construction industry. The findings from the interview data are discussed below:

The Need to Adopt E-Procurement in the Construction Industry

Three of the organizations out of the four investigated agreed that there is the need for e-procurement implementation in the South African construction industry. The participants have identified the following challenges with the current traditional procurement practices: departments working in silos; lack of consistency in implementing policies; it is not easy to manage paper-based procurements, it is susceptible to errors, departments not taking into consideration the impact of non-compliance and corruption. The participants indicated that e-procurement would support in addressing these challenges if implemented. The participants suggested that e-procurement would provide the following benefits: minimum errors; it can save time and money; it can make the tendering process and tender evaluation shorter, and therefore decisions can be taken much faster, and projects can be implemented with a shorter time. To quote from an interview transcript:

“It currently takes more than six months, in their organization, to evaluate tenders using the paper-based system.”

In addition, one of the participants indicated that their organization is now in a position whereby they cannot avoid e-procurement anymore as The National Government is slowly introducing e-procurement through the central supplier database and the e-tender portal. However, a different

participant did not agree to the need for e-procurement implementation in the South African construction industry. To quote from the participant interview transcript:

“We are not at a stage that we can adopt it. In South Africa, we still have a huge population that does not have access to the internet, access to emails, and access to Wi-Fi, so it becomes a disadvantaging issue if you limit people by using e-procurement.”

Overall the participants believe that there is the need for e-procurement in the South African construction industry which will make the procurement process much more at ease, save time and money, and beneficial to all. This is consistent with reports on benefits of e-procurement from previous studies (see: Raghavan and Prabhu, 2004; Pictet and Bollinger, 2008; and Neupane et al., 2012).

Requirements for Successful Implementation of E-Procurement

With regards to the requirements for the successful implementation of e-procurement in the South African construction industry, the most critical requirements suggested by most of the participants are:

- Human capital skills and capabilities to operate the system for successful implementation especially as most of the organizations are lacking the required information and technology (IT) skills.
- Provision of IT infrastructure for e-procurement and giving access to all for the use of the infrastructure and to as well benefit from the e-tender opportunities. The quote from an interview transcript best illustrates this requirement:
 "Implementing e-procurement is not going to work until they know that municipalities have got the IT infrastructure that can accommodate e-procurement."
 Emphasis was also laid on the need for the IT infrastructure to be technically viable and be of right software and capacity to allow for easy uploading, downloading volumes of documents as required in the construction procurement process. The technical challenges often discourage organizations from implementing e-procurement in the construction industry.
- Access to the Internet is another important requirement that was suggested by most of the participants. To quote from an interview transcript:
 "How will emerging contractors and consultants that do not have access to the internet participate in e-procurement? Is not going to work."
- Involving all stakeholders in the process and willingness to change mentality is also required for successful implementation of e-procurement. One participant illustrates this as follows:
 “Change management from the willingness of people is necessary, are they willing to adopt? then if so it will be easier.”
 Also, all the stakeholders need to be consulted and educated on e-procurement implementation, and the process should cover all aspect of procurement requirement including tax clearance from SARS.
- Government legislation is also suggested as an important requirement. All the participants suggest that its successful implementation, particularly in the public sector, will be influenced by a mandatory directive from the government through legislation as practiced in other countries like the UK.

- Other requirements that were emphasized by the participants have to do with transparency and trustworthiness of the process. This is as a result of the manipulation and corruption concerns that may discourage participation in the process. The quote from an interview transcript illustrates this concern:
 "When we tried to implement it, they said they are not going to be tendering. Because they want all these guarantees and proof that the person with the administrator rights is not able to, some also believe that we can program anything, some believe that we will program things in the background and submit a copy of whatever they submit to certain people, as it comes in. Due to corruption, the guys are very hesitant to submit tenders electronically. The big challenge that needs to be overcome is this concern about corruption that exists in the industry, where the administrator can share prices with other people before the submission deadline."

These findings are in concurrence with the findings from a similar study by Laryea et al. (2014).

Conclusion

The study focuses on the implementation of e-procurement in the South African construction industry, by identifying the needs for e-procurement and the requirements for its implementation. Based on the findings it can be concluded that there is a need to implement e-procurement in the public sector construction industry and that its implementation would have a positive impact on the construction industry. This need can be attributed to the fact that there are numerous challenges with the current paper-based procurement system. These challenges include manipulation and corruption throughout the tendering stages and a lack of transparency. The manual process is often prolonged and also tedious, which in turn leads to some errors.

Also, the findings show that the key requirements for successful implementation of e-procurement in the South African construction industry include: human capital skills and capabilities, provision of technically viable IT infrastructure, access to internet facility, involving all stakeholders in the process through consultations and education and willingness for change mentality. Other essential requirements are Government legislation to mandate implementation of e-procurement and concerns regarding transparency and trustworthiness of the process needs to be addressed. The outcome of the study is useful in providing insights for effective implementation of e-procurement in the South African construction industry.

With Quantity Surveyors being active participants in the construction industry procurement process, the implementation of e-procurement will contribute to significant improvement in their productivity and efficiency. This gives them more opportunities to have improved deliverables through factors such as reduced human error, time savings and reduction in overall procurement cost.

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