

## DII-2014 CONFERENCE

# Electronic procurement in the South African construction sector: case study of government departments in the Gauteng Province

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### Abstract

Electronic procurement is a valuable means through which organisations can promote accountability, efficiency, transparency and value for money in the acquisition of goods, services, utilities and works. The adoption and use of electronic procurement in the South African construction industry is still in its early stages particularly in the public sector. The research aim was to ascertain construction procurement practices; and the extent of e-procurement use in the Gauteng Province of South Africa. Qualitative data collected through interviews with seven respondents in two government departments was transcribed and then analysed using content analysis. The findings indicate that the paper-based system is prone to manipulations, delays in approval, poor records keeping and wasted resources. A limited use of electronic systems in the procurement of works was observed, with the call for tenders and payment of contractors being the two main activities executed using electronic database and software respectively. No evidence of electronic tendering was found. The principal reasons for the limited use of electronic procurement systems were attributed to (1) lack of a definite government policy to implement e-procurement; (2) reliability of ICT infrastructure; (3) high costs of installing and operating e-procurement systems; and (4) perceived negative impact of e-procurement adoption on smaller firms and employment of people in the departments. Given the benefits and increasing use of e-procurement globally, these findings should be addressed to maximise the diffusion and adoption of e-procurement in government departments

**Keywords:** construction procurement, e-procurement, government department, interview, South Africa

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## 1. Introduction

Since the introduction of web service aspect of the internet in the mid-1990s, there has been increasing use of electronic procurement to support the execution of procurement activities in the different sectors, including construction. In this paper, electronic procurement (e-procurement) refers to the use of electronic communications and transaction processes to buy supplies and services or conduct tendering for works as defined by Bausa *et al.* (2013:5) in the e-procurement golden book. This means that 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.

In the 1960s, electronic systems such as the electronic data interchange (EDI) was used to support the exchange of construction project information as explained by Gibson and Bell (1990) in their paper on electronic data interchange in construction. Since then, the use of electronic systems has developed to the current state where internet-supported technologies and applications serve as platforms for conducting procurement activities as explained in the United Nation procurement practitioner's handbook (UN, 2006). In a review of developments in electronic commerce as applied to construction, Anumba and Ruikar (2002) noted that the use of electronic means to support the execution of construction activities is a response to the need to improve the traditional business process in construction and the sector's level of productivity and competitiveness. In fact, current development shows that the existing e-procurement systems help to address challenges associated with paper-based system in data management (e.g. capturing, storage, processing, retrieval), real time interactions and exchange of project information and data among geographically dispersed participants in the entire construction procurement lifecycle as the following authors: (i) Mohammed (2003) in a study of web-based technology in support of construction supply chain management (ii) Eadie *et al.* (2007) in a study on drivers and barriers to Public Sector e-procurement within Northern Ireland's construction industry; and (iii) Eadie *et al.* (2011) in analysis of the use of e-procurement in the public and private sectors of the UK construction industry help to buttress.

In the context of South Africa, there is a dearth of published works on the use of electronic systems to support procurement activities, especially in the construction sector. Among the very few works identified are: (i) Coetzee and Boshoff, (1998), which examined the use of e-Commerce in the procurement of construction materials (ii) Jooste and Van Schoor, (2003) that explored a framework for the implementation of e-procurement in the different industrial sectors; and (iii) empirical study on the implementation of regulated-based e-procurement in the Eastern Cape provincial administration by Van Greunen *et al.* (2010). These authors are in agreement that there are challenges in the current procurement practices and barriers to the uptake of e-procurement systems and applications in addressing the challenges in the country.

To promote accountability, efficiency, transparency and value for money in the procurement of public works and infrastructure, there is a need to investigate and understand the extent to which government departments in South Africa are using e-procurement systems to support the execution of construction procurement activities. Therefore, this study was designed to investigate current procurement practices and the use of e-procurement in the South African construction sector using two government departments responsible for infrastructure development and public works in the of Gauteng Province as case study. The specific research questions the study sought to address are:

- What are the challenges associated with the current construction procurement practices in government departments in the Gauteng province of South Africa?
- To what extent are e-procurement systems used to address these challenges?  
and

- What are the barriers to the adoption of e-procurement in the two government departments investigated?

This study hopes to bridge some gaps in the literature and makes contribution to the current discourse on the use of e-procurement in the South African construction sector from the perspective of government departments.

## 2. Literature review

The review of literature is focused on three key areas that are related to the objectives of the research. These are electronic procurement in construction; benefits and barriers of e-procurement in construction.

Broadly speaking, construction procurement encompass all activities involved in the creation, management and fulfilment of contracts relating to the provision of goods, services, engineering and construction works or disposal, or any combination thereof as defined in the International Standard Organization document on construction procurement (ISO 10845, 2010). The specific activities involved are related to announcement /notification or informing stakeholders about tender opportunities (soliciting for tender offers); exchange of project information and data among participants; tendering; evaluation of tenders, award and management of construction contracts (see Bausa et al., 2013).

Prior to the advent of electronic systems, the execution of construction procurement activities had traditionally relied on paper-based processes. However, these have overtime proven to be inefficient in dealing with the demands and complexities of contemporary procurement activities. This is because the paper-based processes are slow, time consuming, labour intensive, attract high transaction and operational costs, associated with poor data management (capturing, storage, retrieval, reproduction and transmission) and result in unnecessary liability claims and low productivity as the following studies (i) evaluation and improvement of the procurement process in construction projects by Alarcon *et al.* (1999) (ii) the role of electronic procurement and Global Sourcing techniques in the United Kingdom construction industry by McIntosh and Sloan (2001); and (ii) Mohammed (2003) help to explain. Hence, in a review of past, present and future of web-based project management and collaboration tools and their adoption by the US AEC industry, Becerik (2004) noted that the use of electronic systems to support the execution of construction procurement activities seeks to improve communication and collaboration as well as promote accurate, efficient and timely exchange of project data and information among the different participants.

The review of literature reveals that there is a wide range of electronic systems and applications currently used to support the execution of construction procurement activities. These include web-enabled software packages such as BIM technology used in the production of construction drawings, specifications and bill of quantities (Jardim-Gonclaves, 2011; Nawari, 2012; Bynum et al., 2013), network technologies such as EDI, e-mail, wireless technologies, e-Marketplace and Web 2.0 for the exchange of project data and information (Bertot et al., 2010; El-Ghazali et al., 2012; Shalle et al., 2013), data collection and handling technologies (e.g. GIS, GPS, RFID) (Underwood and Isikdag, 2011; El-Ghazali et al., 2012; Yassine et al., 2012) and integrative and collaboration technologies such BIM, cloud computing, customised e-procurement and project management software applications, which facilitate the integration of several procurement activities (Zuo and Seo, 2006; Teo et al., 2009; Fathi et al., 2012). One vital feature of these electronic systems and applications is that they facilitate better data management (e.g. capturing, storage, processing, and retrieval), real time interactions and exchange of project information and data among geographically dispersed and multidisciplinary participants in the entire construction procurement lifecycle, which are not possible with

the paper-based system. Hence, these systems are currently used as platforms for conducting construction procurement activities globally.

Further, the literature is replete with studies on the benefits and barriers of e-procurement in the different industrial sectors. Mohamed (2003) views the benefits of e-procurement from three main perspectives: (i) as a communication channel for organizing and communicating information, and improving interactivity among project participants (ii) as a transaction channel for streamlining transaction process, thereby reducing the complexity of task, paperwork and transaction cost; and (iii) as a distribution channel for reducing delivery and operating cost and time. Yu *et al.* (2008) noted that e-procurement promotes transparency in the procurement process; and thus Bertot *et al.* (2010) made it clear that the adoption of e-procurement in the public sector has been driven primarily by the need to entrench accountability and transparency into the procurement process as explained in their study on using ICTs to create a culture of transparency. Despite these benefits, there is copious evidence in the literature that there are several barriers to the adoption of e-procurement in the different countries as studies on e-procurement implementations in Italy, New South Wales, New Zealand, Scotland and Western Australia by the Australian Government Information Office (2005) and that on five major e-procurement projects in UK-based public sector agencies by Doherty *et al.* (2013) help to substantiate.

In a study on the drivers and barriers for e-procurement in the construction industry in Northern Island, Eadie *et al.* (2007) pointed out that construction procurement is more complex than general procurement. According to them, this is because firstly, different parties such as clients, consultants, contractors and suppliers are involved in the process. Secondly, construction work specifications characterised by some elements of uncertainty leading to greater complexity as products and production lines may change locations in the process (see also Jardim-Gonclaves, 2011). On this account, the study on the reasons for the uptake of e-procurement in construction in 29 construction firms in the UK by Eadie *et al.* (2010) reveals that the barriers to e-procurement in the construction sector can be classified into cultural, compatibility, infrastructure, legal security and personnel. Table 1 is a summary of the benefits and barriers of e-procurement in construction sector as identified in the literature

**Table 1: Benefits and barriers of e-procurement in construction**

Benefits	Description	References
<i>Cost</i>	Minimization of the costs of printing and transmitting drawings; timely delivery of information; ensures transparency in procurement process; enhances opportunity for future collaboration process, transaction and administration costs saving; service/material / product costs savings; increase in profit margin; strategic cost saving	Mohamed, (2003); Zuo and Seo (2006); Eadie <i>et al.</i> (2010)
<i>Time</i>	Timely delivery of information, speed of work shorter overall procurement cycle, faster communication cycle time; reduction in time through greater transparency	Mohamed, (2003); Zuo and Seo (2006); Egbu <i>et al.</i> (2003); Eadie <i>et al.</i> (2010)
<i>Quality</i>	increase in the quality of documents, improve quality through increased competition, benchmarking, visibility in the supply chain, efficiency; improved communication; increased accuracy by eliminating errors through the use of computers; quick and easy access to information	Egbu <i>et al.</i> (2003); Zuo and Seo (2006); Eadie <i>et al.</i> (2010)
<i>General</i>	Enhanced inventory management; convenience of archiving of completed works; develops technical skills, knowledge and expertise of procurement staff; better integration of design and construction; improve flexibility to changing needs; access to better work opportunity.	Zuo and Seo (2006); Eadie <i>et al.</i> (2010)
Barriers		

<i>Cultural</i>	Lack of leadership support ; resistance to change; bureaucratic dysfunctionalities; insufficient assessment of systems prior to installation; different national approaches to e-procurement; reluctance to buy-into one off system; perception of no business benefit realized; lack of publicity/ awareness of best practice solutions ,forum to exchange ideas and business relationship with suppliers providing e-procurement; organizational culture; lack of confidence in the new technology	Rankin <i>et al.</i> , (2006); Eadie <i>et al.</i> (2007); Eadie <i>et al.</i> (2010)
<i>Infrastructure</i>	Lack of widely accepted e-procurement software solution, complicated procedures; poor access to Internet and ICT infrastructure; data transmission reassembly-incorrect ; partial display of data; clarity of sender and tender information	Egbu <i>et al.</i> (2003) Eadie <i>et al.</i> (2010)
<i>Security</i>	Security of data; confidentiality of information; tampering of data ; proof intent- electronic signatures	Aranda-Mena (2004) ; Rankin, <i>et al.</i> (2006); Eadie <i>et al.</i> (2007)
<i>Legal</i>	Lack of national IT policy relating to e-procurement issues; lack of pertinent case law; enforceability of electronic contracts; level of legality of e-procurement	Aranda-Mena (2004), Eadie <i>et al.</i> (2007)
<i>Compatibility</i>	Lack of flexibility in the use of e-procurement systems; interoperability of e-procurement software and systems; investment in compatible systems	Egbu <i>et al.</i> (2003) Rankin, <i>et al.</i> , (2006); Eadie <i>et al.</i> (2007)
<i>Personnel</i>	Lack of technical expertise and staff turnover;	Aranda-Mena (2004) Eadie <i>et al.</i> (2007);
<i>Economic</i>	Other competing initiatives; information technology investment costs	Eadie <i>et al.</i> (2007)

From Table 1, it is evident that the benefits of e-procurement in construction are enormous and related to improving the efficiency and effectiveness of construction procurement process in terms of cost, time and quality. On the other hand, the key barriers to the adoption of e-procurement in the public sector are generally related to cultural, environmental, technology, organizational, and social factors.

### 3. Research design and methods

As noted earlier, the goal of the study was to investigate the use of e-procurement in construction by two government departments in Gauteng Province of South Africa. In order to achieve this goal, it was important to choose appropriate research design. Among the various research strategies and approaches available, interview was used because it was considered the most suitable in addressing the broad aim and research questions of the current study.

Government departments were purposively chosen for this study because of the believe that the public sector should spearhead the adoption of e-procurement in construction to ensure accountability, efficiency, transparency and value for money in public procurement as Neupane *et al.* (2012) suggested. The Gauteng Province of South Africa was also chosen for the study for obvious reasons of being the most populated with approximately 12.7 million people, representing around 24 percent of South Africa's estimated population of 52.89 million (Statistics South Africa, 2014), and having strategic cities of Johannesburg and Pretoria-the administrative capital of South Africa. These suggest that this province has the largest economy in the country; hence large volume of construction procurement activities are most likely to place here in response to its demographic and economic status in South Africa in particular and the continent in as a whole .

Two departments responsible for physical infrastructure development and public works were purposely selected for investigation. Specifically, the supply chain management units of the two departments responsible for planning, executing and overseeing all construction procurement activities of the provincial administration were the target units. Interview guide containing questions on the challenges of current construction procurement

practices; the extent of use of electronic systems to address these challenges and the barriers to the use of electronic systems in construction procurement in the Province was used to elicit responses from informants. This instrument was designed based on findings from the review of literature and interactions with experts in the field.

#### 4. Data collection and analysis

The study was conducted in May 2013 in the study area. The target population was staff members actually involved in the planning and execution of construction procurement activities in the two departments. The human resource units of the departments assisted in indentifying this category of staff members. Of the eight persons identified in the two departments, one person refused to participate in the research for personal reasons. Consequently, seven officers were interviewed using pre-determined questions drawn from the interview guide. The interviews took place in each of the interviewees' offices. Each interview session lasted approximately 30 minutes, and was audio recorded. All the seven interview sessions were completed in three days.

In view of the fact that data collected were mainly qualitative in nature data, content analysis was used in analysing the data. Initially, the data were transcribed, this was followed by the integration of related pieces information and idea from the different interviews; and identification of common and key themes emerging from all the interviews. Although attempt was made at improving the validity of the result of the research by ensuring that only top management staff members within the supply chain management unit in the two departments were selected to the study, the findings cannot be generalised for all the nine Provinces in South Africa.

#### 5. Results

Table 2 provides a summary of interview responses obtained from the seven respondents. It seems evident from Table 2 that there are a number of key challenges in the current construction procurement practices in the two departments investigated.

##### 5.1 Challenges of current construction procurement practices

Among the challenges associated with current construction procurement practices in the two government departments identified by our informants is tampering, misplacement or loss of project information or data (e.g. tender submissions). Responding to the question on the problems of the current construction procurement practices, one of the respondents noted, *"the traditional way of doing things leaves you vulnerable to the tampering of documents"*; while another explained that *"I can make examples on tender... yah... they are close to my area ...let's say the tender closes today the tenders are recorded and kept in a safe office where not everyone can access it. But you will find that some people are able to access those documents even if they are not allowed to be on it. At times these documents are tampered with or misplaced"*. In addition, the current practices were also identified to be characterised by poor recording keeping, duplication of efforts, delays in approval due to large volume of tender submissions and extensive paper work.

**Table 2: Summary of interview responses**

Discussion variables	Extracts from transcript of interviews with respondents						
	R1	R2	R3	R4	R5	R6	R7
<i>Level of respondent's understanding of electronic procurement</i>	Low	Low	Low	Medium	Low	Medium	High
<i>Government legislation complied with in</i>	Section 217 of the Constitution, PFMA	PFMA, constitution, PPPFA and the BBBEE	PPPFA, PFMA, Competition Act, CIDB guidelines	PFMA	Information Technology Act.	Constitution, PFMA, treasury regulation	CIDB regulations

<i>procurement Use of e-procurement in department</i>	It has never been used. It's been manual since the day that I started.	act. I really don't know much about e-procurement	... in our department we have not implement it... less than 5% of activities are done electronically	I am aware of it, for instance when we advertise Bids on the CIDB website and on the government bulletin	We only use it in a manner of buying goods and services. We currently use mostly paper	There are wishes to implement it in the future but there are no set target dates	In terms of our SCM systems there's no software that is currently being utilized
<i>Factors inhibiting adoption of e-procurement in government departments</i>	Money, electronic infrastructure, requirement for documents to be in original not electronic form (e.g. tax clearance certificate)	ICT infrastructure (It's not yet advanced. Basically it's a well-functioning system but advance? No), possible impact on employment	ICT infrastructure (our server is not efficient in the sense that most of the time it's down)	ICT infrastructure, It's costly, and you will need to train people. Sometime you will have to downsize staff. Our logistics people are using e-procurement	ICT infrastructure, leadership and budget from Treasury	Costly, leadership and budget from Treasury , ICT infrastructure , you need systems and when you procure that particular system you have to make sure that it run efficiently and to run the system it is costly	network stability, budget, resistance to change, a smooth transition
<i>Current electronic systems used to support procurement</i>	SCM system, use of CIDB portal for inviting tenders	GSSC, SAP	..they use it more in provisioning... stationary...they also use it in their orders processed electronically... when they communicate with the service providers	SAP, HRM or BAS... the software that is used in GSSC is called procure-to-pay system	SAP, GSSC - We are using it more on things that are below R 30 000.00 those above R 30 000.00 and less than R 500 000.00.	GSSC, database of Professional Service Providers (PSP)  CIPC system to verify vendors, SARS system to verify tax clearances, CIDB database to verify grading of contractors	SAP system for the payment process of our suppliers
<i>Procurement processes supported by electronic systems</i>		Use of website to announce tenders. Payment – Here in our section its payment and provisions, acquisitions we are not.	We advertise on the tender bulletin	We advertise Bids on the CIDB website and on the government bulletin	We only use it in a manner of buying of goods and services. We use SAP, its used to order goods and payment	Award is published on the CIDB website, departmental portal, our website as well, CIDB has an electronic database where you can source. Payment	
<i>Problems currently experienced with paper-based system</i>	Tampering with submission, accurate records keeping, duplication of effort, management of 150 tenders is a problem and requires many people	Loss of documents, tampering with documents	Tampering, misplacement of documents, delay in approvals processes sometimes because someone in not in the office, needs to be kept in safe place in office	Lot of paper usage. It is better if we use electronic mechanism because we can also have electronic files and signatures.	the current paper based method is easily manipulated	It is easy to manipulate this current system because it has a lot of gaps...anything that has a human element can be manipulated but e-procurement is programmed tracking system, auditing,, going	Documents can be lost or misplaced, mixed up with other documents
<i>Perceived impact and benefits of e-</i>	electronic procurement provides	evidence is traceable	Efficiency, security (when you use	Save us from lot of papers used or	In e-procurement you make a		economy efficiency and effectiveness,

<i>procurement</i>	ease of tracking, security, potential impact on levels of employment	electronic processes it is not easy for anyone to temper with the processes).	wasted. Because it will also be addressing the issue of green agenda initiatives	request electronically to the services providers. E-mechanism will receive, evaluate and give you reports. Unlike the current situation where we must evaluate and do all things	to take up a few jobs done by a few individuals e-filing by SARS is an example of how to drive the change	positive impact on smaller companies We need to adopt a strategic approach to it
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## 5.2. Extent of use of electronic procurement

Table 2 also shows that although four of the seven officers interviewed had low knowledge of e-procurement, it appears interesting that their responses on the perceived impact and benefits of e-procurement are consistent with evidence in the literature. In the words of one of the respondents *“I really don’t know much about e-procurement but reading on the websites and searching doing research e-procurement is about procuring using a system...It’s a system actually not just any internet”*. The result also indicates that there is limited use of electronic systems to support the execution of construction procurement activities in the two departments. The following response provided by one of the interviewees help to buttress this:

*“I am aware of e-procurement but not in details because in our department we have not implemented it...We are pretty much into manual ... I would not called it electronic procurement the way it is currently done... all the processes are manual in the sense that everything we use paper work... I think less than 5% of our activities are done electronically”*

In addition, the data in Table 2 suggest that the current electronic systems used to support construction procurement are the Construction Industry Development Board (CIDB) portal, the Gauteng Shared Services Centre (GSSC) and SAP System Administrative Processes (SAP). According to those interviewed, the CIDB portal is a database of contractors and it is used for contractor selection and soliciting for tenders from contractors. In the words of a respondent: *“the electronic procurement that I am aware of is for instance when we advertise Bids on the CIDB website and on the government bulletin...”* The GSSC is an online procurement-to-pay system established by the government to support procurement process in the province, but it is currently not used in construction procurements, while SAP is used for requisition and data management, payment of contractors and suppliers. As one of the interviewees explained *“the SAP system that we are implementing has nothing to do with e-procurement. We are using SAP system to capture our information (data capturing) and pay our suppliers”*.

## 5.3 Barriers to the use of electronic procurement

As regards the factors inhibiting the adoption of e-procurement in the departments, Table 2 also shows that the respondents were of the view that there was no definite government policy as regards the implementation e-procurement. For instance one of the respondents noted that *“National treasury is the one who is drawing up procurement policy.... We cannot implement electronic procurement without their approval”*. Another respondent claimed that *“I have never heard any government principal talking about that unless I am not listening to the news correctly. I have never heard anyone talking about e-procurement more especially in government departments and governmental institutions”*. Another barrier to e-procurement adoption identified was the cost of e-procurement technologies.

When asked on why they were not using e-procurement now, one of the officers responded: *"It's costly, and you will need to buy a server, licence and train the staff; and this licence you will have to pay over a certain period annually"*. Another key barrier identified was a lack of very efficient and reliable ICT infrastructure to support the use of e-procurement. The following responses by two different respondents support this assertion, *"the ICT infrastructure of our department is not yet advanced. Basically it's a well-functioning system but not advance"*; and *"our network system it's not efficient, our telephone lines example... you find that the lines are not adequate... our server is not efficient in the sense that most of the time it's down. ...really I think we need to beef-up before we can adopt it"*. It is also seems evident from Table 2 that the fear that e-procurement adoption will result in for loss of jobs in the departments and have negative impact on smaller contractors was another barrier to the adoption of e-procurement. As one of the respondents noted: *"the adoption of e-procurement will have a negative effect on younger contractors, cause from my experience these upcoming contractors do not have the resources to buy equipment like fax, and emails, they run their businesses from their cell phones"*. Another respondent also opined that *"It will have a disastrous impact as most the contractors are used to a traditional method all over the country"*.

## 6. Discussion

From the result presented in the preceding section, three key issues have been identified and brought forward for discussion. These are the challenges of the current procurement practices; the extent to which electronic systems are used to support the execution of construction procurement activities; and the barriers to the use of e-procurement in construction in the two government departments investigated.

First, the study shows that current construction procurement practices in the departments are prone to manipulations, misplacement and loss of vital information, and characterised by poor recording keeping, duplication of efforts, delays in approvals due to large volume of documents and information involved and requires extensive paper work. This finding appears to be in support of the description of paper-based procurement process as described by Alarcon *et al.* (1999) and Mohammed (2003) as previously highlighted. It can be inferred from the result that the current construction procurement practices in the two departments are inefficient in data management (data capturing, storage, retrieval, reproduction and transmission) and involve wastage of resources. This goes to suggest that there is a need for the adoption of electronic systems to support and improve construction procurement practices in these government departments.

Second, it is also seems evident from the result that despite the availability of a wide range of electronic systems to support the execution of construction procurement activities, there is limited use of such systems in the two departments. In fact, the result reveals that that apart from the CIDB website and the SAP software used to advertise tenders and make payment to constructors, respectively, there are no other electronic systems identified in this study used by construction supply chain mangers in the two departments to support the execution of procurement activities. This finding corroborates that by Mutula and Mostert (2009) on the challenges and opportunities of e-Government implementation in South Africa, which found that there was a general underutilisation of ICTs in service delivery in the country; and also that by Van Greunen *et al.* (2010) indicating that there was also less adoption of information technology to support supply chain management in the Eastern Cape provincial government.

Lastly, as regards the barriers to the use of e-procurement in the departments, four key factors, namely, a lack of definite government policy on the adoption of e-procurement; the cost of acquisition, operating and maintenance of e-procurement systems, unreliable ICT infrastructure and perceived negative impacts on employment and small scale contractors were identified. Notably, the finding on a lack of clear government policy on e-procurement

adoption is in line with finding by the Australian Government Information Office (2005) and Doherty *et al.* (2013) that a lack of public policy on e-Procurement was a barrier to the uptake of e-procurement in the different countries. Similarly, cost and infrastructure issues identified by the respondents are also consistent with the findings of previous studies (including Aranda-Mena, 2004; Rankin, et al., 2006; Eadie et al., 2007; Eadie et al., 2010) as previously highlighted. Further, the fear expressed by the respondents that e-procurement adoption can lead to loss of jobs and negative impacts on small scale contractors was to be expected given their knowledge base of e-procurement and the peculiar nature of the country, particularly with the preferential procurement policy (PPP), which seeks to provide employment and business opportunities to previously marginalized groups.

## 7. Conclusions and Recommendations

This study examined and analysed the current procurement practices and the use of e-procurement in the South African construction sector using two government departments in Gauteng Province as case study. From findings of the study, the following conclusions can be made. First is that the current construction procurement practices in the two departments investigated appears not be promoting efficiency, transparency and value for money there are fraught with some challenges. Second is that there is limited use of e-procurement systems to support construction supply chain management in the departments. The last but not the least conclusion is that key barriers to the uptake of e-procurement in construction in government departments in the Gauteng province are cost, infrastructure and culturally related.

The study implies that in government departments in the Gauteng province of South Africa, the use of e-procurement systems in construction is relatively low when compared with the trend in the developed countries. Therefore to achieve better diffusion and maximize the benefits of e-procurement in construction in the South African public sector, the following recommendations are made.

First, there is a need for the government to come up with a definite policy on the adoption of e-procurement in its departments and agencies. This calls for policy guidelines and legislation by the appropriate government institution. As a change management strategy, an action plan need be developed that would see both the paper-based and electronic systems run concurrently for a period of time as the former is gradually phased out.

Second, the ICT infrastructure in government departments responsible for infrastructure development and public works need to be upgraded to ensure that they are reliable and can support smooth operation of e-procurement systems. Although this will require some financial investment, evidence in the literature indicates that the long term benefits and impact of e-procurement outweigh the financial investments on it.

Lastly, to cushion any negative effect the adoption of e-procurement in construction may have on small or emerging contractors, the CIDB and other relevant government agencies may have to provide technical support to this category of contractors in order to upgrade their IT facilities and skills; and develop capacities and capabilities to engage in e-procurement activities.

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