E-TENDERING FRAMEWORK FOR PUBLIC PROCUREMENT IN SRI LANKA

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ABSTRACT

The growth of Information and Communication Technology (ICT) opens new opportunities for businesses all over the world which accelerates the competition among the businesses and professions. Even though good communication is an essential tool for procurement and consultation process, the usage of IT in public procurement in Sri Lankan construction industry is not as much of other sectors, while other developed and developing countries are practicing and gaining advantages. However, adopting e-Tendering in pre contract stage, yields several benefits which can be experienced directly and indirectly. In an economic point of view, e-Tendering enhances the efficiency through transaction cost savings and reduce the direct procurement costs, maintaining transparency, accountability, ease of use and speedy exchange of information including other intangible benefits such as reduced administrative costs. Eventually, e-Tendering will lead to pave the way to reduce the time, cost and resources of a project from which the triple bottom line of the Sustainability can be accomplished to a great extent. This research paper discusses the benefits and challenges in adopting e-Tendering and the legal, technological and material requirements to be appraised in forming a proper framework for e-Tendering. A qualitative research approach is proposed considering the aim and the context of the study.

Keywords: *Construction; e-Tendering; Public Procurement; Sri Lanka; Technology.*

1. INTRODUCTION

Tendering is probably the most critical and important activity in a construction project life cycle. Inefficient outcomes of a tender action will significantly affect the project success. However, very rarely a tender action is done without a rush. As a result, the decisions often become less than optimal. Advancements in Information and Communication Technologies (ICT) has been identified and effectively used to face these challenges for many years. However, this is not the case of Sri Lankan construction industry. e-Tendering, the key solution known to improve the efficiency of tendering by using ICT, is not practiced. A research was initiated to explore the key functions and requisites of tendering process in order to recommend a suitable e-Tendering Framework for construction. The research is an ongoing study and this paper presents the initial literature findings together with proposed research methodology.

2. CONSTRUCTION PROCUREMENT

Construction industry as an open system, which is very sensitive to change; its characterization throughout the world is determined by the operating external environment and consists of subsystems such as economic, political, financial, legal and technological systems (Rameesdeen, 2002). This has led the industry to be in a challenging state in addressing the changes forced by the subsystems in an efficient and effective manner. Thus, the construction industries in the world are striving to tackle these changes through the new and innovative ways of construction, efficient resource utilization and better organization of projects. It is inevitable that, when concerning about proper utilization and efficiency, construction procurement has the vital role to be considered.

The construction procurement system can be defined as an amalgam of activities undertaken by a client in order to obtain a new building and includes processes that seek to place risks and obligations

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on the various parties to the project (Ross, 2005). Moreover, Naduranga (2012) clarified that, in traditional procurement there are five steps to be followed to complete the procurement process. These are shown in Figure 1. The process starts with the requirements for an item or a service and ends after the settlement of payments to the supplier.

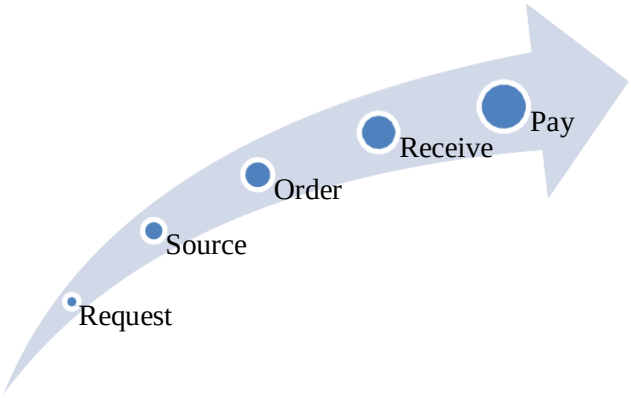

Figure 1: Process of Traditional Procurement (Source: Naduranga, 2012, p 09)

The steps of the procurement process are substantiated by Luis (1999) elaborating that, the term Procurement Process is used to describe the process required to supply equipment, materials and other resources required to carry out a project. This process usually involves sub-processes such as acquisition, purchasing, logistics, monitoring, quality assurance and contract administration. Sumasekara (1997) through his research clarified that the procurement method depends on the client's requirements and the contractor's proposal. Moreover Sumasekara (1997) categorized the available procurement methods as traditional procurement system, Design and build, Management contracting, Construction management.

3. CONCEPT OF E-PROCUREMENT

A broadly-based evolutionary development of electronic business has set in across the globe. This development, though not visibly revolutionary in character, has been nonetheless powerful in its impact, and the maturity of e-business has substantially increased across sectors and regions (European Commission, 2012), which conveys the idea of promotion of sustainable use of energy. Furthermore according to Eddie (2011), e-Procurement (a sector within e-business) has further been promoted as a means of producing cost savings through even a minor uptake in adoption within the construction sector.

Sumasekara (1997) has shaped out the current procedure in the public procurement system as Project Strategy, Prequalification, Obtaining Tenders, Evaluation of Tenders, and Award of Contract. This method is used by the Corsi (2006) to develop the concept of e-procurement and e-Tendering. The Figure 2 demonstrates the steps to be followed during the e-procurement process.

4. TENDERING PHASE

Lou (2009) argued that, the tendering phase is deemed to be the most critical and important throughout the lifecycle of the construction project. This phase will shape the contractual and legislative agreements between the client, consultant team, contractor and other members of the project. Based on traditional contracting, the tendering phase starts when the drawings and tender documents are completed. Compilation and analysis of project data are gathered through the stages of strategic briefing, outline and final proposals, production information, statutory approvals, building contracts and others. This phase is information-intensive and paperwork-heavy. Tender documents comprise of the invitation to tender, form of tender, architectural drawings, bills of quantities, health and safety

agreements and others. These documents are paper intensive, not portable, expensive, tedious and troublesome to produce. Once the tender documentation is prepared, it is ready to be distributed to interested bidders. To reduce this material usage and time wastage the concept of e-Tendering is emerging among the construction professionals.

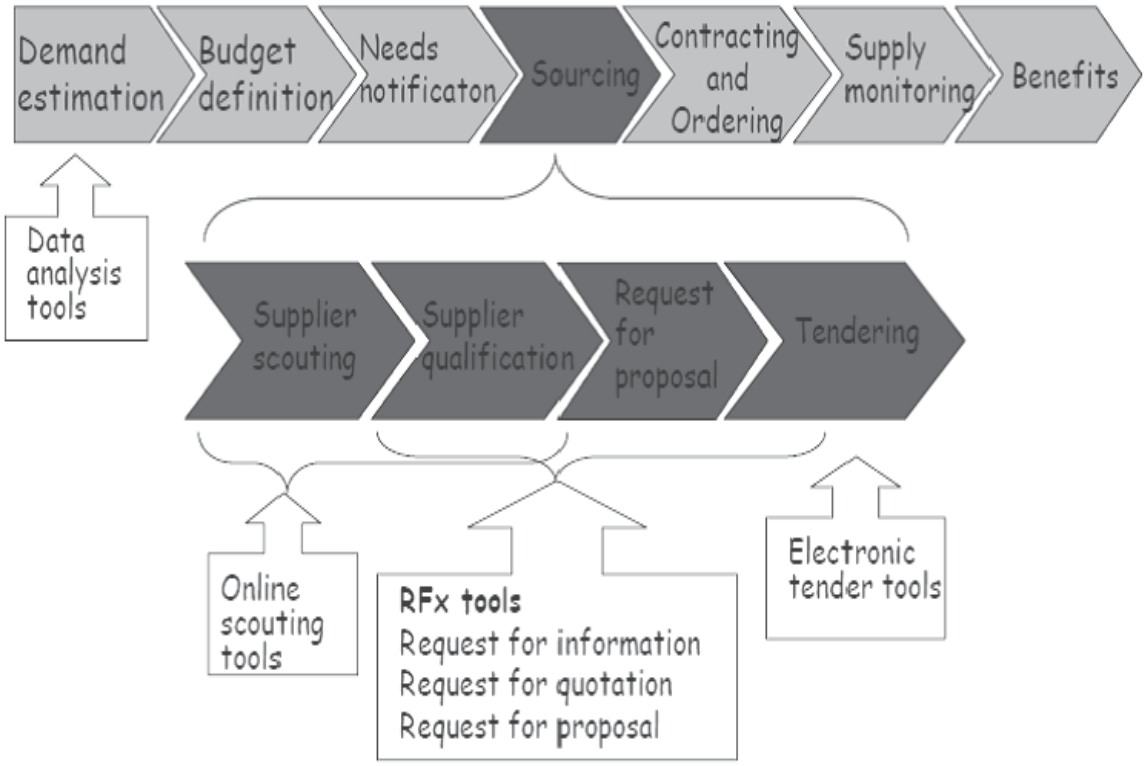

Figure 2: Process of e-Procurement (Source: Corsi, 2006, p 05)

5. INTRODUCTION TO E-TENDERING

Black *et al.* (2005, as cited in Oyediran, 2011) detailed that e-Tendering is basically an expression used to describe the dissemination and receipt of tender information, indication of interest in tendering, receipt of tender documents, submission of tender sum and final selection of successful tender for contracts via the internet. It does not change the basic principles of tendering, just the method of exchange of documents and information (RICS, n.d). Furthermore CIPS (2006) describes it in more detail e-Tendering portals **(**secure dedicated websites, specifically set up for the exchange of information and tender documents electronically over the internet) and systems should allow the buyer to create, manage and transmit contract announcements (notices and addenda) electronically. Tenderers can create and manage multiple profiles containing expressions of interest/pre-qualification information. Invitation to Tender (ITT) documents can be exchanged electronically, and the assessment and award of tenders are usually automatic. Dean *et al.* (2006) gave a conservative idea of illustrating even though there are a number of e-tender systems available to governments and the construction industry each of the systems generally offers similar communication tools (such as messaging to all parties), document management tools and audit trails. The functionality and process aspects of current e-tendering systems are similar and attempt, at most points, to mirror the legal requirements of a paper tendering system. The main parties in an e-Tendering system are the principal and the Tenderers.

6. INFLUENCES TO E-TENDERING

6.1. ORGANIZATIONAL INFLUENCE

When new software or new processes are introduced in any organization, it is only natural for the employees to be cautious and afraid of their jobs; employees will fear responsibility and process changes (Lou, 2006 cited Lou, 2009). The main reasons for the high percentage of systems failure is the rarely purely technical in origin. They are more related to the organizational "soft issues", which underpin the capability of the organization to successfully absorb information systems (IS) and Information Technology (IT) into its work practices; in this context one or more collaborative environment. IT is still, in many cases, being considered by the management of organizations as a cost-cutting (Alshawi, 2007 cited Lou, 2009). People are the determinant force in deciding the success or failure of the uptake of e-Tendering and collaborative environments. When the individual is willing to change, there will be the willingness and aspiration to explore new horizons. Top management support, the presence of an innovation champion among employees and a motivated manager will drive the desire to try and change from the old ways Neef *et al.* (2001) as mentioned in Lou (2009).

The main tasks of e-tendering flat form are identified by Netcoach (n.d) as follows;

- Publication of the tender (i.e. full text of the tender)
- Degree of research involved in compiling the project (meant for tender) the various criteria used (market segment, trades, products/services, regions, time to implement etc.) and full text research.
- Easy exchange of digital files, with the help of data in an agreed data format
- Administration of the awarding process (user and document administration, current services.)
- Handling the legality of awarding, through signatures / encryption and time

6.2. GOVERNMENT INFLUENCE

Tendering processes are considered to be a suitable mechanism for governments to fairly assign contracts for construction projects and procurement. The demand for efficiencies to be created in the process has resulted in a significant number of governments implementing e-Tendering systems (Dean, 2006). Government (often key client within the construction industry) and with its increased tendency to transact its business electronically, undoubtedly has an effect on how various private industry consultants contractors, suppliers and related parties do business by offering a wide range of (current and anticipated) E facilities or services including e-Tendering. Overall going business electronically is found to have a profound impact on the way today's construction business operate-streamlining existing processes, with the growth in innovative tools , such as tender, offering the construction industry new responsibilities and opportunities for all parties involved. It is therefore important that these opportunities should be accessible to as many construction industry businesses as possible (Eddie, 2010).

Kajewski and Weippert (2004) categorized the governments' main expectations of implementing E-Tendering as, best value for taxpayers' money and increased efficiency and effectiveness. However, they further put forward the consistent tendering practice across Government, promotes overall e-Commerce initiative and environmentally friendly due to a predominantly 'paperless' process as added expectations of the government when implementing E-tendering.

6.3. LEGAL INFLUENCE

According to Islamy (2002) there is a need to ensure that, the users' online privacy is protected, both legally and technologically as this assurance will make them feel comfortable to surf the internet and more importantly to submit their data and spend their money online. The researcher added that the

legislation is important due to no matter how advanced the technology may be, without any legislation that regulates the rights and duties the technology can be abused (Yusoff, 2011). Many governments are increasingly relying on board range of resources outside the traditional governmental law enforcement expertise to address Cyber threats and forensic issues. As such new institutional models may have to be created. The Sri Lankan experience is as interesting example. In mild 2006 Sri Lanka CERT (Computer Emergency Response Team) was created to address cyber security incidents. This is a government owned company (A subsidiary of ICT Agency of Sri Lanka – ICTA), established and runs with highly skilled incident handlers where the board consists of a range of key stakeholders such as enforcement authorities, bankers, private sector and academia (Fernando, 2009).

6.4. TECHNOLOGICAL INFLUENCE

The Internet provides considerable opportunities for firms to streamline their business operations, as well as offers greater choices and lower prices to customers. A large number of enterprises have migrated to Internet-based systems for increased efficiencies, lower costs, and the ability to operate in real time across different platforms. E-commerce is changing business economics and as a result, many firms are reengineering their core business processes (Netcoach, n.d). As in the Prior to Tenderer Communication stage, the integrity and confidentiality of most network communications must be maintained. In closed or restricted tenders all communication can be kept confidential using Secure Sockets Layer (SSL) an effective mechanism to provide integrity and confidentiality for communications or other cryptographic mechanisms. Secure communications protocols such as SSL only protect data during transmission. In addition to communications security, it is advisable to encrypt sensitive tender documents, such as offers, while stored. The main improvement of the Tender Submission and Two-Way Communication stage is that tenderers can upload electronic tender submission documents. Hyper Text Transfer Protocol (HTTP)

file upload or similar point to point, connection oriented protocol should be used rather than email or other store and forward protocols especially when information is not encrypted. This ensures that non-trusted intermediate parties cannot store data for extended periods of time before being sent to the electronic tender box. Security mechanisms that simulate the physical tender box must ensure that electronic tender documents cannot be opened before the designated opening time in the tender conditions. The tender box simulation security may be considered equivalent to the current common practice of using a physical tender box that requires two keys to be opened. One approach to simulate this system is to open the electronic tender box using threshold public-key decryption. This encryption system requires multiple cryptographic keys to be used to decrypt an encrypted message (Dean, 2006).

7. BENEFITS OF E-TENDERING

The primary benefit that, government agencies, service providers, and industry seek to achieve from implementing electronic procurement (e.g. e-Tender) is to reduce the liable cost of business and to deliver services that are more efficient for the community. e-Tendering is a key strategy in the development of various electronic procurement programs and initiatives, offering additional opportunities for industrial businesses, contributing to a globally competitive economy, and helping secure a sustained economic growth. (Kajewski and Weippert, 2004)

In the opinion of the objective of e-Tendering is to specifically increase productivity during the tendering process by decreasing paper handling and speeding up communication and interaction. This represents the ultimate goal of E-tendering, a shift from manual paper methods to fully electronically enabled means of communication. One of the major strengths of arguments for e-Tendering is the remote accessibility of the system. Thus making it possible for a tender manager, tenderer, contractor or client to access the facilities of the tender engine from anywhere in the world without being impeded by geographical location constraints (Seah, 2004 cited Oyediran 2011). Sell's 2005, study (as cited in Lavelle 2009, p105) explains how time and cost savings can be gained. Avoiding the postal system leads to possible reductions in the tender period or use of previously abortive time to

concentrate on the production of the tender. Printing costs will drop, as well as copying and postage costs, together with the associated staff time and overhead costs. Kajewski and Weippert (2004) structured the general benefits as follows.

- Streamlines the whole tendering process.
- Provides improved and secure access to tender information.
- Brings about innovative business processes.
- Initiates greater opportunities for small and regionally based businesses.
- Allows downloading of electronically submitted tenders in a form suitable for evaluation purposes without having to manually re-enter data.
- Makes it easier for businesses to obtain tender documentation and to submit.

8. LIMITATIONS TO E-TENDERING

A list of barriers ranked by study of Eddie *et al.* (2007) highlighted that, uncertainty as to the legal position of e-procurement is the major barrier to the implementation of e-tendering. Simultaneously the argument goes that, company culture and upper management support will highly influence the implementation. Not having the IT infrastructure, expensive IT systems, lack of technical expertise, lack of E-procurement knowledge / skilled personnel, lack of business relationship with suppliers providing E-procurement and Security of transactions are the added limitations of the implementation. Carayannis *et al*. (2005) approved the above findings. Their research stated that, public procurement faces many deficiencies. They enumerated these as complicated procedures and extended relationships, excessive state intervention, absence of a clear national IT policy, lack of flexible centralized control, lack of information quality and resistance to change. With the exception of a reduction in paper in public procurement each of the above remain as barriers to implementation of a system of. However, it is pointed out that "resistance to change" is one of the biggest barriers to the introduction of e-Tendering within the public sector. Resistance to change, lack of a widely accepted solution and lack of leadership seem to be major barriers. Therefore, a cultural change needs to take place prior to adoption of an e-Tendering system. This is proved by the Martin's 2008 findings (cited Eddie *et al.*, 2010, p. 24) based on the United Kingdoms' construction industry, the perceived advantages of monitory savings and efficiency gains prompted the UK government to set targets for all procurement activities to be fully electronic by the end of 2005 (Local E-Gov, 2004 cited Eddie *et al*., 2010). Martin (2003 cited Eddie *et al.,* 2010) had shown that only 2.9% of Contract Documentation was being transmitted and received in Construction Industry Trading Electronically (CITE) format. Five years later, Martin (2008, cited Eddie *et al.*, 2010) shows that less than 20% of tender documentation is sent out and received through e-tendering.

Security is a major concern when working on the internet. Jennings (2001, cited Eddie *et al*., 2007, p.111) states "The World Wide Web leaks like a sieve. Data transmitted on it can be garbled, can reassemble wrongly at the other end, or can display only partially because of incompatible software". Many of the banks although acknowledging these problems, have set systems in place to mitigate these problems.

9. RESEARCH METHODOLOGY

Development of e-Tendering framework for government projects requires identification of both regulatory and practical requisites of a tendering process. A suitable research methodology has to be developed to fulfil this need.

9.1. RESEARCH APPROACH

As explained by Yin (2009), a research approach is the way of collecting and analyzing empirical evidence, following its own logic having its on advantages and disadvantages. Qualitative and quantitative research approaches are the two main schools of research design. Quantitative approach tend to relate to positivism and seek to gather factual data and to study relationships between facts and how such facts and relationships accord with theories and the findings of any research executed previously (Pinsonneault and Kraemer, 2002). Survey researches and experimental researches generally come under quantitative approaches. By using a qualitative approach the researcher will study whole population as individuals or groups and could be able to identify beliefs, understandings, opinions and views of people (Fellows and Lui, 2003). Case study research, ethnography, action research and grounded theory approach can be taken under qualitative approaches.

9.2. TECHNIQUES FOR DATA COLLECTION

This section is focused on determining how the qualitative data would be collected. As described by Yin (2003), there are six sources of data collection techniques including documents, archival records, interviews, direct observation, participant observation and physical artefacts.

Documentary survey (Secondary data)

The intention of documentary survey is to identify the important data on e-Tendering in global context and in Sri Lanka, critical issues in implementing e-Tendering as a sub part of public procurement method.

Interviews (Primary data)

The semi-structured interviews will be adopted as the data collection technique in this study because it offers sufficient flexibility to approach different respondents differently while still covering the same areas of data collection. The interviews will be carried out with professionals or who are involved in public procurement.

9.3. TECHNIQUES FOR DATA ANALYSIS

Content analysis, which is a technique of analysing data, involves codifying qualitative information into pre-defined categories, in order to derive patterns in the presentation and reporting of information. After gathering data from semi structured interviews, data reduction and concept identification will be done.

10. CONCLUSIONS

The construction industry is information sensitive and categorized as one of the most important industry in a developing country like Sir Lanka. e-Tendering solutions can undoubtedly improve the tendering process and drastically cut-down the amount of time taken. This can result in an increase in the amount of tenders undertaken at any one time and an improvement in the overall control of the process. End users can be given access rights to involve them in the process to a large work with purchasing to achieve the best overall value in terms of price and quality. The security policies have to be drawn up with the consideration of both the tendering business and its legal obligations, to ensure the designed system can generate legally admissible evidence. The security mechanisms have to be carefully integrated into the system to provide desirable security service for the complex contract processes involved in an e-tendering system. The transition towards full is not primarily a technical nor a technological challenge. It is above all an economic and political challenge, which cannot be overcome without strong commitment at the highest political level. While the study demands for objective conclusions, a quantitative approach will not offer deeper understanding about the Sri Lankan context. A qualitative research approach is proposed for the next step of the research.

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