

Electronic Tendering in the Malawian Construction Industry: The Dilemmas and Benefits

Rodrick Lengama Chilipunde

(The Polytechnic, University of Malawi, P/Bag 303, Chichiri, Blantyre 3, Malawi)

Abstract: The advent of internet technology has enabled electronic procurement in the construction industry which aids in the reduction of procurement costs. Among the technologies that have been praised by many stakeholders in reducing tendering cost of construction work is the arrival of electronic tendering (e-tendering). The aim of this research was to establish the reasons why e-tendering has not been adopted in full; in addition it assessed the drivers of e-tendering and the shortfalls of the traditional paper-based tendering system. The study targeted Quantity Surveying, Architectural, Engineering firms and the Roads Authority. The methodology used included an extensive literature review and field survey conducted on 37 consultants. The field survey used the questionnaire instrument and random sampling. The critical findings from the literature were that there are binding constraints in the applications of traditional paper-based tendering system. The field survey confirmed the issues raised in the literature reviewed and posited inefficiencies of traditional paper-based tendering system, barriers in the full implementation and the benefits of e-tendering system. The findings make an invaluable contribution to highlight the inefficiencies of traditional paper-based tendering system, barriers to the full implementation and the benefits of e-tendering. The recommendations include conducting awareness campaign of the benefits of e-tendering amongst built environment practitioners, highlighting the inefficiencies of paper-based tendering system and dealing with the barriers of e-tendering. There is also a need to formulate rules and regulations that accommodate e-tendering. In addition, promoting e-tendering system to ensure its acceptability among the stakeholders.

Key words: e-tendering, Malawi, technology, barriers, drivers

1. Introduction

The traditional paper-based tendering method can prove to be very costly and harbouring virtually endless inefficiencies (Shakantu, 2003). CITAX (2008) admits that current practice in the Irish construction industry is heavily dependent on paper which is prone to inefficiencies. Smith and Jaggar (2007) recognise the direct overhead costs that arise from using the traditional paper-based tendering method are high. Al-Lawati and Aibinu (2008) report that the most severe problems arising from the method is the enormous administrative tasks involved. E-tendering has been assumed to be more cost and time effective than the current traditional paper-based tendering method. This implies reduced printing, copying and courier costs and also reduce the chances of miscommunication (Tindsley & Stephenson, 2008; Al Dhuhli, 2002). Research has shown that firms

Rodrick Lengama Chilipunde, MSc Built Environment specialising in Project Management, BSc (Hons) Quantity Surveying Construction Economics, The Polytechnic, University of Malawi; research areas: road construction industry vs environment performance in Malawi. E-mail: lengama2@gmail.com.

are more likely to make economic gains if they replace the traditional paper-based method with an e-tendering process (Deloitte, 2004; Yang, Ahuja & Shankar, 2007). Unfortunately, the industry as is the case with other technology uptake is slow to adopt the technology (Yang, Ahuja & Shankar, 2007).

The industry in Malawi is overly dependent on the traditional paper-based method of tendering (Malinda, 2011). It is currently experiencing a paradigm shift from traditional paper-based methods to digitally based information exchange (Rivard et al., 2004). This has led to the introduction of e-tendering purportedly due to its perceived benefits (Deloitte, 2004; Tindsley & Stephenson, 2008; Oyediran & Akintola, 2011; CITAX, 2008).

However, Peel (2008) believes that notwithstanding the perceived advantages of the internet, harbours genuine concerns that have been raised in regards to random placement and ease of access of information in the electronic world (Heckman, 2000; Royal Institute of Chartered Surveyors, 2005; Al-Lawati & Aibinu, 2008). It is therefore important to study the factors behind the slow uptake of the e-tendering process in Malawi. The objectives of this study are to identify the perceived:

- constraints of the traditional paper-based tendering system;
- advantages of an e-tendering system, and
- barriers of an e-tendering system.

2. Literature Review

The construction industry in Malawi mostly uses the traditional paper-based method of tendering (Malinda, 2011). The method has been commonplace within the industry for a significant number of years, but with recent technological advancements, this traditional process is rapidly becoming obsolete. Therefore, it is not surprising that several major projects within the UK are now being procured through the e-tendering process this included the multibillion pound development for the Olympic Games in London 2012 (Tindsley & Stephenson, 2008). Admittedly, opinions are still mixed and the industry is still undecided on the full implementation of e-tendering. If the technology fails at a crucial moment, it can also mean unfairness to one or more of the tenderers (Tindsley & Stephenson, 2008; CITAX, 2008; RICS, 2005).

CITAX (2008) reports that the idea of introducing e-tendering in the Irish construction industry is certainly to drive down overhead costs in a sector where profit margins are getting tighter, and e-tendering certainly provides one means to reduce overheads. Additionally, e-tendering is becoming an important tool in the construction project procurement process (Al-Lawati & Aibinu, 2008). However, CITAX (2008) reports that there is some initial scepticism that real savings can be achieved from introducing e-tendering. With the advancement of information technology and internet penetration into the business communities, traditional paper-based tendering system now have the option to conduct the procurement processes via electronic means savings of data entry, error reduction, processing time as well as more streamlined processes through standardized modes of operations.

Martin (2008) asserts that, where the tender process involves the exchange of a large amount of documentation, all of which originates from an electronic format, continuing with paper based tendering is untenable. Brook (2008) stated that in most construction projects, documents are exchanged electronically. Nevertheless, contractors are still asked to submit paper copies of their tender documents.

2.1 What Is E-Tendering?

Tendering, generally, is the process which is undertaken to obtain offers to create a contract between a client and a contractor (Tindsley & Stephenson, 2008). E-tendering is therefore defined as the process by which tender

documentation, such as drawings, bills of quantities (BoQ) and specification are issued to construction firms in an electronic format and via the internet. Therefore, the invitation to tender, tender award, contract administration and monitoring project performance will be all undertaken electronically online. Furthermore, tender queries, tender addendums, updates, evaluation of work for payment and notification of payments are all to be exchanged electronically on the internet via the system's website and e-mail (Al-Lawati & Aibinu, 2008). E-tendering is the process of issuing electronic tender documentation to main contractors, sub-contractors and industry suppliers and receiving their responses electronically (CIOB, 2009).

2.1.1 E-tendering in Malawi

In Malawi e-tendering is done piecemeal for example addendum tender information is sent to contractors through e-mails in most cases. Unfortunately, there is no procurement organization that has fully implemented e-tendering methods. Malinda (2011) argued that there are virtually endless barriers in using the method. Some of the barriers mentioned include unreliable internet, security problems of the tenders, possible hacking, virus attacks, unreliable power supply, technology challenges, and the lack of internet connectivity (Malinda, 2011).

2.2 Traditional Paper-Based Tendering Method

The traditional tender process involves the professional quantity surveyor (PQS) gathering the documentation together. This includes: photocopying/printing; assembling it into packages; binding, and dispatching to each of the prospective bidders for the tender. The dispatching thereof may be paid for by the bidder or by the PQS and normally involves the documentation being delivered by courier (CITAX, 2008). The process which involves the PQS in preparing tender documentation includes: the BoQs that lists all of the items that should be priced in each bid; drawings that are relevant to the tender, and any other relevant information (CITAX, 2008).

2.2.1 Constraints of the Paper-Based Method of Tendering

Many researchers have highlighted inefficiencies that are prevalent when using this method of tendering that can be eliminated when using e-tendering. These disadvantages include: large storage capacities, such as, storing rooms and archives are required to store tenders and projects documents and drawings; lack of security of stored data in papers; time wastage and cost in exchanging information and tender documents; labour intensive tasks required to issue and respond to tenders; intensive administrative tasks, such as, printing, collating, binding and distributing of tender documents to all interested contractors (Al Dhuhli, 2002). In addition, CITAX (2008) admits that the paper-based method of tendering has inherent inefficiencies in many forms such as handling errors, estimating process errors, and finally errors that arise during evaluation. CITAX (2008) further posits that all these errors can be eradicated/minimized if e-tendering can be introduced in an organization.

2.3 Electronic Tendering Process

E-tendering solution is conducted via the internet predominantly paperless. This process can include the advertisement of the requirement, document production, supplier registration, electronic delivery of documents between buyer and supplier, opening ceremony, evaluation of submissions and finally the contract award and publication (Deloitte, 2004). In addition to these core functions, most e-tendering software solutions provide additional support such as archiving, document management, early warning of opportunities to suppliers, and maintenance of approved and/or potential supplier lists.

2.3.1 Benefits of E-tendering

The process tries to eliminate paper while shortening the time taken to submit and respond to queries. Clarifications should be issued electronically and distributed automatically to all interested parties, thus reducing

the risk of errors and increasing visibility of responses to all interested parties. This increases the accuracy of tenders while reducing the cost of managing the tender process (CITAX, 2008; RICS, 2005; Brooks, 2008). The benefits of e-tendering include: simplifying the process; reduced tendering period; fast and accurate pre-qualification and evaluation, avoiding the need for double or triple entry of the same information, and the reduction in labour-intensive tasks of receipt, recording and distribution of tender documents. There is increased integrity and transparency in the tendering process, a reasonably high return on invested funds on such technology improved quality of tender specification and supplier response and provision of quality management information (Brooks, 2008; Tindsley & Stephenson, 2008; Lou & Ashalwi 2009; Oyediran & Akintola, 2011; RICS, 2005).

It is interesting to further note that e-tendering increases the level of security and authentication of the tender process. The findings are in sharp contrast to the industry continued concern that it exposes sealed bids to possible hacking which defeats the principle of sealed bids. Most e-tendering software solutions provide additional support such as archiving, document management, early warning of opportunities to suppliers, and maintenance of approved and/or potential supplier lists (Local e-gov, 2011).

2.4 Barriers to Implementing E-Tendering

The benefits of using e-tendering are primarily perception based and not quantifiable (Westcott & Mayer, 2002; Egbu, Gaskell & Howes, 2001; Yang, Ahuja & Shankar, 2007). Deloitte (2004) reports that one of the key challenges to deriving benefits from e-tendering as: authorities need to invest money and time to both identify their opportunity from e-tendering and to deliver the expected benefits; the presence of internal resistance to adopting a corporate, standardized approach to tendering; change management is critical to securing buy-in; supplier concerns over the robustness of the technology and practical issues such as file sizes; a supplier education process is essential; there is choice as to the technology solution — package versus bespoke; in-house versus hosted.

A central concern when industry organizations have to use the internet for electronic information transfer is that of security (Root & Thorpe, 200; Eadie et al., 2010. Oyediran & Akintola, 2011) identify security of e-tendering and ignorance of benefits as highly influential factors to the dismal state of e-tendering usage among Nigerian construction industry professionals in the performance of their activities. As expected, irregular electric power supply ranks highest on the influence scale followed closely by financial implications of setting up the facilities. These precede poor communications infrastructure, lack of training of professionals, skepticism about the system, reluctance to change, low quality education of graduates and lack of interoperability of software in use by construction industry professionals in that order (CITAX, 2008; Tone, 2005), Oyediran and Akintola (2011) bemoans the lack of ICT infrastructure for ensuring a secure e-tendering process are not widely available, and it is not clear whether those that have them have been using them to secure exchanged data. In addition Brook (2008) warns of the dangers that arise when introducing this system. Firms need to consider if the market sector they are trying to source from is ready for e-tendering because a loss of bidders due to perceived complexity may be a big problem and a discouragement to securing a competitive bid.

High rate of obsolescence (Root & Thorpe, 2001; Ozumba, Ata, Oburo, David, 2010) a lack of strategic direction within the industry, in terms of overall direction, the standards and protocols that would inform any IT investment decision (Root & Thorpe, 2001). Ozumba et al. (2010) lament the high rate of development; inadequate infrastructure; power supply, and other essential public services, socio-economic and political upheavals, it seems that negative perceptions are justified (Ozumba et al. 2010; Westcott & Mayer, 2002). The

conservative nature of the industry means that it embraces change slowly (Tone, 2005; CITAX, 2008). The lack of awareness is one of the major barriers specifically acknowledged as the principal impediment to the adoption of collaborative technology environments (Lou & Ashalwi, 2009).

3. Research Method

A draft questionnaire was pre-tested on a pilot study. The questionnaire used a five-point Likert-type scale to measure a range of opinions from, “Strongly disagree to strongly Agree” as the case may be. The significant agreement or otherwise with the notion being tested was determined by adopting the mid-point value of the index (that is 3) as the hypothesized mean (Coakes & Steed, 2001). The design of the questionnaire was based on input from the literature review. The main purpose for this investigative study was to identify the factors behind the slow uptake of the e-tendering process in Malawi, which is perceived to have many benefits compared to the traditional paper-based tendering method. The results were used in the design of the template to be used for collection of data during the empirical study. At this stage data capturing and language clarity problems were addressed. Overall, the pilot study helped to modify the research instrument and made it more effective in capturing data that would best answer the research question and clarify the stated objectives.

4. The Sampling Strategy

The nature of the research method employed, in conjunction with the population being studied, largely dictated the sampling strategy used. The purpose of the study had a significant impact on the nature of the sampling selected (Fellows & Liu, 1997; Welman et al., 2005; Naoum, 2007). The study which utilized a questionnaire survey of architectural, engineering, and quantity surveying consultants was carried out between August and September 2011 in Blantyre and Lilongwe City in Malawi where the majority of the consultants are based. Fellows and Liu (1997), Desta (2006), argue that if there is no evidence of variation in the population structure or if there is no reason to ignore the structure, then random sampling procedure is appropriate. Random sampling procedure was chosen for this study because there was no evidence of variation in the reasons as to why there is slow-uptake of e-tendering among different construction firms.

4.1 Respondents’ Profiles

The majority of the respondents’ firms (53.8%) have been in existence for over 20 years and were therefore well established. Only 18.5% have existed for less than 10 years. Most of the respondents (61.5%) have been in their firms for more than 5 years. This indicates that the respondents were very familiar with their firms and were well placed to provide useful data for the survey.

4.2 Inefficiency of Paper-Based Tendering System

Table 1 indicates responses relative to the inefficiencies of paper-based tendering system, scores ranged between 1, (no inefficiency), and 5, (a very high inefficiency). Table 2 indicates that inefficiencies are prevalent in the use of traditional paper-based tendering system. Respondents strongly agree that intensive administrative tasks, such as printing, collating, binding and distributing tender documents to all interested contractors were ranked highest with a mean of 4.67, estimating process errors was ranked second with a mean of 4.65. Respondents further agreed the challenges faced with the need for large storage capacities, such as, storing rooms, archives are required to store tenders and projects documents and drawing with a mean of 3.95, ranked fourth are errors that

come during evaluation of tenders with a mean of 3.84. Possibility of late submission of tender is ranked fifth with a mean of 3.74, and finally ranked the least are the tender handling errors with a mean of 3.53.

Table 1 Inefficiency of Paper-Based Tendering System

Inefficiency	Number of responses	Minimum	Maximum	Mean	Strongly Agree
The need for large storage capacities, such as, storing rooms and archives are required to store tenders' and projects' documents and drawings	37	1	5	3.95	1.39
The lack of security of stored data in papers	37	1	5	3.32	1.34
Intensive administrative tasks, such as, printing, collating, binding and distributing of tender documents to all interested contractors	37	1	5	4.67	0.77
Estimating process errors	37	1	5	4.65	0.96
Errors that come during evaluation of tender documents	37	1	5	3.84	0.83
Handling errors	37	1	5	3.53	0.84
Possibility of late submission of tenders	37	1	5	3.74	1.19

Table 2 Barriers of E-tendering

Barrier	Number of responses	Minimum	Maximum	Mean	Std deviation
Doubtful clarity and simplicity of e-tendering method	37	1	5	3.17	1.15
Difficult in quantifying electronic tendering benefits	37	1	5	2.94	1.16
Lack of efficiently designed websites	37	1	5	3.79	1.36
Large initial capital investment is required	37	1	5	3.63	1.42
High operating cost is required	37	1	5	2.68	1.42
Lack of in-house skills with relevant knowledge	37	1	5	3.44	1.42
Frequent Viruses attacks	37	1	5	3.74	1.24
High rate of obsolescence of software	37	1	5	3.21	1.18
It exposes sealed bids to possible hacking which defeats the principle of sealed bids	37	1	5	3.84	0.89
Lack of robustness of electronic tendering	37	1	5	3.61	1.04
Ignorance of benefits	37	1	5	3.89	1.05
Adequacy of existing system	37	1	5	3.11	1.24
There are compatibility problems	37	1	5	3.26	1.04
Conservative nature of the industry	37	1	5	3.89	1.05
Prevalence of legal and technical traps	37	1	5	3.06	1.06
Lack of agreed standards	37	1	5	3.63	0.95
Poor ICT infrastructure to support electronic tendering	37	1	5	4.21	1.24
Scepticism about the method	37	1	5	3.63	1.01
Lack of interoperability of software in use	37	1	5	3.42	0.84
Irregular electric power supply	37	1	5	3.63	1.34
The rules and regulations that cover the tendering process are still predominantly paper-based	37	1	5	4.47	0.84
Unreliable internet	37	1	5	3.32	1.60
The lack of internet connectivity	37	1	5	3.11	1.37
Uncertainty of benefits from process	37	1	5	3.42	1.02
Unreliable power supply	37	1	5	3.47	1.26
Concerns of security of submitted tenders	37	1	5	3.74	1.15

4.3 Barriers of E-tendering

The results obtained from responses to barriers of e-tendering are provided in Table 2, scores ranged between 1, (not a barrier), and 5, (a severe barrier). It indicates that barriers are prevalent in the use of e-tendering in Malawian Construction Industry. It is therefore, noted that respondents generally agree with the presence of barriers in the application of e-tendering. The rules and regulations that cover the tendering process are still predominantly paper-based is ranked highest with a mean of 4.47, the second barrier is the poor ICT infrastructure to support electronic tendering with a mean of 4.21. Conservative nature of the construction industry and ignorance of the benefits are ranked third with a mean of 3.89, whilst exposing of sealed bids to possible hacking defeating the principle of sealed bids is ranked fourth with a mean of 3.84. The lack of efficiently designed websites to facilitate e-tendering is ranked fifth with a mean of 3.79. Ranked sixth is the concerns of security of submitted tenders and frequent virus attacks with a mean of 3.74. The large initial capital investment required to establish e-tendering system, the lack of agreed standards, scepticism about the method and irregular electric power supply are all ranked seventh with a mean of 3.63. The lack of robustness of e-tendering system is ranked the lowest barrier with a mean of 3.61.

Table 3 Benefits of E-tendering

Benefit	Number of responses	Minimum	Maximum	Mean	Standard deviation
Reduced risk of errors	37	1	5	4.06	1.16
Increased visibility of responses to all interested parties	37	1	5	3.71	1.12
Reduced cost of managing the tendering process	37	1	5	4.33	0.91
Reduced tendering period	37	1	5	3.67	1.24
Fast and accurate pre-qualification and evaluation	37	1	5	3.89	0.9
It avoids the need for double or triple entry of the same information	37	1	5	3.83	0.79
Reduction in labour-intensive tasks of receipt, recording and distribution of tender documents	37	1	5	4.44	0.71
Improved audit trail of the tender	37	1	5	3.67	1.03
Enabling a fairer assessment amongst tenderers	37	1	5	3.56	0.71
Improved transparency of the tendering process	37	1	5	3.33	0.97
Provides quality management of tender information	37	1	5	3.78	0.81
Reduced potential disputes that arise from responses arriving late as a result of courier delays	37	1	5	3.83	1.04
Savings in process costs	37	1	5	4.22	5

4.4 Benefits of E-Tendering

In terms of e-tendering benefits, scores ranged between 1, (not a benefit), and 5, (a very important benefit). Table 3 indicates that benefits accrue when using of e-tendering in Malawian Construction Industry. Respondents agree the benefits that come about when using e-tendering in the Malawian construction industry. Respondents agree that when using e-tendering there is a reduction in labour-intensive tasks of receipt, recording and distribution of tender documents with a mean of 4.44, and is ranked the first benefit, ranked second is the savings in process costs with a mean of 4.22. Reduced cost of managing the tendering process is ranked third with a mean of 4.33 whilst risk reduction of errors is ranked fourth with a mean of 4.06. Respondents agree the fast and accurate pre-qualification and evaluation information which is ranked fifth benefit with a mean of 3.89. The avoidance of the need for double or triple entry of the same information benefit and the reduced potential disputes

that arise from responses arriving late as a result of courier delays are both ranked sixth with a mean of 3.83, seventh ranked benefit is the provision of quality management of tender information with a mean of 3.78. Improved audit trail of the tender and reduced tendering period are both ranked eighth with a mean of 3.67. Respondents agree that the least benefit is the enabling a fairer assessment amongst tenderers with a mean of 3.56.

5. Conclusion

The study was premised on the following objectives: to investigate constraints of traditional paper-based tendering system; to further investigate the barriers facing the full implementation of e-tendering, and finally to investigate the drivers of e-tendering in the Malawian construction industry. The literature study investigated the e-tendering in the Nigeria, South Africa, Malawian, EU, United Kingdom, Ireland, Australia, India and Oman construction industry. One set of questionnaire was prepared for the respondents. E-tendering technology has been received with reticent in different countries in the world. Some hold the view that it has more advantages compared to the traditional paper-based tendering system whilst others even though they agree the advantages of the technology points at the unresolved fundamental technical concerns to render the system universally accepted besides the conservative culture of the industry in adopting technology.

The empirical findings of the research agree with the issues highlighted in the literature review in regards to inefficiencies of traditional paper-based tendering system. It highlight inefficiencies in administrative tasks, estimating process errors, the need for large storage capacities, such as, storing rooms, archives are required to store tenders and projects documents and drawing, and evaluation of tender errors, possibilities of late submission of tender, and finally tender handling errors.

The barriers to full implementation of e-tendering include: the rules and regulations that cover the tendering process are still predominantly paper-based system, the poor ICT infrastructure to support e-tendering system. In addition, the conservative nature of the industry in adopting technology besides the ignorance of the benefits that come about when using the e-tendering system remain barriers. It also exposes sealed bids to possible hacking defeating the fundamental principle of sealed bids. The lack of efficiently designed websites to host e-tendering processes, the concerns of security of submitted tenders and frequent virus attacks are some of the barriers. The salient findings also pointed at large initial capital investment required to establish e-tendering system, the lack of agreed standards, scepticism about the method, irregular electric power supply and the lack of robustness of e-tendering system are barriers preventing the full implementation of e-tendering in the Malawian construction industry.

The benefits of using e-tendering system are: a reduction in labour-intensive tasks of receipt, recording and distribution of tender documents, savings in process costs, reduced cost of managing the tendering process and reduction of errors. The system also provides a fast and accurate pre-qualification and evaluation information. It eliminates the need for double or triple entry of the same information and it also reduces potential disputes that arise from responses arriving late as a result of courier delays. It also provides quality management of tender information besides improving audit trail of the tender. In addition it reduces tendering period as it enables a fairer assessment of tenders.

5.1 Recommendations

The study recognizes the absence of rules and regulations governing e-tendering, therefore, there is need to review rules governing the tendering process to reflect the new dawn of the ICT technology in the construction

industry. As of now, only rules governing the paper-based tendering system are in place and this means that the e-tendering system automatically falls-off.

There is a need to civic educate built environment practitioners to embrace recently discovered ICT technologies for example e-tendering system, according to the empirical findings improves the efficiency and drives down tendering cost. This will reduce technology phobia which has been haunting the industry for decades now.

Built environment professionals should engage computer specialists as to how the concerns of security of submitted sealed tender bids and frequent computer virus attacks can be addressed without raising questions of possible hacking to win the confidence of the construction industry stakeholders.

The NCIC should establish a tailor made website of higher repute that will be used for tendering public and private construction projects in its initial phases of introduction that can win public trust with strong security features that deter hacking of sealed bids. The website should also be able to evaluate tenders without the input professionals once the bid has been submitted. This will eliminate scandalous stories of favoritism during tender evaluation process henceforth reducing chances of corruption.

The stakeholders spearheaded by the NCIC should make awareness campaign to the built environment practitioners explaining to them the advantages e-tendering as opposed to traditional paper-based tendering system to re-enforce the need to embrace the technology as is the case with other innovative ICT construction technologies.

5.2 Further Research

There is need for further research. This will help fine-tune the e-tendering system in the Malawian construction industry with a view to win public trust and help in addressing corruption in Malawi. The areas of possible research should include:

- How can internet and computer hacking of sealed bids be addressed in the Malawian construction industry?
- How can the NCIC establish a tailor made website that can facilitate e-tendering process in the construction industry?

References

- Al-Lawati M. A. and Aibinu A. A. (2008). "Electronic tendering adoption in Oman construction industry", in: *Conference Proceeding of COBRA 2008*, Dublin: RICS Construction and Building Research Conference.
- Brook M. (2008). *Estimating and Tendering for Construction Work* (4th ed.), Amsterdam: Butterworth Heinemann.
- CIOB (2009). *Code of Estimating Practice* (7th ed.), Wiley-Blackwell, A John Wiley and sons, Ltd, Publication: Oxford.
- CITAX (2008). "CITAX Project Module 3 — Electronic tendering report", report prepared: Finbarr McCarthy, Kindly supported by: Enterprise Ireland
- Coakes S. J. and Steed L.G. (2001). *SPSS: Analysis without Anguish*, John Wiley & Sons, Milton, UK.
- Egbu C., Gaskell C. and Howes J. (2001). "The role of organizational culture and motivation of information technology for team working", in: *Proceeding of ARCOM Seventh Annual Conference*, Vol. 1, pp. 91–100.
- Heckman J. D. (2000). "The challenge of scientific publishing in the new millennium", *The Journal of Bone and Joint Surgery*, Vol. 83, No. 5, pp. 1–4.
- Idrus A. B. and Newman J. B. (2002). "Construction related factors influencing choice of concrete floor systems", *Construction Management and Economics*, Vol. 20, pp. 13–19.
- Local e gov. (2004). "How to...quantify and realize the benefits from e-tendering national e-procurement project: Benefits realization strand Report- Final v1.4 23/03/2004", The government of Ireland.
- Lou E. W. and Ashalwi M. (2009). "Critical success factors for e-tendering implementation in construction collaborative environments: People and process issues", *Journal of Information Technology in Construction*, Vol. XIV, pp. 98–109.

- Malinda M. (2011). "Roads and bridge maintenance for 2011/2012 grading and reshaping programme pre-bid meeting", A pre-bid meeting conducted by the Roads Authority, held at Ryalls Hotel in Blantyre, Malawi, 22 May.
- Martin J. (2008). "Web-based electronic tendering — UK practical experience (Abstract)", in: *Conference proceeding of COBRA 2008*, conducted by the Royal Institution of Chartered Surveyors.
- Oyediran O. S. and Akintola A. A. (2011). "A survey of the state of the art of e-tendering in Nigeria", *Journal of Information Technology in Construction*, Vol. 32, pp. 1–20.
- Ozumba A. O. U. and Shakantu W. M. W. (2008). "Improving the site management process through ICT", *CIDB 2008 Post Graduate Research Conference, Bloemfontein, South Africa*, pp. 7–8.
- Peel D. (2008). "JEBE online for the future", *Journal for Education in the Built Environment*, Vol. 3, No. 1, pp. 1–4.
- RICS (2005). *E-tendering RICS Guidance Note*, RICS Business Services Limited.
- Root D. and Thorpe T. (2001). "Refocusing collaboration technologies in the construction chain: looking beyond the organization", *Proceedings of Annual Conference*, University of Salford 1, pp. 252–262.
- Shakantu W. M. W. (2003). "Corruption in the construction industry: Forms, susceptibility and possible solutions", *1st Postgraduate Conference 2003 of the CIDB ON Construction Industry Development*, Port Elizabeth, Construction South Africa, 12–14 Oct. 2003, pp. 274–283.
- Smith J. and Jaggar D. (2003). *Building Cost Planning for the Design Team* (2nd ed.), Oxford: United Kingdom.
- The construction Confederation (2001). "Electronic tendering: an industry perspective", CRC for Construction Innovation Report, Brisbane, Australia.
- Tindsley G. and Stephenson P. (2008). "E-Tendering Process Within Construction: A UK Perspective", *Tsinghua Science and Technology*, Vol. 13, pp. 273–278.
- Tone K. (2005). "Talking past each other: The impact of cross-cultural communication on project management in Samoa", PhD thesis, Queensland University of Technology, Brisbane, Australia.
- Westcott T. and Mayer P. (2002). "Electronic tendering: Is it delivering? A UK and European perspective", in: *Proceedings of RICS Foundation Construction and Building Research Conference*, Nottingham Trent University, Nottingham United Kingdom, 5–6 Sep. 2002, p. 10.
- Yang J., Ahuja V. and Shankar R. (2007). "Managing building projects through enhanced communication — An ICT based strategy for small and medium enterprises", in: *Proceedings of the CIB World Building Congress 2007*, Cape Town, South Africa, May, 2007.