

Leveraging e-business technology for construction procurement improvement: Qualitative perspectives from Ghana

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ABSTRACT

e-Business technology adoption within the Ghanaian construction context has been described as abysmal, particularly among Ghanaian construction micro and small businesses (GCMSBs). Elucidating the salience of e-business technology in engendering construction procurement improvement, this study focuses on the development of capability within GCMSBs to engage with, and benefit from, the adoption of such technologies. The study adopts a qualitative multi-case study research design. Consequently, three (3) projects were selected based on pre-determined case selection criteria. Forty-five (45) interviewees were recruited from the projects and government agencies in a manner suggestive of purposive sampling. Excerpts from the interview sessions were transcribed and subsequently, analysed through thematic analysis. Findings confirmed that the absorptive capability of GCMSBs were indeed at a low level due to inadequate training and education, and; non-investment in capability development. A conceptual model to facilitate the adoption process in GCMSBs was proposed. These findings, as epitomized in the conceptual framework, contribute to the burgeoning discourse on the development of innovative capabilities within Micro and Small businesses in the construction industry in developing economies. Furthermore, this study highlights the positive influence of the adoption of e-business technologies on the capacity and capability of GCMSBs. Such improvements on the part of these firms through the framework will translate into optimal working relationships between them and foreign construction firms working within the local Ghanaian context. And, through such relationships, foster growth within these GCMSBs.

KEYWORDS: Case study, Construction, e-Business technology, Ghana, Procurement.

INTRODUCTION

The advent of the internet in the 1990s heralded a new era, especially concerning the general application of information and communication technology (ICT) in various societal aspects. Accordingly, Organisations in developed countries have deployed ICT towards supporting and managing extant inter and intra-firm relationships (Issa *et al.* 2003; Adzroe & Ingirige, 2013). Also, the emergence of e-business and business-to-business (B2B) relationship concepts, both driven by the adoption and implementation of relevant technologies, can be traced to this era of ICT-driven innovation. The resultant phenomena have led to a paradigmatic shift in the manner activities across different economic facets were carried out, with significant emphasis on driving efficiencies. The construction industry was not an exception, as aspects like tendering, project management, procurement, design, scheduling, etc. have been affected by the adoption of e-business and B2B concepts (Ruikar & Anumba, 2008; Adzroe, 2015).

Baladhandayutham and Venkatesh (2010) reiterated the utility of the e-business concept in facilitating integration of distinct business processes. This definition implies that e-business covers various aspects of relationships with clients or employers, contractors, sub-contractors, suppliers, installers and other collaborators within a project environment (Ribeiro & Lopes, 2002). Also, scholars have described e-business as a strategic business tool that needs to be carefully aligned to achieve business goals (Ming-Ling & Shaw, 2005; Sorensen, 2009; Chen *et al.*, 2013). Eadie *et al.* (2010) buttressed that the adoption of an e-business approach in the construction industry can improve efficiency levels. However, Perera *et al.* (2012) posited that benefits accruable from the adoption of e-business approaches can only be realised if it is supported by appropriate technological infrastructure: e-business technologies.

e-business technologies consist of a variety of software packages, hardware components, mobile solutions, cloud computing and the internet (Perera *et al.*, 2012; Costa & Tavares, 2012). From a construction perspective, e-business technologies have been referred to as tools which can be applied towards the attainment of optimal facilitation of information processing and associated communication activities between parties to a project (Yang *et al.*, 2015). When these technologies are deployed to business processes, it increases organisational efficiency and productivity, reduces costs and expands market reach (Eadie *et al.*, 2010). Also, its potential to improve performance through the provision of an integrated business environment where communication and information flow remains an essential component, has been observed (Acar *et al.*, 2005; Yang *et al.*, 2015). Construction Organisations working in developing countries have the potential to attract benefits appropriate to their scale and nature of operations (e-Business W@tch, 2006; Costa & Tavares, 2014). However, the ability of such Organisations to attract such benefits are often encumbered by contextual factors. Thus, an understanding of the nature of these technologies, the capabilities and capacities required to engage with the technologies, optimally and their subsequent effects on the construction industry's activities in the developing country context, is imperative.

Issa *et al.* (2008) observed that, the adoption of e-business technology in construction has contributed to improved construction industry performance. In furtherance to this, a review of relevant literature revealed that benefits have accrued from the deployment of e-business technologies within the construction industry across various country contexts. Examples of such country contexts mentioned include: The United States of America (Issa *et al.*, 2003; Hsu *et al.*, 2006), Canada (Rankin *et al.*, 2006; Bowmaster & Rankin, 2016), Australia (Aranda-Mena & Stewart, 2004), and India (Cherian & Kumaran, 2016). There was a consensus across these studies concerning the criticality of training and education as enablers for e-business technologies adoption. Ibem and Laryea (2015) observed the low level of e-business technology adoption in the construction sectors across Africa. This observation was confirmed by Adzroe and Ingirige (2014a, 2014b) in their study on rate of e-business technology adoption in the Ghanaian construction industry, despite the presence of basic knowledge concerning the phenomenon.

The desire to proffer an opinion and probable recommendations on how to improve the adoption of e-business technologies among GCMSBs given the foregoing, made this study, imperative. Central to the study's objective was an investigation into how the capability of such firms to work in a more integrated mode with foreign-owned, large construction companies operating within the Ghanaian context, can be boosted by the adoption of e-business technologies.

LITERATURE REVIEW

The theoretical considerations underpinning the study and a rendition of excerpts from previous studies concerning e-business technologies adoption in construction were significantly dwelt upon in the literature review.

Theoretical Consideration

The adoption of new ideas, processes or technologies purposely for improving efficiency can be described as innovation (Troshani & Rao, 2007). Klein *et al.* (2001) explained that, adopting innovation or innovative processes served as organisational improvement processes, which must respond to human resource and equipment queries. Corroborating, Rogers (2003) explained that innovation adoption is an organisation-driven exercise. Other contributors to the diffusion of innovation discourse like Woodside and Biemans (2005), Damanpour and Schneider (2006), described innovation adoption as a decision-making process which is inclined to an individual unit's desire to adopt a new way of doing business. Such a desire starts with the creation of awareness (Sharma & Rai, 2015).

To understand the nature of e-business deployment in firms like GCMSBs, a review of the extant theoretical viewpoints was considered necessary. In furtherance to this, a few notable theories are explored concerning the adoption of new technologies at the firm level. The following theoretical viewpoints were considered: the diffusion of innovation (DOI) theory by Everett Rogers in 1962; the technology framework of organisation and environment (TOE) by Tornatzky *et al.* (1990); the Technology Acceptance Model (TAM) by Venkatesh and Davis (2000), unified theory of acceptance and use of technology (UTAUT) by Tran *et al.* (2011); and the theory of reasoned action (TRA). Elgrari and Ingirige (2011) and Oliveira and Martins (2011) suggested that DOI and TOE theories are appropriate for the study of technology transfer or adoption at the organisational level whilst conceding that TAM, UTAUT and TRA dealt with technology adoption at an individual level within an organisation. It is important to note that TAM, UTAUT and TRA basically have to do with the interest and attitude of individual members belonging to an organisation. This research focuses on e-business technology transfer or adoption at the organisational level within GCSMBs, therefore DOI and TOE theories are considered relevant for this study.

Rogers (2003) argues through the DOI theory that certain innovation attributes significantly influence its adoption in Organisations. Continuing, Rogers (2003) listed these attributes to include:

- i) Relative advantage: the degree to which an innovation is perceived as better than the idea it supersedes. The underlying principle is that the greater the perceived relative advantage of an innovation, the quicker its rate of adoption;
- ii) Compatibility: the degree to which an innovation is perceived as being consistent with existing values, past experiences, and needs of potential adopters;
- iii) Complexity: the degree to which an innovation is perceived as being difficult to understand and use;
- iv) Trialability: the degree to which an innovation may be experimented with on a limited basis. If an innovation is trial-able, it results in less uncertainty for adoption, and;
- v) Observability: the degree to which the results of an innovation are visible to others. The easier it is for individuals to see the results of an innovation, the more likely they are to adopt it.

The relevance of the DOI in understudying the adoption of ICT-based innovation within Organisations has been confirmed by Iben and Laryea (2015) who highlighted the relevance of three attributes; relative advantage, compatibility and complexity to the success of the technology adoption process. Furthermore, Songip *et al.* (2013) and Gao *et al.* (2013) confirmed that DOI has been applied, severally, in research on ICT diffusion within construction. Yet, the scholars lamented the non-consideration of issues concerning market and industry characteristics on adoption choices of Organisations, as a major shortcoming of the DOI. Suffice to say that, DOI has been criticised for not taking into consideration the nature of construction Organisations and the market structure that they operate within. So, Tornatzky *et al.* (1990), in a bid to address the inadequacies of DOI, developed the TOE model. According to Tornatzky *et al.* (1990), the TOE model dwelt on the notion that technological, organisational and environmental factors influenced the innovation adoption process, significantly. Oliveira and Martins (2011) and Osabutey *et al.* (2014) stated that technological factors consisted of existing, new and emerging technologies, and equipment within and outside the organisation. According to Gao *et al.* (2013), the organisational factors concern issues like size, management structure, scope of activities, and resources available to the organisation. The environmental factors include industry type and characteristics, government policies and relevant institutions (Gao *et al.*, 2013; Osabutey *et al.*, 2014).

It is important to note that e-business technology adoption within construction seems slow when compared to other sectors like banking, car manufacturing, retail and; service industries (Chen *et al.*, 2011). Moreover, Chen *et al.* (2013) proposed a holistic approach for construction Organisations toward e-business technology adoption. Therefore, this research sought to explore the process of e-business technology adoption within the GCMSBs' community and the inherent capabilities and capacities required within and outside the firms to engender such adoption.

Factors Influencing e-Business Technology Adoption in Construction

An increment in e-procurement and e-commerce activities has been observed in construction-related Organisations because of e-business technology adoption (Ahmed *et al.*, 2005; Qin, 2010). Teo *et al.* (2009) discovered that the decision to adopt and implement e-business technology by 141 Singaporean construction firms was mainly influenced by firm size, top management support, perceived benefits and business partner influence. Likewise, Rankin *et al.* (2006) established, through a survey of 226 firms in the Atlantic AEC industry, that the adoption and implementation of e-procurement was influenced by the perceived benefits in gaining access to a larger market as well as increased opportunities; increased productivity, and; considerable reduction in procurement cycle time and transaction cost. In the United Kingdom, Eadie *et al.* (2011) examined 775 public and private construction Organisations' perspectives on the adoption and implementation of e-procurement. They observed that there was a correlation between the size of the organisation and procurement budget. This implied that whereas e-procurement brought about efficiency for survival within smaller firms, larger firms identified cost savings as a critical aspect of e-procurement implementation. In a survey of 91 construction companies to determine the degree of implementation of e-business strategy in the US construction industry by Issa *et al.* (2003), the low adoption rate was highlighted. e-business according to the study's findings promised benefits like; cost savings, revenue growth, market expansion, and customer satisfaction through the propagation of efficient and responsive business processes.

Isikdag *et al.* (2011) identified technology infrastructure and security concerns in data transfer, inadequacy of legal infrastructure to support e-commerce activity, top management support and most importantly, the lack of IT skills in the staff as key impediments to the adoption and subsequent implementation of e-procurement. Ruikar and Anumba (2008) noted that infrastructure, trust and reliability and regulatory issues are barriers to the adoption and implementation of e-business. Tran *et al.* (2014), investigated 112 construction firms in Vietnam in a bid to determine factors that influenced the initial adoption and institutionalisation of e-procurement processes in construction firms in developing countries. That study revealed that technology, organisation and environment are key influential factors for e-procurement adoption. Furthermore, the findings showed that the government played a salient role in decision-making in terms of initial adoption and institutionalisation of e-procurement processes in individual construction firms. Ibem *et al.* (2016) identified technology, size of organisation and awareness as significant predictors of e-procurement adoption.

Conceptualizing Elements Influencing e-Business Process adoption in GCMSBs

Based on the foregoing, it can be deduced that the presence of technological infrastructure, awareness and regulatory issues are major factors that can influence the adoption and implementation of e-business processes in GCMSBs. This highlights the significance of e-technology and the capabilities and capacities associated with it in the optimal deployment of the e-business procedures in GCMSBs. In furtherance to this, a review of extant literature revealed the paucity of literature concerning the adoption and implementation of e-business procedures within construction Organisations in developing countries. Undoubtedly, this has resulted in a knowledge gap.

As such, the governance of e-business deployment in construction Organisations has been premised on the adoption of an appropriate technology and appropriate infrastructure as shown in Figure 1.

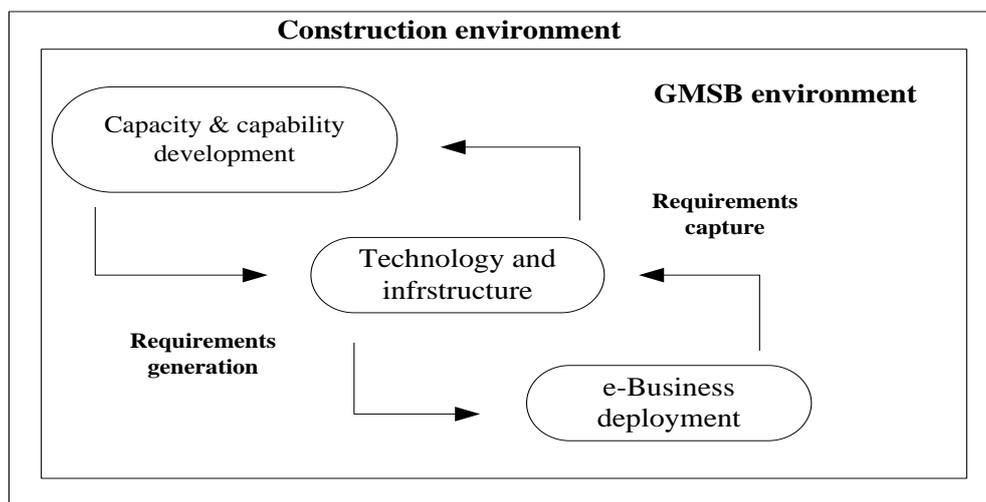


Figure 1: Conceptual framework for e-business capability development in GCMSBs (Authors' work, 2018)

A significant aspect of e-business technology deployment pertains to the decision on how to create e-business technology awareness, and; the utility of distinct approaches in bringing about quick benefits to the GCMSB community. Although there are various mechanisms for e-

business technology awareness creation, this research adopted the processes shown in Figure 1. This choice was predicated on the basis that the process was not self-propelled but rather performed based on a deliberate systematic process which is sympathetic to the needs of the Ghanaian context. The framework in Figure 1 allows for a top-down as well as bottom-up requirements capture and generation method and systematically achieves an appropriate e-business deployment decision. Figure 1 indicates the significance of capacity and capability development within GCSMBs. This can be achieved through training and acquisition of ICT-related skills to enable staff of GCSMBs to carry out basic ICT functions. The second element shown in Figure 1 is technology and infrastructure. This element is considered most influential as it defines the tools and processes within network computing and web environment which accentuate the deployment of e-business capability in these firms. The downward flow is intertwined with the upward requirement capture process to ensure that e-business deployment decisions reached are suitable for the context.

RESEARCH METHODOLOGY

In a bid to address construction procurement process improvement through e-business technology adoption, three (3) case studies were identified and selected. The selection criteria for the cases were centred on the need to ensure that there was an existing relationship between local and foreign-owned firms on the construction project. Care was taken to ensure that the cases were construction projects which were either on-going or recently completed (not exceeding the past 12 months) and were situated in Ghana. The choice of the case study research strategy resulted from its ability to engender in-depth understanding of a phenomenon within the phenomenon's natural context (Yin, 2009). Besides this, the utility of the case study research design in availing the researcher with an opportunity to adopt and apply more than one research technique for data collection and/or analysis (Creswell & Plano-Clark, 2011), made the design, a natural choice for the study.

As such, the case studies explored the context within which GCSMBs respond to the knowledge and use of ICT and e-business to improve communication within the procurement process. Forty-three (43) semi-structured interviewees were conducted with purposively selected interviewees from various Organisations working on the selected case study projects. These Organisations were categorized according to GCSMBs and foreign-owned construction company counterparts. To provide a balanced insight into the phenomena, two more interviews were sought for and obtained from stakeholders within the government (public) sector (see Table 1).

Table 1: Case Study Information (Authors' Fieldwork, 2016)

| Case Study | Case Project | Type of Organisation (Ownership) | Number of Organisation | Number of Interviewees |
|------------|------------------|----------------------------------|------------------------|------------------------|
| CS1 | Road | Foreign (1) Local (2) | 3 | 11 |
| CS2 | Luxury Apartment | Foreign (1) Local (2) | 3 | 17 |
| CS3 | IT Park | Foreign (1) Local (2) | 3 | 15 |
| Expert | Policy | Government | 2 | 2 |

This allowed for the elicitation of viewpoints from a policy perspective. The interview sessions held at the offices of the Organisations involved in the selected projects and lasted for an average duration of thirty-five minutes each. Questions asked during the sessions focused on the identification of the factors influencing e-business technology adoption and e-business processes within their Organisations. Also, the interviewer inquired into the perception of the interviewees on the utility and potential utility of optimal adoption of e-business processes in construction procurement. The interview sessions were recorded with the permission of the interviewees and subsequently transcribed.

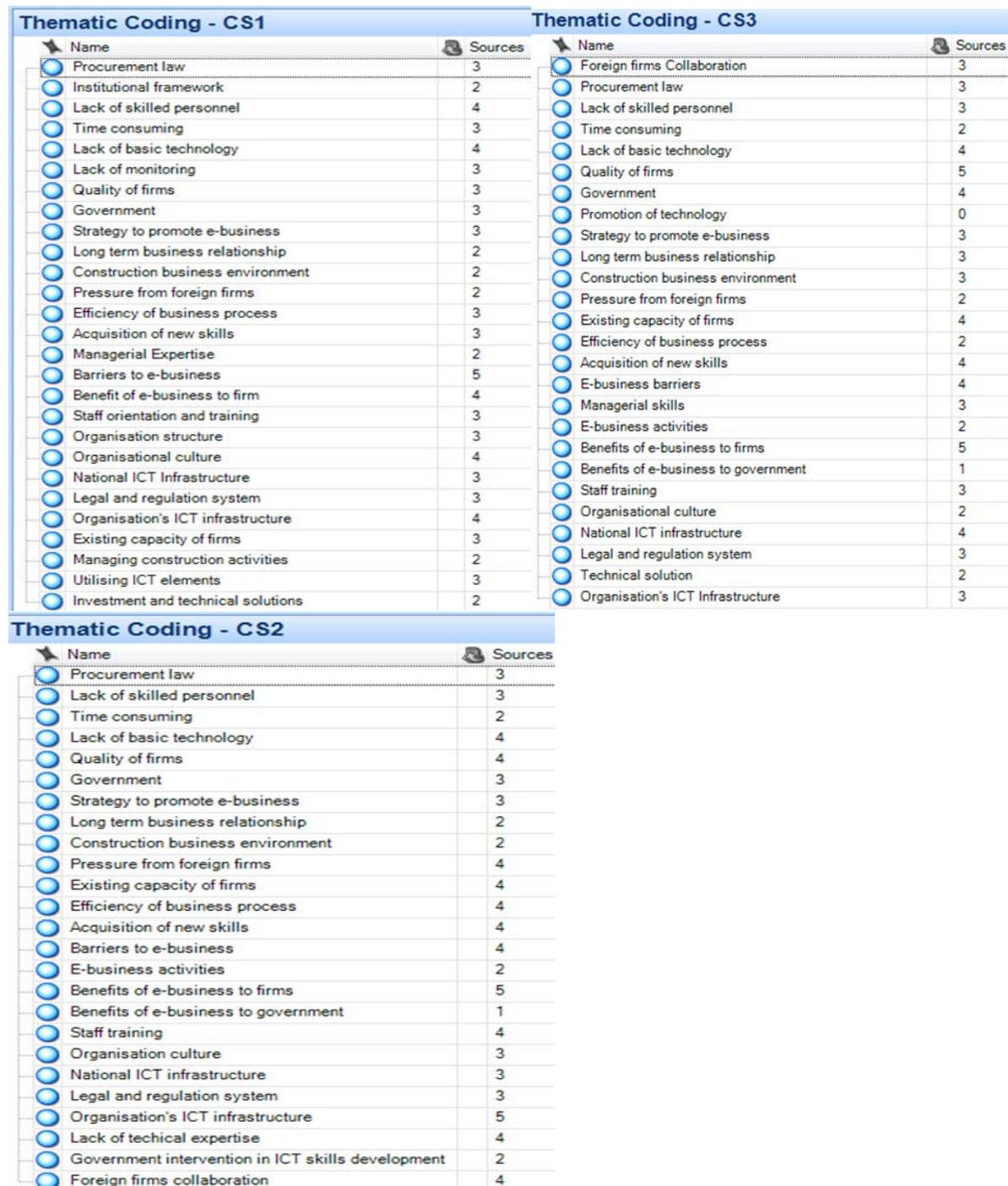


Figure 3: Free nodes screen of CS1, CS2 and CS3 (Authors' Fieldwork, 2016)

For the purposes of securing a valid reportage of interviewees' views, the transcribed texts were sent to them for verification and confirmation. Due to the use of NVivo 10, the analysis commenced with coding of the data from a broader perspective before narrowing down to the merging of similar and identified themes, concepts, ideas, topics, phrases and terms.

These concepts, themes, ideas, etc. were inputted into NVivo 10 software packages as free nodes, see Figure 3. Figure 3 shows that the nodes provide the basis for further analysis using NVivo to merge concepts derived from the free nodes. The free node themes were filtered and carefully sorted through the merging of the themes into two main tree nodes, namely, construction works procurement and political context thus reflecting the views and perceptions of respondents as shown in Figure 4.

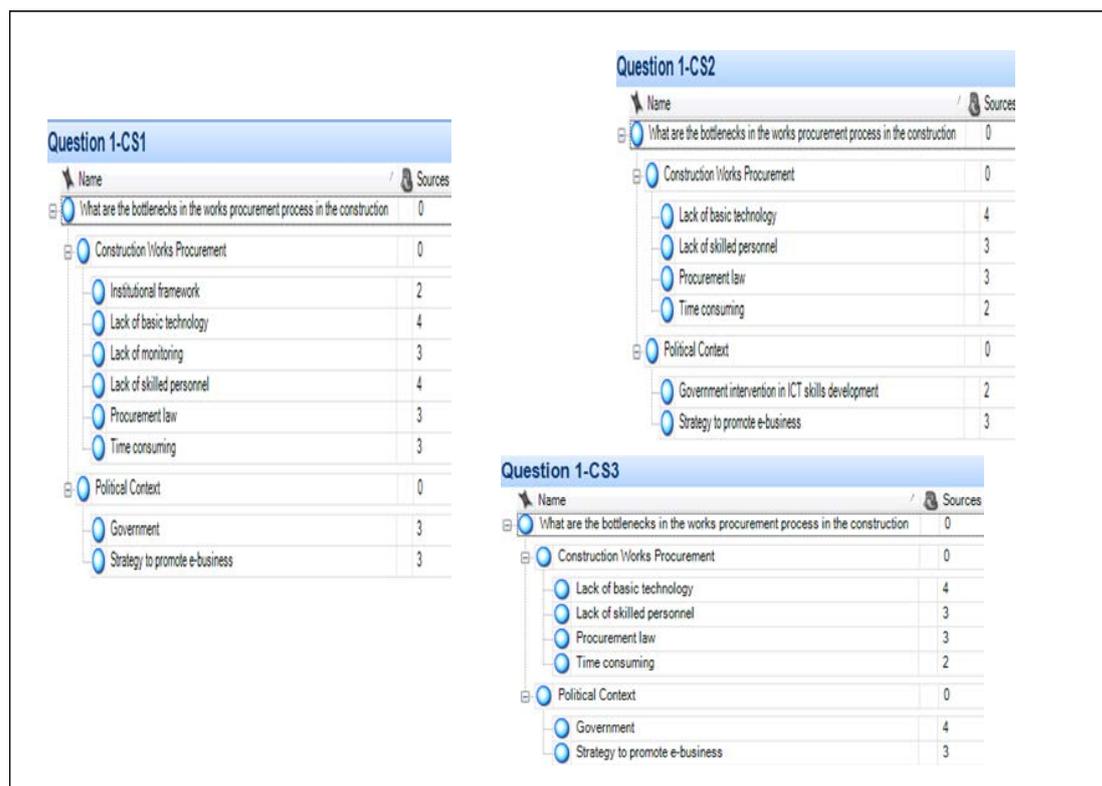


Figure 4: Tree nodes screen of CS1, CS2 and CS3 (Authors' Fieldwork, 2016)

PRESENTATION OF FINDINGS

Three case studies were conducted within the Ghanaian construction industry context to investigate the perspectives from key stakeholders on the status of e-business technologies that support effective and efficient procurement practices. The qualitative content analysis (QCA) of the case studies are indicated in Figures 3 and 4. For the purposes of analysis and discussion, the emergent themes from the cases showing the number of times (no) the interviewees identified a factor across the cases are summarised and presented in Tables 2 and 3.

The findings from the case studies (CS) showed that different factors were capable of influencing e-business technology adoption in GCMSBs. These factors were categorised into two broad categories namely: construction procurement-related factors, and political and government-related factors. These factors are explained in the next subheadings.

Table 2: Construction Procurement-related Factors (Authors' Fieldwork, 2016)

| Categories | CS1 | | | CS2 | | | CS3 | | | Total | Summary of interventions |
|--|--|-----------|----------|---|-----------|----------|---|-----------|----------|-------|--|
| | Identified influence factors | Frequency | Evidence | Identified influence factors | Frequency | Evidence | Identified influence factors | Frequency | Evidence | | |
| Institutional framework | Lack of understanding; Inadequate management skills. | 2 | Fig. 4 | No details provided | N/A | N/A | No details provided | N/A | N/A | 2 | Improve capacity of GCSMBs |
| Lack of basic technology and infrastructure | No computers. Manual processes prevalent. | 4 | Fig. 4 | No Internet connectivity. No computers. | 4 | Fig. 4 | No internet connectivity. No computers and printers. Inadequate infrastructure. Lack of ICT skills. | 4 | Fig. 4 | 12 | Need for equipment support and awareness of ICT and e-business |
| Lack of skilled personnel | Low procurement skills; Low project management skills. | 8 | Fig. 4 | No training schemes. Low managerial skills. | 9 | Fig. 4 | Unskilled managers. Financial constraints. | 11 | Fig. 4 | 10 | Education/training and continuous professional development |
| Procurement law | Poor understanding of details. Manual process. | 3 | Fig. 4 | Costly process. Manual process. Less transparent. | 3 | Fig. 4 | Manual process. Excessive paperwork. | 3 | Fig. 4 | 9 | Need for seminars/workshop on provisions of the law |

Table 3: Political and Government-related factors (Authors' Fieldwork, 2016)

| Categories | CS1 | | | CS2 | | | CS3 | | | Total | Summary of interventions |
|--|---|-----------|----------|--|-----------|----------|---|-----------|----------|-------|--|
| | Identified influence factors | Frequency | Evidence | Identified influence factors | Frequency | Evidence | Identified influence factors | Frequency | Evidence | | |
| Government-related | Undue interference from government agencies | 3 | Fig. 4 | Lack of Government intervention in ICT skills development | 2 | Fig. 4 | Inadequate infrastructure (Internet/ electricity); Policy to support training | 4 | Fig. 4 | 9 | The provision of national infrastructure, i.e. Internet and electricity |
| Absence of an e-Business promotion strategy | Awareness of e-business; Commitment from government to support e-business technology adoption in GCSMBs | 3 | Fig. 4 | Limited access to internet facilities. Understanding the philosophy of e-business. | 3 | Fig. 4 | Limited incidence of government and industry collaboration. | 4 | Fig. 4 | 9 | Encourage both government offices responsible for procurement and industry players to use e-business |

Institutional Framework-Related Factors

Institutional framework is used in this context to connote specific processes that must be rolled out in line with the type of project to make it a success. However, oftentimes the red tape that surrounds it makes it very difficult for some Organisations to understand the influence of these factors. Under procurement, factors associated with institutional framework occurred once under CS1 (see Table 2). The impact of an institutional framework on the capacity of GCSMBs can have a consequential effect on construction work procurement processes. In this instance, findings reported in CS1 showed that two (2) interviewees suggested that most local construction firms operating within the industry lack the capacity to follow and understand the institutional framework provided in the procurement law of 2003. Although represented by just two occurrences in CS1, it is by no means, a salient factor. The interpretation of the law into a programme of action within the procurement process is a good thing to get right the first time. This was corroborated by an interviewee from CS1. Such knowledge and understanding can be improved through continuous training and professional development.

Lack of Appropriate Technology

Another factor that has a negative impact on the procurement process is the lack of an appropriate technology (see Table 3). As indicated in Table 2, CS1, CS2 and CS3 highlighted the lack of technology that includes both the hard and soft elements, thus the lack of computing facilities constituted a negative influence on the improvement of the construction procurement process. As reported in CS1, a GCSMB manager observed that ineffective communication and poor quality of work are a common characteristic of the Ghanaian construction industry. It is, therefore, suggests that e-business can resolve communication difficulties and bring about timely information flow within the procurement process. This statement is consistent with the views reiterated by London and Bavinton (2006) who argued that e-business technology provides commercial efficiencies in construction information, procurement and contract management. To deal with identified technology gaps, the discussion similarly identified specific capacity development action that is required from GCSMBs, these include: awareness and contribution of e-business; self-initiative capacity development; capacity development through education, training/workshop and exchange of ideas through local collaborations. Arguably, this will address the low level of e-business adoption in construction observed by Iben and Laryea (2015). It is believed that this will have a long-term impact on the capacity development of local firms within the construction industry if carried out through a structured industry led programme.

Lack of Skilled Personnel

Lack of skilled personnel was highlighted by 10 interviewees in all the three CS as shown in Figure 4. CS1, CS2 and CS3 noted at different stages with different expressions based on their experience in the industry. For example, it is reported in CS1 by a manager of a foreign firm that: "...Ghanaian construction practitioners are generally ill-trained; they lack basic skills in handling procurement and general day to day project management issues..." This is in line with the argument advanced by Klein *et al.* (2001) that adopting innovation improves organisational processes and respond as well to human resource development.

Investment in training therefore seems to be moving very slowly as most GCSMBs do not have many longer-term planning horizons. Such companies put very little resources into training. According to Laryea and Mensah (2010), as a consequence for not allocating sufficient financial resources for training and recruitment of suitable qualified staff, the Organisation could be starting a cycle of poor capacity development. This may lead to a negative impact on the procurement process. CS1, CS2 and CS3 respondents identified the need for industry led training schemes with specific emphasis on training centres. Improving personnel capacity and capability of GCSMBs through education/training and continuous professional development would have direct impact on the procurement process. Further, it can provide a baseline for skilled personnel within the industry, which ultimately can enhance any future collaboration with foreign firms.

A good number of interviewees (9) noted that poor understanding of the details of the procurement law, which includes administrative and institutional arrangements and procedures stipulated for procurement. GCSMBs seem not to be conversant with the details of the procurement law of 2003 and this is linked to the poor nature of personnel working within GCSMBs. Interviewees as reported in CS1 and CS3 noted that this is exacerbated by the manual process advocated by the procurement law whilst a local firm manager in CS2 observed

that the entire process lacks technology such as computers and the Internet. In addition, interviewees explained that the time-consuming nature of the procurement process is because of poor procurement skills of personnel within the industry. For instance, another local manager in CS1 observed that skills shortage and lack of technology in the procurement process render the entire process inefficient and time consuming. This discussion agrees with the position advanced by Isikdag *et al.* (2011), earlier in the literature noting that the lack of IT skills by construction staff poses impediments in adoption and implementation of IT related technologies such as e-business technologies. The way forward in situations like this within the industry will be through seminars and workshop on the digital proficiencies as well as considerable understanding of provisions of extant procurement laws ostensibly to improve the professional images of GCSMBs and, skill-sets of their employees.

Under the political context, three factors, namely: government; a government strategy in ICT skills development and strategy to promote e-business emerged. Findings from CS1 and CS3 suggest both strategic and grassroots level measures that are vital to enable a good e-business process. For instance, under the government's role to improve the procurement process, the respondent identified inadequate national infrastructure for electricity as an important factor to kick start IT use and further broaden the provision of Internet services. For example, an interviewee in CS3 mentioned that the provision of technology infrastructure can support capacity and capability development, which confirms both strategic and grassroots measures. With reference to ICT training, a local manager in CS2 identified non-availability of a strategy to making ICT training available throughout the country so that GCSMBs will benefit from the availability of ICT skilled personnel. This discussion corroborates earlier discussion in literature by Tran *et al.* (2014). These authors argued that, government plays a cardinal role in promoting e-business technology through decision-making and related strategies. It is evident from the comments of the interviewees that lack of strategic direction in e-business implementation can be blamed for the low levels of adoption and usage experienced within the industry. Arguably, e-business is a salient way to manage and deal with the numerous bottlenecks associated with the procurement process within the Ghanaian construction industry. As deduced from the conversations from both foreign firms and GCSMBs revealed that for a real gain, there is a need for continuous education and training directed at local GCSMBs in the area of e-business and e-business technology adoption and utilization.

DISCUSSION OF FINDINGS

The results showed that GCSMBs demonstrated low understanding of the deployment of e-business technology, although they showed e-business activities within their Organisations it did not support or transform their processes in respect of improving procurement activities within their respective firms. The results further confirmed that manual activities in respect of procurement processes are still prevalent within GCSMBs in construction, confirming non-availability of technology, most especially e-business that has proven to improve business processes and a facilitator for capacity and capability development across the industry. The case study findings established that capacity and capability issues such as lack of basic technology and lack of skilled personnel, has affected GCSMBs negatively and indeed has influenced the procurement process and their inability to establish sound working relationship with their foreign counterparts.

For example, it is argued for the government to promote the use of e-business by publishing all projects online in real time. In this context, GCSMBs will become proactive by taking the

necessary action to enable them to benefit from such initiative. For GCSMBs to quickly respond to the use of e-business, it is important for them to develop a better strategy to enhance their capacity and capability. In response to this, interview findings showed that government has initiated e-Government Procurement (e-GP) project which is like e-business. Full deployment of e-GP potentially will address the capacity and capability gap within the industry (PPA, 2013). The research identified key capacity and capability issues amongst GCSMBs as negating their opportunities to work in an integrated project environment. Again, it could be recalled that inadequate training and education including non-investment in capacity and capability development has had negative impact on the procurement process within the Ghanaian construction industry. Also, this has extended the difficulty faced by these Organisations when they try to work together with foreign firms, primarily due to low capacity and capability. It is important for policy makers together with the Association of Building and Civil Engineering Contractors of Ghana (ABCECG) to focus on development that can target GCSMBs to improve on their capacity and capability that can enable them to work in a more collaborative way with their foreign counterparts. Adopting a gradual process, the capacity and capability of GCSMBs can be improved through awareness creation, training and ICT skills development this can work better when it is linked to the development of technological capabilities in a coordinated fashion. In this, foreign firms have a critical role in supporting GCSMBs through working with them and extending training facilities to them in the spirit of collaboration within the Ghanaian construction industry.

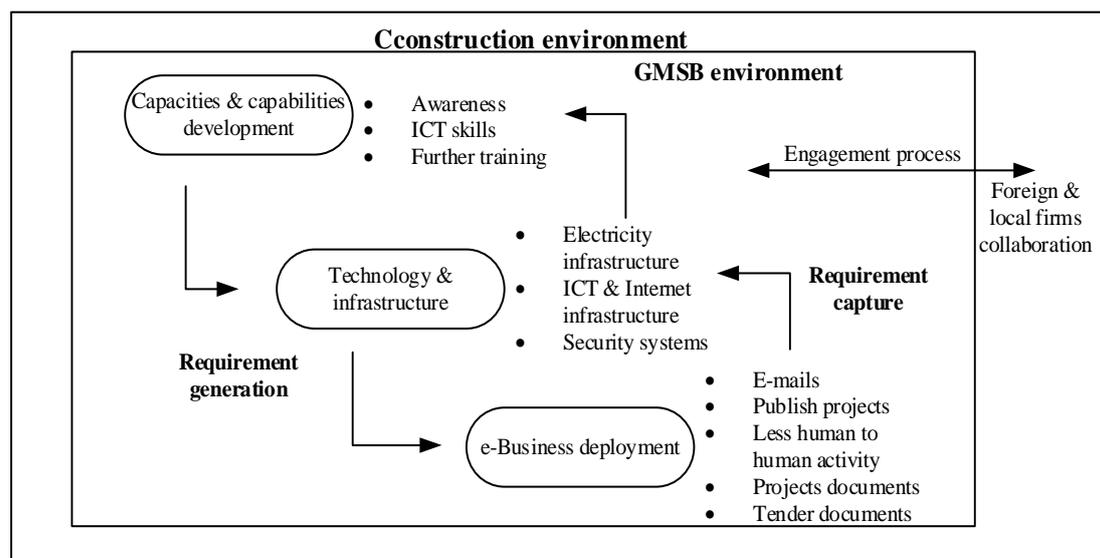


Figure 5: e-Business capability development process within construction in Ghana (Authors' Fieldwork, 2016)

It can be seen from Figure 5 that construction environment as a platform for foreign and GCSMBs collaboration and engagement within which e-business activities can take place. As illustrated in Figure 5, e-business technology capability development is underpinned by the capacity and capability development of GCSMBs. This component explains the extent to which awareness about the potential benefits of e-business is created amongst GCSMBs, acquisition of ICT skills by personnel of GCSMBs to equip them to carry out day to day basic ICT functions. These skills can be improved upon through further and continuous training schemes. The second component which is technology and infrastructure as shown in Figure 5, it is considered the most influential as it defines the tools and processes within network computing and the web environment. Accordingly, this can be delivered through the availability of

electricity infrastructure at the grassroots level and more widespread development in Internet access within the several regions in Ghana. Putting all these components together provides e-business capability within the construction environment where communication through e-mails, publication of project documents and other related activities of e-business can be realised. Figure 5 provided the mechanism of achieving requirements generation and capture through a top down and bottom up approach as explained earlier in Figure 1. Based on this, the framework in Figure 5 was populated because the downward flow is overlapped with the upward requirement capture process in a loop function to ensure that e-business decision reached is appropriate for the Ghanaian construction industry. In addition, Figure 5 shows the engagement process between GCSMBs and their foreign collaborators ensuring good communication between them.

CONCLUSION

The paper assessed the structure and procurement practices employed within the construction industry in Ghana. There is clear evidence from the research suggesting that the regulations governing procurement ostensibly was to deal with weak institutional arrangements with issues such as absence of rules governing the conduct of public procurement, lack of accountability, inappropriate institutional and administrative structures and arrangements, inadequate human resource capacity and lack of transparency. Further, it provides the legal framework, for all procurement in respect of goods, works and services obtained wholly or partially with public funds. Analysis of data obtained from the research shows that GCSMBs demonstrated poor understanding of the provisions of the regulations governing procurement. Most of the respondents noted that construction practitioners are generally ill-trained; they lack basic skills in handling procurement and day to day management issues. The study further established that construction project procurement in the Ghanaian construction industry adopts traditional labour-intensive methods resulting in duplicate work and inefficient management practices. Most of the activities from design to tender during the pre-construction process is manual based. It is not only the traditional processes, but also the technological knowhow in the procurement processes is also lacking so that it presents challenges from both a capacity as well as a capability point of view. For example, the fact that designs are generally done manually, affects activities down the line such as tender evaluation and other related items.

Adopting e-business can cater for the developments in both processes as well as the technology side and develop and contribute towards a better institutional environment and this can result in a step change within this environment so that it will enable further technological infusion in this area. This would enhance the capacity and capability of GCSMBs working within the Ghanaian construction industry. Improving the capacity and capability of GMSBs would translate into providing an enabling environment where GCSMBs and foreign firms can work together in an interactive environment. The results of the research showed that if the current state of GCSMBs in the construction industry remained unchecked, the capacity and capability of GCSMBs will be undeveloped and consequently have a deeper negative development trend within the entire construction industry in Ghana. Therefore, it is important to note that this proposal is a grassroots method to making a good procurement decision to implement an e-business strategy within the construction industry in Ghana. The results of the research are transferable across developing country's construction industries which share similar characteristics with Ghana.

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