

EARLY CONTRACTOR INVOLVEMENT IN GOVERNMENT CONSTRUCTION PROJECTS IN GHANA

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The importance of Early Contractor Involvement (ECI) and the input in project development has been acknowledged, however little has been done in practice to actually involve contractors early in government projects in Ghana. This study explores the prospects of early contractor involvement in public construction projects in Ghana. It investigates current construction procurement practices, evaluates potential benefits and challenges of ECI and examines the prospects of adopting the practice in public construction procurement. The research adopted quantitative research methodology using survey that solicited the opinions of 100 professionals from contracting organisations, consulting firms and the relevant government ministry. Results from the study shows that some challenges encountered under the traditional procurement route are linked to poor project development. It also reveals that the government of Ghana might be reluctant to try ECI on its projects however, if adopted; the practice could be successfully implemented and perpetuated. The research shows that ECI could be greatly beneficial to public sector projects if the government embraces the concept and explore the numerous benefits that could be achieved; the practice has good prospects in the delivery of public sector construction projects in Ghana.

Keywords: Early Contractor Involvement (ECI), pre-construction phase, Ghana

INTRODUCTION

The traditional procurement method whereby the contractor is selected based on price and is brought in only after designs are completed has been infamously problematic. This called for the shift to more collaborative forms of procurement. ECI arose in the early 2000s in the UK due to the realization of the need for contractor input during projects' early stages (Turner and Riding, 2015; Mosey, 2009). Turner and Riding (2015) noted that the early introduction of other parties could increase the prospects of benefits realization in construction projects. Benefits of early contractor involvement include quality improvements, cost and time saving, better understanding of risks, reduced conflicts and litigation and improved collaboration (Song *et al.*, 2009). According to Westring (1997) construction procurement forms a large chunk of government expenditure through its Ministries and Agencies. Based on this premise, efficient public construction procurement ensures the appropriate use of state funds to achieve economic growth (Anvuur *et al.*, 2006). Construction procurement in Ghana

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is plagued with adversarial relationships and delays right from the pre-contract stage through the post-contract stage and cost overruns and legal disputes post-contract (Westring, 1997; World Bank, 2003). Though the Public Procurement Act of Ghana (Act 663) suggests a number of other procurement routes, National Competitive Tendering is the most widely used in public construction procurement. This allows contractors to be brought on board only after designs have been completed and construction is set to commence presenting a challenging atmosphere for the integration of construction and design (Song *et al.*, 2009). The early involvement of contractors and their input at project inception and development stages is therefore limited (Mosey, 2009).

Public Construction Procurement in Ghana

Procurement of goods, works and services stood at \$600m as reported by the World Bank (2003) and this is an estimated 10% of Ghana's GDP. Government's procurement includes the acquisition of goods, works and services for public consumption and benefit (Hughes, 2005). The Public Procurement Act 2003 (Act 663) of Ghana emerged from the realised shortcomings of the public procurement system in Ghana (Bamfo-Agyei *et al.*, 2015). The Public Procurement Act of Ghana is applicable to all publicly funded procurement whether fully or in part (PPA-Section 14, 2003). The procurement Act 663 (2003) aims at promoting competition, efficiency, transparency and accountability in contract awards so as to ultimately achieve value for taxpayers' money (Bamfo-Agyei *et al.*, 2015).

The usual tendering process for public works as stipulated by Act 663 (2003) begins with an invitation to tender, submission of tenders, opening of tenders, evaluation of tenders and acceptance of successful tender and contract award. For public construction works the traditional procurement route, where designs are completed before main contractors are invited to bid competitively, is most widely used and accepted. Prior to the enactment of Act 663, the procurement of public works were plagued with issues of monitoring, no clear link between procurement function and public management, delays in procurement cycle and corruption, some of which are still problems today (Transparency International, 2009; Lengwiler and Wolfstetter, 2006). Westring (1997) emphasized the development of adversarial relationships between contractors and clients on government projects due to time lags. Apart from pre-contract delays, project execution delays as well as cost overruns are characteristic of public construction projects in Ghana (World Bank, 2003; Westring, 1997). The dynamic nature of the construction industry through its fast changing demand and supply has necessitated innovation to meet public needs and to obtain value for money (Anvuur *et al.*, 2006). Such dynamism within the construction industry has brought about a host of challenges, which may work against efforts of innovation and value for money.

The Nature of Early Contractor Involvement

Early Contractor Involvement (ECI) simply concerns the main contractor actively engaging in the design process, construction programming as well as risk management (Mosey, 2009). Scheepbouwer and Humphries (2011) define ECI as the process of bringing on board a contractor to contribute to design before construction work begins. It is also described as the informal engagement of the main contractor/service provider at the design stage and also the formal process of obtaining efficiency and value for money from the contractor's early engagement (Turner and Riding, 2015). The process involved in early contractor involvement describes the approach where a

partnering agreement is entered into with the main contractor early in the project lifecycle to assist and advice on project planning (Rahman and Alhassan, 2012; Nichols, 2007). A target price system is then used in determining the contractor's compensation as stipulated by the contract. However Seah (2012) adds that, ECI involves competent contractors submitting documents on their financial stance, human and other resources strength, completed jobs track records during a pre-qualification exercise. The early involvement of the main contractor at the pre-construction phase could either have the same contractor being engaged early on planning and also carrying out works on site or different main contractors for pre and post planning phases. A pre-construction phase agreement ought to be in place to legitimize main contractors' contributions earlier on in the project and also to assign risks and responsibilities as well as contractor compensation (Mosey, 2009). The Joint Contracts Tribunal (JCT) in the UK has in place standard forms of pre-construction services agreements for general contractors and specialists. However, they must be used in conjunction with one of the JCT standard forms of contracts, which serves as the main construction contract (JCT, 2011).

Extent of Early Contractor Involvement in Ghana

In Ghanaian public construction procurement, the standard form of building contract is that of the Public Procurement Board's tender documents for the procurement of works for medium contracts (lump sum) and more recently in use are the standard contract forms that are part of tender documents for international competitive tendering. There also exists a form of contract for consultant services for complex time-based assignments and large lump sum assignments. According to Act 663 (2003) the main contractor (consultant) could be selected based on quality and cost only subject to the client's preference.

Public construction procurement in Ghana has contracts awarded to main contractor's right before construction starts on site as it's the general practice in other developing countries. There is no formal knowledge of Early Contractor Involvement being practiced on public projects in Ghana as the government as a client depends on its consultants to provide services that the main contractor would otherwise provide at the project development stage. Mosey (2009) argued that the single stage procurement process involving price based selection of main contractors complicates and perpetuates an already fragmented construction sector. The fragmentation of the construction industry as a barrier to growth among other issues has been stressed severally (Emmerson, 1962; Banwell, 1964; Latham, 1994). The notion of integrating design and construction has also been overemphasized as main contractors' input in design has been found to achieve more functional designs.

Benefits and challenges of Early Contractor Involvement

ECI could be a source of the much-needed increase in productivity levels in construction and also advocated the approach as a means of encouraging partnering in tendering (Seah, 2012). Lines of responsibility are better defined and understood under the ECI contractual arrangement. The contributions of the main contractor as well as subcontractors will ensure buildability of designs while making the project more affordable to pursue (Mosey, 2009). The most important benefit of ECI is that it seeks to reap much improved results than that offered by traditional procurement routes (Seah, 2012). Other benefits of ECI in a project are presented in Table 1.

Early Contractor Involvement has its downside and challenges to its successful implementation. The benefits of the approach however, far outweigh its challenges.

Such constraints could be minimized or eased if it can be proven that better value for money as well as honesty on the part of the main contractor can be achieved with his early involvement or with two-stage procurement. Some of the challenges of ECI are presented Table 2.

Table 1 -Benefits of Early Contractor Involvement

	Benefits of ECI	Source
1	Project risks are better understood and dealt with through joint problem solving which enables the easier prediction of project outcomes	Seah, 2012
2	Subcontractors are also able to prepare responsive bids due to the availability of information on design, risk, etc.	Mosey, 2009
3	There is less adversarial relationship amongst the project team reducing the occurrence of conflict during or after projects	Rahmani <i>et al.</i> , 2013
4	The joint risk management approach between the client and the main contractor when adopted allows for effective value engineering and prevents delays on site	Mosey, 2009
5	The development of a partnering relationship under ECI could reduce risk due to transparency involved	Van Elburg, 2008
6	ECI improves productivity, encourages innovation and successful project execution	Turner and Riding, 2015
7	The construction programme is also better-developed and followed, with milestones set within realistic time periods	Mosey, 2009
8	The main contractor is able to infuse latest construction technology and knowledge into projects due to his early involvement in the project	Seah, 2012

Table 2 -Challenges of Early Contractor Involvement

	Challenges of ECI	Source
1	The construction industry being slow or resistant to change and constitutional constraints negatively impacts progressive concepts such as ECI in construction procurement	Mosey, 2009
2	Ineffective information sharing in the project team stifles the progress of the practice	Turner and Riding, 2015
3	Absence of trust in contractors' expertise coupled with competitive tendering and a rigid contract are likely to strain contractual relationships and reduce project performance	Laan <i>et al.</i> , 2011
4	Cost estimates produced at the early stages of a project with ECI may not be accurate enough to incentivise clients to adopt the practice in future projects	Nichols, 2007
5	Simple, small sized or low risk projects may not warrant ECI as it may include unnecessary cost and contractors may be unwilling to sign an additional contract	Mosey, 2009

METHODOLOGY

The study adopts quantitative research methodology for primary data collection using a survey; the use of quantitative method provides a wider view of respondents' offering an increased reliability and validity of research results (Opoku *et al.*, 2016) Quantitative research methodology provides responses that describe the experiences, opinions, and other characteristics of respondents with the view of making statistical interpretations of the phenomenon under investigation (Fowler, 2013). Questionnaire survey as a data collection technique provides a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population. The study is focused on the Greater Accra Region of Ghana, which is the commercial capital of the country and as such has a concentration of most large construction firms

in the country. The D1K1 class of main contractors are chosen for this study as they handle contracts valued above \$500,000, and are therefore most likely to execute large public construction projects. Professionals with experience in the areas of Engineering, Architecture, Quantity surveying, Project management and Contracting were randomly selected from the consultant, main contractor and client (government) organisations that took part in the study.

RESULTS AND DISCUSSIONS

A total of 100 questionnaires were distributed to professionals from the Ministry of Water Resources, Works and Housing, construction consultants and main contractors involved in Ghana government projects. A response rate of 83% was achieved with 24% representing consulting firms, 45% contracting organisations and 31% respondents belonging to the Ministry of Water Resources, Works and Housing.

The concept of Early Contractor Involvement (ECI)

In exploring respondents understanding of the concept of Early Contractor Involvement (ECI), respondents were asked to rank their thoughts on statements identified through literature review concerning the ECI practice on the Likert scale of; 1- Strongly disagree, 2- Disagree, 3- Neutral, 4- Agree and 5-Strongly Agree. The results is summarised in Table 3. Analysis of these results indicates that the Mean rating for pre-construction phase agreements being used as contracts (3.40) is closer to 'neutral' (3). The remaining statements could all be said to be closer to 'agree'. The Modes of all but one of the statements depict agreement (4), with integration of design and construction through ECI as a means of eliminating issues having a modal rating of 5 (strongly agree).

Table 3 - General Statistics on the concept of ECI

		Main contractors services formally engaged early	Formal signing of contracts for ECI	Pre-construction phase agreements used as contract	Lack of ECI being linked to government project issues	Integration of design and construction through ECI to eliminate issues	Possibility of ECI being successfully adopted in government projects
N	Valid	83	83	83	83	83	83
	Missing	0	0	0	0	0	0
	Mean	3.72	3.59	3.40	4.07	3.96	4.13
	Median	4.00	4.00	3.00	4.00	4.00	4.00
	Mode	4	4	4	4	5	4

Analysis of the statistics shows that statements with particularly high percentages of responses in favour of 'agree' were main contractors' services being formally engaged early and formal signing of ECI contracts, which had 53% of respondents and 47% of respondents respectively, agreeing with the statement. For ECI having pre-construction phase agreements as the form of contract, though 35% of respondents agreed, 28% were neutral and 22% also disagreed. This could mean a different form of contract is signed for such an arrangement in Ghanaian public construction. Respondents were also asked if there was a link between a lack of ECI and government project issues, 45% of them agreed with a further 35% strongly agreeing. In terms of integration of design and construction through ECI eliminating project issues, 36% strongly agreed while 29% agreed and 31% were neutral. Though majority of respondents agreed this was possible, a significant number were not fully convinced. Lastly, when respondents were asked if ECI could be successfully implemented in government projects, 48% of respondents agreed with 36% strongly

agreeing. This raises a beacon of hope for the adoption of ECI practices in the Ghanaian public sector construction.

When respondents were asked to express their opinion on government’s willingness as a construction client, to adopt ECI in its projects, the analysis of the results indicate that 47% of the respondents observed that public construction procurement entities will be reluctant to adopt ECI. It further shows that a significantly 33% are of the view that government will be unwilling to adopt the practice while only 20% admitted that government will be very willing to adopt ECI. This is contrary to the research expectations, which hoped to see a significant number of respondents affirming the government’s willingness to embrace the ECI concept. Responses are illustrated in the Figure 1.

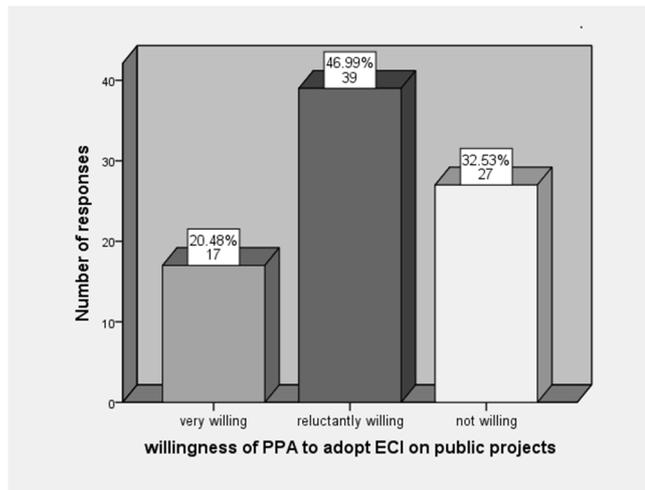


Figure 1: Willingness of Government procurement entity to adopt ECI

Benefits of Early Contractor Involvement

This section of the study required respondents to rate their level of agreement with a number of benefits of ECI. Respondents were to select their preference from the Likert scale with the following rankings: 1- little importance, 2-some importance, 3- quite important, 4-important, and 5- very important. The tables and figure below illustrate the rate of response to each question.

Table 4 shows Mean values for all benefits to be close to 4 (important) on the Likert scale.

Table 4: General Statistics on Benefits of ECI

	Development of feasible cost assessment plan	Better risk assessment	More information to prepare responsive bids	Effective value engineering due to joint risk management	Better developed construction programme	Development of team spirit and transparency
N Valid	83	83	83	83	83	83
Missing	0	0	0	0	0	0
Mean	3.86	3.93	3.99	3.93	4.10	4.00
Median	4.00	4.00	4.00	4.00	4.00	4.00
Mode	4	4	4	4	5	4
Std. Deviation	.912	.973	.994	.894	.970	.937

The Mode for five benefits is 4 (important) while that on ECI enabling a better-developed construction programme has a Mode of 5 (very important). The results

therefore show that, better developed construction programmes as a result of ECI is a very important benefit. Respondents also believe benefits of ECI such as the development of a feasible cost plan, better risk assessment, more information to prepare responsive bids, effective value engineering as a result of joint risk management and the development of team spirit and transparency, to be important.

There is a significantly high percentage of respondents finding all the listed benefits either 'important' or 'very important' as shown in Figure 2. These benefits are directly linked to the issues encountered on projects without ECI. Respondents' affirmation of these benefits therefore substantiates findings from literature review that, ECI could reduce or eliminate some construction challenges.

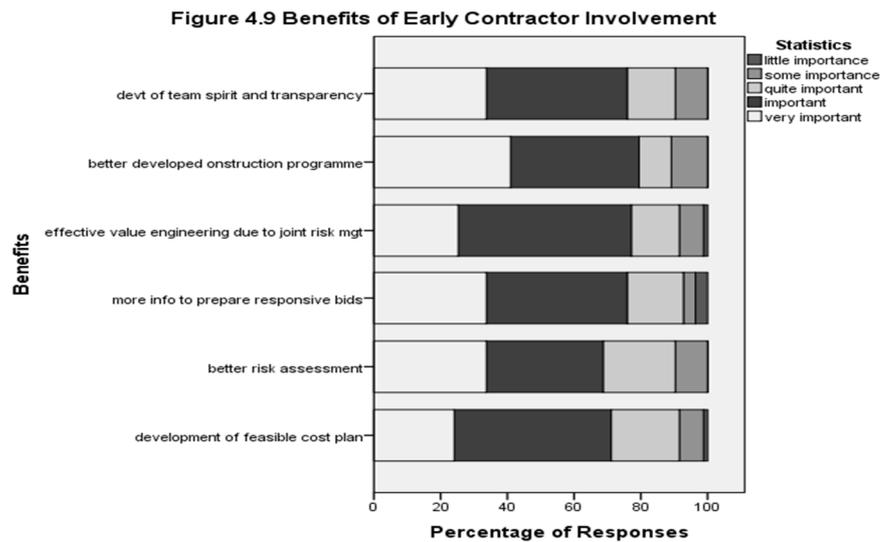


Figure 2: Benefits of ECI

Challenges of ECI

Finally respondents were asked to rank their level of agreement on a number of challenges of ECI identified through literature review on the Likert scale where 1- Strongly disagree, 2- Disagree, 3- Neutral, 4- Agree and 5-Strongly Agree. Table 5 shows that 25% of respondents disagree that ECI is a new procurement approach. In spite of majority of respondents agreeing or strongly agreeing that it is, construction literature reports its existence for several years. Respondents therefore generally agree that ECI could have the downside of smaller projects not needing ECI, procurement laws limiting ECI prospects and lengthy and expensive processes surrounding pre-construction phase agreement.

Table 5: Frequency table on the challenges of ECI

	ECI is a new procurement approach	Lack of incentive to adopt ECI	Smaller less complex projects may not need ECI	Procurement laws limiting prospects of ECI	Length of time and cost of pre-construction phase agreements deterring use of ECI	Reluctance to the signing of pre-construction phase agreement
Strongly disagree	1%	3%	2%	6%	1%	0%
Disagree	25%	19%	12%	8%	5%	16%
Neutral	11%	24%	18%	28%	29%	31%
Agree	39%	29%	40%	45%	42%	31%
Strongly agree	24%	25%	28%	13%	23%	22%

The results however, did not fully lean towards the reluctance of the government and contractor to sign an additional contract and ECI being a new procurement approach as major challenges of ECI.

Generally, the analysis shows that, the traditional method of procurement, which is most commonly used for government projects in Ghana offer poor project development and strongly linked to the issues encountered on such projects. It was also found that ECI usually involves the signing of a formal contract to ensure contractor compensation for project development activities. Respondents also strongly believe that ECI could enable the development of a better construction programme.

CONCLUSIONS

The prevalence use of the traditional price-based procurement route to obtain the services of a main contractor is associated with numerous challenges most of which are regarded as being strongly linked to poor project development. The results of the study show that there is lack of early contractor involvement in most Ghana government project. However, respondents were generally sceptical about the government's willingness to adopt the ECI approach due to procurement laws or the relative newness ECI to the Ghanaian construction industry. The study revealed that public construction procurement entities are reluctant to adopt ECI in government projects. However there is hope that the practice of ECI could become common in the near future as the construction industry continues to grow and evolve. The construction industry is known as being resistant to change, ineffective in information sharing amongst the project team and a general lack of trust in the main contractor's expertise.

These challenges are believed to be affecting successful implementation of ECI in Ghana, especially in government projects. However ECI in government projects offer numerous benefits including the assurance of buildability of designs, better risk management, better developed construction programme and cost plan as well as effective value engineering and greater team spirit. The study highlighted the importance of these benefits in ensuring the successful implementation of ECI. Mapping these benefits to the challenges of current government procurement practices in Ghana, it is evident that early contractor involvement, if not completely, could make a significant difference in public construction procurement by minimizing the incessant issues plaguing the construction industry in Ghana. The paper therefore recommends that, public sector construction procurement entities in Ghana should be sensitised and exposed to the concept and benefits of early contractor involvement. Public procurement entities in Ghana could introduce early contractor involvement, governed by a pre-construction phase agreement, in their procurement of works by testing it on some pilot projects, which meets the criteria of it being large and quite complex. As ECI has been successfully implemented in government projects in some developed countries such as UK, Ghana's construction industry could draw from these experiences to successfully adopt ECI practice in public sector procurement of construction projects.

REFERENCES

- Anvuurl, A; Kumaraswamy, M and Male, S (2006) Taking forward public procurement reforms in Ghana. *CIB W107 Construction in Developing Countries International Symposium Construction in Developing Economies: New Issues and Challenges*, 18th-20th January, Santiago, Chile.

- Bamfo-Agyei, E, Hackman, J K and Nani, G (2015) Assessment of the Public Procurement Act 2003 (Act663) on project time performance of construction projects in Ghana. *African Journal of Applied Research (AJAR)*, 1(1).
- Banwell Report (1964) *The Placing and Management of Contracts for Building and Civil Engineering Work*. London: HMSO, The Banwell Report.
- Emmerson, H (1962) *Survey of Problems before the Construction Industries*. HMSO: London, Ministry of Works.
- Fowler, F J (2013) *Survey Research Methods: Applied Social Research Methods 5th Edition*. New York: Sage Publications.
- Ghana Government (2003) *Public Procurement Act, 2003 (Act 663) Of the Republic of Ghana*. Accra-Ghana.
- Hughes, M (2005) *Evaluation of the Local Government Procurement Agenda- Baseline Survey Report*. London: The Office of the Deputy Prime Minister.
- JCT (2011) *Pre-Construction Services Agreement*. London: The Joint Contracts Tribunal Limited (JCT).
- Laan, A, Voordijk, H and Dewulf, G (2011) Reducing opportunistic behaviour through a project alliance. *International Journal of Managing Projects in Business*, 4(4), 660-679.
- Latham, M (1994) *Constructing the Team, Final Report of the Government/Industry Review of Procurement and Contractual Arrangements in the UK Construction Industry*. London: HMSO.
- Lengwiler, Y and Wolfstetter, E (2006) *Corruption in Procurement Auctions, Governance and the Efficiency of Economic Systems*. Discussions Paper No. 90. Available from <http://www.sfbtr15.de/uploads/media/90.pdf> [Accessed 30th June 2018].
- Mosey, D (2009) *Early Contractor Involvement in Building Procurement: Contracts, Partnering and Project Management*. Chichester, West Sussex: John Wiley and Sons.
- Nichols Group (2007) *Review of Highways Agency's Major Roads Programme*. London: Nichols Group.
- Opoku, A, Ahmed, V and Akotia, J (2016) Choosing appropriate research methods. In: V Ahmed, A Opoku and Z Aziz (Eds.) *Research Methodology in the Built Environment: A Selection of Case Studies*. London: Routledge, 32-49.
- Rahman, M and Alhassan, A (2012) A contractor's perception on early contractor involvement. *Built Environment Project and Asset Management*, 2(2), 217-233.
- Rahmani, F, Khalfan, M M A, Maqsood, T, Noor, M A and Alshanbri, N (2013) How can trust facilitate the implementation of Early Contractor Involvement (ECI)? In: *19th CIB World Building Congress Construction and Society*, Brisbane, Queensland, Australia.
- Scheepbouwer, E and Humphries, A (2011) Transition in adopting project delivery method with early contractor involvement. *Transportation Research Record, Journal of the Transportation Research Board*, 2228(-1), 44-50.
- Seah, E (2012) The power of early contractor involvement. *Executive Summaries for the Practitioner*, 12(2). Singapore: Langdon and Seah Singapore PTE LTD.
- Song, L, Mohamed, Y and AbouRizk, S M (2009) Early contractor involvement in design and its impact on construction schedule performance. *Journal of Management in Engineering*, 25(1), 12-20.

- Transparency International (2009) *The East African Bribery Index*. Available from <https://tikenya.org/wp-content/uploads/2017/06/eabi-2009.pdf> [Accessed 30th June 2018].
- Turner, N and Riding, M (2015) Early contractor involvement in Australia: Learnings from Transfield Services projects. *Small Enterprise Research*, 22(2-3), 173-184.
- Van Elburg, J C (2008) Market consultation as a tool for early market involvement in infrastructure projects (governance of infrastructure projects). In: *First International Conference on Infrastructure Systems and Services: Building Networks for a Brighter Future (INFRA)*, 10-12 November, Rotterdam, Netherlands.
- Westring, G (1997) *Ghana Public Procurement Reform: An Audit Report*. Stockholm: World Bank/Advokatfirman Cederquist KB.
- World Bank (2003) *Ghana 2003 Country Procurement Assessment Report*, Washington, DC: The World Bank, Ghana Country Department.