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Corrupt Practices in the Construction Industry: A Survey of Ghanaian Experience

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ABSTRACT

Globally, corruption presents a major risk that reduces construction project performance by inflating costs and reducing the quality of infrastructure commissioned. In developing countries, corruption stifles economic development and engenders social inequality. This paper uncovers the prevalence and forms of corrupt practices within the developing country of Ghana using a structured questionnaire survey to elicit direct knowledge and lived experiences of construction practitioners. Research findings illustrate that habitual corruption and unethical behaviour prevails amongst public officials, contractors and construction professionals during the bid evaluation, tendering and contract implementation stages of a construction contract. This research proffers that corruption is driven by a toxic concoction of high political connections, excessive and reckless sole sourcing of public construction projects, lack of commitment by construction companies to address corruption and the inherently idiosyncratic operational environment of the construction sector. The top-five forms of corruption frequently

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encountered, in descending order, are kickbacks (extortion), bribery, collusion and tender rigging, conflict of interest and fraud. The research presents a rare glimpse of construction industry corruption in a developing country and provides polemic clarity geared to intellectually challenge readers in government and industry. Future work is required to explore and develop appropriate countermeasures to address the corrupt practices and behaviours.

Keywords: Corruption, kickbacks, bribery, construction industry, developing country

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INTRODUCTION

The United Nations Development Programme (UNDP 2008) defined corruption as: *"the misuse of entrusted power for private gain."* Corruption represents a major and persistent obstacle to governments and businesses that seek to achieve sustainable social and economic development (Pillay 2004; World Bank 1997). According to the World Economic Forum et al. (2012), corruption accounts for ≥ 5% of the world's gross domestic product, which translates into some US$2.6 trillion, with over US$1 trillion paid in bribes annually. The construction sector in particular has been described as an inherently dishonest industry (Transparency International 2005, 2011, 2013) and corrupt practices occur at all stakeholder levels and phases of project development (Brown and Skitmore 2015; de Jong et al. 2009; Shakantu 2006). These malpractices include fraud, fronting, bribery, kickbacks, conflict of interest, collusion and bidrigging, nepotism and other unfair/ unethical conducts (Brown and Skitmore 2015; Le et al. 2014; Bowen et al. 2012; Tabish and Jha 2011; Zarkada-Fraser and Skitmore 2000; Sohail and Cavill 2008). The repercussions of corruption include stifled economic development, absence of competition in prices and quality and poor workmanship (Sohail and Cavill 2008; Uneke 2010). The industry's susceptibility to corruption is attributed to its inherently idiosyncratic characteristics such as: the size, uniqueness and complexity of constructed products; lengthy and sophisticated construction processes; fragmented structure with multiple contractual relationships; adversarial culture; and poor professional ethical standards (Sohail and Cavill 2008; Transparency International 2013; Shan et al. 2015).

The parlous state of developing countries demands effective and efficient construction outputs to initiate affordable housing and infrastructure to fuel economic growth and circumvent poverty; yet paradoxically such countries are most vulnerable to corruption (Fanteye 2004). Le et al. (2014) recommended more empirical research should be commissioned within

developing countries that are challenged with addressing corruption. Their review (*ibid*) of 56 pertinent published articles between 1990 and 2012 revealed that more empirical research is needed to investigate corrupt practices in developing countries. The nature and extent of corrupt practices varies across countries, owing to differences in maturity and/ or availability of effective procurement structures and, regulatory and administrative systems (Le et al. 2014; Heywood and Rose 2014; Sampford et al. 2006; Shakantu and Chiocha 2009). Shan et al. (2015) reinforces this assertion, reporting that tenuous regulatory structures – underpinned by inadequate sanctions and negative leadership – have a strong effect on corruption vulnerabilities. Within the developing country of Ghana, widespread dishonest practices amongst public and government officials has engendered public disquiet (World Bank Enterprise Surveys 2013; CDD-Ghana 2000; Mensah et al. 2003). In response, the government enacted the Public Procurement Act in 2003 (i.e., Act 663) to reform and regulate public works procurement and combat corruption (Government of Ghana 2003). However, despite the Act 633, corruption remains an importunate and unrelenting issue (Osei-Tutu et al. 2010), for example, Ameer (2015) recently reported that contractors pay 10–20% of the tender sum in bribes to secure public contracts. Ghana has not improved its scores on the Transparency International's (TI) corruption index and has consistently fallen below the midpoint of TI's scale of 0 (highly corrupt) and 100 (very clean). Figure 1 shows Ghana's ranks and scores on the Corruption Perception Index (CPI) between 2007 and 2016. The country is described as the second worst decliner in the 2016 CPI in the Sub-Saharan region, scoring 43 (equivalent to the global average) on the index. These scores indicate pervasive corruption in Ghana's public sector (Transparency International 2016).

[Insert Figure 1 around here]

Against this background, an empirical investigation of corruption in public infrastructure works procurement is conducted in Ghana. Specifically, the research reports upon the personal experiences of construction practitioners regarding the extent and nature of corruption. This research will assist policy makers to develop workable anti-corruption strategies that are formulated upon a cogent understanding of the extent and nature of this omnipresent problem.

LITERATURE REVIEW

Corruption and the Construction Industry

The Chartered Institute of Building's (CIOB 2006) construction industry-wide survey indicated that there was no clear and commonly accepted definition of 'corruption' within the UK construction industry. Indeed, results showed that the respondents held conflicting perceptions as to what constitutes corruption. Hence, for this study corruption is defined as the: *"offering, giving, receiving or soliciting, directly or indirectly anything of value to influence the action of an official in the procurement or selection process or in [construction] contract execution"* (United Nations 2006). Within construction literature, various research studies have investigated corruption and ethics. In the UK, the Charted Institute of Building (CIOB 2006) found that 51% of the 1,404 practitioners had direct experiences of corruption and that on at least one occasion, 41% of the respondents had been offered bribes. The study found that corruption is *"present in many aspects of the UK construction industry"* (pg. 3) and recommended that industry and government must do more to eliminate corruption. In response, the UK government introduced the Bribery Act 2010 (with effect from April 2011) which requires construction firms to demonstrate their commitment to battling corruption (Bribery Act 2010; Donohoe 2011). The Bribery Act is extra-territorial and holds senior officials of companies liable for not fighting corruption.

In South Africa, Bowen et al. (2012) surveyed the views and experiences of construction practitioners and clients. They concluded that corruption is pervasive and that contractors, subcontractors and public officials are actively implicated in such practice; this finding concurred with the earlier work of Zou (2006). Government officials frequently engage in nepotism, dishonesty and unfairness, tender irregularities, and extortion of bribes/kickbacks whilst architects and engineers are guilty of negligence and financial maladministration (Zou 2006; Bowen et al. 2007b). In Australia, May et al. (2000) revealed that bid cutting amongst main contractors and subcontractors is widely practiced; however, whilst main contractors regarded bid cutting as perfectly ethical, subcontractors vehemently disagreed. Zarkada-Fraser and Skitmore (2000) investigated Australian construction professionals' attitudes towards collusive tendering. Three major collusive tendering practices were identified (*ibid*), namely submission of cover prices, inflation of tender prices and withdrawal from the tendering process. Similarly, Vee and Skitmore (2003) surveyed the views and personal experiences of Australian construction professionals on industry ethics and found that all respondents had experienced or witnessed corrupt or unethical behaviour. Most recently, Brown and Skitmore's (2015) exploratory study found that corruption was widespread in the Australian construction sector and was attributed to personal reward.

Elsewhere, Tabish and Jah (2011, 2012) studied corruption in public construction project procurement in India and hypothesized that anti-corruption strategies eradicate corruption. In the United States (US), a survey found that 84% of the responding construction professionals have experienced corrupt acts or transactions (FMI/CMAA 2004). Chotibhongs and Arditi (2012) confirmed the existence of collusive bidding in the US and revealed that five out of 80 bidders were jointly awarded 72% of the contracts, and identified a widespread use of cartel bidders. Similarly, Bajari (2001) observed bid-rigging in paving, school construction and

bridge repair projects in New York City and Chicago. From the industrial organisational theory perspective, Dorée (2004) discussed the problem of collusion in response to an extensive use of cartels and structural bid-rigging in the Dutch construction industry. Dorée (*ibid*) linked this persistent malpractice to the Dutch culture, improper market functioning and changes in antitrust legislation.

This synthesis of extant literature illustrates that corruption is a persistent and endemic issue within the construction industry internationally. Indeed, corruption is so pervasive and entrenched that it permeates both process and professionalism.

Forms of Corruption

Corrupt and unethical practices within the construction industry exist in many guises and include: *bribery* (Gordon and Miyake 2001; Amundsen 2000); *fraud* (Tabish and Jha 2011; Vee and Skitmore 2003; United Nations 2006); *kickbacks* (Sohail and Cavil 2008; Osei-Tutu et al. 2010; Aluutu 2007); *collusive tendering and bid rigging* (Chotibhongs and Arditi 2012; Dorée 2004; Bajari 2001); *embezzlement* (Hartley 2009); *conflict of interest* (Brown and Skitmore 2015; Bowen et al. 2007b; Osei-Tutu et al. 2010; Vee and Skitmore 2003); and *fronting* (Le et al. 2014; de Jong et al. 2009).

- *Bribery* is widespread in developing countries and whilst difficult to define, it includes speed and grease money (payments), gifts and gratuities, hospitability and the use of intermediaries (Gordon and Miyake 2001; Amundsen 2000).
- *Fraud* is an economic crime involving acts such as swindle, trickery, misinformation or deceit (Tabish and Jha 2011; Vee and Skitmore 2003). Fraud represents a false misrepresentation or concealment of facts for commercial gain (United Nations 2006).

- *Kickbacks* are illicit economic incentives used to obtain a favourable decision from a person in a position of power, for example, in contractor selection (Aluutu 2007; Sohail and Cavil 2008; Osei-Tutu et al. 2010). Kickbacks typically inflate the cost of construction but rarely the quality (Aluutu 2007).
- *Collusive tendering* and *bid-rigging* refers to a "secret agreement between two or more parties for a fraudulent" reason (Le et al. 2014). *Collusive tendering* includes compensation of unsuccessful bidders, cover pricing, hidden fees and bid cutting (Chotibhongs and Arditi 2012; Dorée 2004; Bowen et al. 2007a; Zarkada and Skitmore 2000; Bajari 2001). *Bid-rigging* occurs between the tenderer and the tenderee where the former creates constraints that elevates the preferred tenderee to win a contract (Le et al. 2014).
- *Embezzlement* occurs when an official (with the client's organisation) misappropriates or intentionally misuses project funds for personal rewards or political gain (Hartley 2009). Repercussions of embezzlement include unfinished projects, delayed or non-payment of contractors and suppliers, and below-standard workmanship.
- *Conflict of interest* is frequently cited in construction procurement (Brown and Skitmore 2015; Bowen et al. 2007b; Osei-Tutu et al. 2010; Le et al. 2014; Vee and Skitmore 2003) and is defined as a clash between the interest of the client organisation and personal interest of the client organisation's official (United Nations 2006).
- *Fronting* occurs when officials within government agencies or client organisations create front companies to obtain construction contracts. Front companies obtain unfair or illegal benefits in awarding public contracts because of their owners' powerful positions in government (de Jong et al. 2009; Bowen et al. 2007a). These contracts are subsequently delegated to other construction firms for personal gains.

RESEARCH METHODS

Questionnaire Survey

A questionnaire survey conducted sought to solicit views and personal experiences of construction practitioners regarding: the extent and forms of corruption; participation in corruption; causal factors of corrupt acts; and measures needed to fight corruption. This data collection method was used because it provides valid and reliable information about the respondents' experiences and knowledge of corruption at a reasonable cost (Hoxley 2008). Questionnaire surveys can also ensure anonymity of respondents when researching into sensitive topics such as corruption. The questionnaire design was adopted from Bowen et al. (2012) but with some modification to suit the current research. The questionnaire comprised of closed and forced-choice, declarative, multiple-choice and dichotomous questions to elicit the respondents' experience and views. The responses were captured using five-point grading scales.

Survey Participants

The survey was conducted with practising quantity surveyors, architects, engineers and project/ construction managers from public agencies that sponsor construction projects and construction and consultancy firms that work for public clients. A selection exercise was first conducted to select a panel of practitioners who: i) are members of a construction industry professional body; ii) hold director and other senior management level positions in the public and private sectors; iii) have more than 10 years working experience in the construction industry; and iv) have personal experience of corruption. In order to avoid bias in the survey responses, respondents were selected from private construction companies, professional consulting firms and public sector agencies/departments (refer to Table 1). This selection strategy was adopted to secure quality respondents and to guarantee credible and balanced feedback. The selection exercise yielded thirty-five practising construction professionals from public and private organisations

who participated in the questionnaire survey; thirty-four are members of the main industry professional bodies, namely: Ghana Institution of Surveyors (GhIS); Ghana Institution of Engineers (GhIE); and Ghana Institute of Architects (GIA).

Given the contextual sensitivity of corruption, acquiring a larger sample size is problematic (Brown and Skitmore 2015; Tabish and Jha 2011). Indeed, respondents were initially concerned with preserving their anonymity and preventing reprisal. To alleviate these concerns, ethical control measures were implemented and respondents were: given an opportunity to withdraw from the survey at any stage in the process; given assurances that all data would remain strictly confidential and would be securely disposed of post survey analysis; and informed that their personal details would be omitted from the questionnaire. These ethical control measures ensured that the sample size compared favourably with previous studies; for example, Vee and Skitmore's (2003) and Brown and Skitmore's (2015) surveys were based on responses of 31 and 23 respondents, respectively whilst Tabish and Jha's (2011) findings were based on six respondents. Therefore, the sample size is considered to be sufficient.

[Insert Table 1 around here]

THE SURVEY RESULTS

Survey results were analysed using descriptive statistics including mean, relative significance and standard deviation. The mean and relative index were applied as consensus approaches (Murphy et al. 2105; Jannadi 1996). The results are structured to iteratively report upon key sections of data collected from the questionnaires, namely: prevalence and forms of corruption; participation in corruption; facilitators of corruption; and control of corruption.

Prevalence and Forms of Corruption

Overall, 97% of the survey respondents agreed or strongly agreed that corruption is widespread, with a mean level of agreement of 4.40 (refer to Table 2). This result reinforces TI's corruption index findings on Ghana, which indicate that the country declined in the 2016 CPI to a score of 43 from 47 in 2015. As shown in Figure 1, between 2007 and 2016, Ghana's scores on the corruption index range between 37 and 48, below the midpoint of the scale. When requested to indicate on a five-point scale the project stages during which they have experienced or observed various corrupt activities, the respondents overwhelmingly indicated the *tendering* and *bid evaluation* phases, with high frequency indexes of 0.85 (mean = 4.25) and 0.86 (mean = 4.31), respectively. The tendering and bid evaluation phases are critical in construction contracts, ranging from invitation to tenders to contracts award. According to European Union (2013), direct losses resulting from corruption during the tendering process for rail and road transport construction and urban and utility construction in Europe is estimated at 17% and 20% of procurement cost respectively. The findings suggest that public officials within client departments exert influence upon the tender process (tenders and tender results) for personal reward or political gain. As indicated by Tullock (2001), decision makers favour an individual construction firm, for example, through a reduction in the number of bidders. Corruption during tendering and bid evaluation processes mean that tenders are deemed non-responsive for trivial reasons in order to elevate favoured tenderers; tender prices being leaked in exchange for payments; government officials abuse their administrative powers to award public contracts; and projects that are re-tendered in the absence of due diligence. The results also revealed that the *contract implementation and administration* phase is vulnerable to corruption with a score of 0.77 (mean = 3.84). Various malpractices occur during this stage of construction projects, including: approval of shoddy works by consultants; over-measurement of works by quantity surveyors; over-payment of contractors by corrupt officials; and kickbacks (Dorée 2004;

247 OseiTutu et al. 2010). These survey results illustrate that most industry stakeholders are
248 actively engaged in various corrupt acts (refer to Tables 3 and 4).
249
250 **[Insert Table 2 around here]**
251 **[Insert Table 3 around here]**
252
253 Regarding *prevalence* of the seven forms of corruption, Table 3 shows that kickbacks (mean =
254 3.97) is the most prevalent, followed by bribery (mean = 3.91), collusion and bid-rigging (mean
255 = 3.76), conflict of interest (mean = 3.63), fraud (mean = 3.41), fronting (mean = 3.22) and
256 embezzlement (mean = 3.00). Kickbacks and bribes are often used to obtain contracts, or secure
257 a professional appointment and failure to participate in this corrupt practice results in either
258 unemployment or difficulties in executing the job if employed. The order of prevalence of these
259 corrupt practices varies across countries; for example, Bowen et al.'s (2012) survey revealed
260 collusive tendering and bid-rigging, fronting and kickbacks in South Africa.
261
262 ***[Insert Table 4 around here]***
263
264 Table 4 reports upon the forms of corruption experienced and/ or witnessed by respondents.
265 The analysis indicated that 46–81% of respondents had a personal experience of, or witnessed
266 various corrupt acts – namely: conflict of interest (81%); bribery (78%); collusion and
267 bidrigging (78%); kickbacks (77%); fraud (61%); and fronting (52%). These findings illustrate
268 that the construction supply chain allows greater interactions among upstream (consultants and
269 clients) and downstream (material suppliers, contractors and subcontractors) stakeholders.
270 Construction and consulting companies and their executives develop relationships with
271 government officials and both sides could exploit these for economic benefits (Jamie et al.

2009). Conflict of interest, involves the shared interest of consultants and the client on a project, the consulting engineer working on a project for both the contractor and client, and government officials awarding public projects to private firms in which they have financial interests (Bowen et al. 2007a). Some contractors may offer bribes to public officials and consultants in exchange for tender information to secure contracts. Embezzlement is the least experienced corrupt practice. This is probably because (public and government) officials often embezzle project funds without knowledge of other industry participants, hence they are not easily exposed to the general public.

Participation in Corruption

The respondents' experiences regarding the parties involved in corruption were also explored (refer to Table 5). Public and government officials, who serve as clients for public construction projects, actively engage in corruption (mean agreement = 4.23 or index = 0.85). The next most corrupt stakeholder groups are contractors and sub-contractors, with a mean agreement score of 3.79 (or index = 0.76) and 3.90 (or index = 0.79), respectively. Public or government officials engage in corruption for personal gain while contractors and subcontractors perceive that winning contracts is more important than observing the rules of procurement or breaking the law in order to remain in business (Brown and Skitmore 2015; Chotibhongs and Arditi 2012). Government officials and contractors and subcontractors' active involvement in corruption is attributed to their extensive involvement in the construction process (Bowen et al. 2007a). Thus, there is some government-contractor interaction which facilitates corrupt activities. The amount of time contractors devote in dealing with public/government officials is related to the extent of corruption (Svensson 2003; Jamie et al. 2009). The analysis further illustrates that professional stakeholder groups (quantity surveyors, project managers, engineers and

296 architects) are involved in corruption, as indicated by a reasonable level of consensus among
297 the survey respondents.
298
299 ***[Insert Table 5 around here]***
300 ***[Insert Table 6 around here]***
301 Respondents were also requested to indicate the forms of corrupt acts that industry stakeholders
302 frequently engage in. The survey allowed multiple responses. Table 6 illustrates that
303 government officials (clients) mostly participate in conflict of interest (22 responses),
304 kickbacks (21 responses), tender rigging and collusion (18 responses), bribery (16 responses),
305 and embezzlement (16 responses). These results augment and concur with the survey findings
306 of Vee and Skitmore (2003) in Australia and instantiate the theory that conflict of interest is a
307 major concern internationally. Table 7 shows specific corrupt activities of public officials
308 witnessed or experienced by the respondents. There is a high consensus that they primarily
309 award contracts for political gains (mean = 4.47); extort bribes as inducement for awarding
310 contracts (mean = 4.26); leak information to preferred bidders in exchange for payments (mean
311 = 3.82); and awarding contracts to family members or friends (i.e., conflict of interest) (mean
312 = 3.74).
313
314 ***[Insert Table 7 around here]***
315 ***[Insert Table 8 around here]***
316 ***[Insert Table 9 around here]***
317
318 Contractors are reported to be associated with bribery (21 responses), fraud (17 responses), and
319 fronting (11 responses) to win tenders, thereby undermining any possibility for competition
320 (refer to Table 6). Contractors frequently offer bribes in the form of gifts and payments to
321 obtain government construction contracts (Doh et al. 2003; Gordon and Miyake 2001), or
322 obtain government approval or permit for a profitable public contract (DeSoto 2000; Jamie et

al. 2009). In the latter case, construction firms are more likely to speed up approvals through corrupt payments (Martin et al. 2007). Table 8 further illustrates that contractors collude with other contractors, for example, to win contracts (mean = 3.70); produce fraudulent invoices (mean = 3.67); and manufacture fraudulent timesheets (mean = 3.58). Subcontractors were found to primarily engage in bribery (Table 6). The respondents have also experienced or witnessed acts similar to contractors (see Table 9) such as: production of fraudulent timesheets (mean = 3.58); and collusion with other subcontractors to dictate the market (mean = 3.36).

Among the professionals, Table 6 shows that quantity surveyors are found to primarily engage in tender rigging and collusion, and kickbacks, followed by bribery and conflict of interest. Table 10 reveals that the respondents have experienced or witnessed quantity surveyors being involved in specific corrupt behaviours such as: working for both client and contractor on a project (mean = 3.26) which creates conflict of interest; delaying issuance of payment certificates to contractors (mean = 3.26); and deliberate under-payment of interim payments to contractors (mean = 3.24). These corrupt behaviours are in expectation of gifts and payments from contractors for personal gain.

[Insert Table 10 around here]

Facilitators of Corruption

High political connections is considered to be the most important facilitator of corruption (mean = 4.28 or index 0.86 - refer to Table 11). This factor is important, because it facilitates secrecy in the award of public construction contracts in developing countries. The Bowen et al. (2012) survey reinforces this finding, reporting that the process of awarding construction projects in South Africa lacks transparency and accountability. Ghana is no exception; award of potentially

lucrative public construction contracts is shrouded in secrecy and lacks transparency (Osei-Tutu et al. 2010).

[Insert Table 11 around here]

Excessive and reckless sole sourcing for public projects is also ubiquitous as indicated by a high consensus mean score of 4.06 (index = 0.81). Excessive and reckless sole sourcing eradicates competitive tendering and affords ample opportunities for malpractices particularly inflated prices. Respondents also agreed that a lack of commitment by contractors in addressing corruption in their activities also provides a platform for corruption (mean = 3.94). This may be explained by the profit motive of contractors and other professionals, and a lack of ethical standards in the construction industry. Many construction companies operating in the construction industry of Ghana lack ethical codes of practice and/ or do not enforce these codes. In addition, government and public officials do not have a clear code of conduct to check their behaviour in performance of their duties.

Control of Corruption

Efforts at controlling corruption start by an individual or organisation experiencing or witnessing corruption reporting it to the appropriate authorities or persons. Sohail and Cavill (2008) proposed that accountability initiatives could help to minimise corruption in infrastructure projects. Similarly, Le et al. (2015) asserted that anti-corruption strategies (e.g., rules and regulations, training, leadership, and sanctions) are key to curbing corrupt practices within public construction projects. However, several barriers that impede the reporting of corruption are apparent amongst respondents (refer to Table 12); the two highest rated being: fear of dismissal or imposition of an occupational penalty by the employer (mean = 4.42 or index = 0.88); and a concern that the 'whistle-blower' is not adequately protected and may be

exposed (mean = 4.38 or index = 0.88). Three other important barriers indicated by respondents were: lack of confidence in the national anti-corruption agencies and the judicial system (mean = 4.22 or index = 0.84); loyalty to friends and organisations (mean = 4.16 or index = 0.83); and a belief that no serious action will be taken (mean = 4.03 or index = 0.81).

[Insert Table 12 around here]

DISCUSSION

Construction industry stakeholders are expected to discharge their duties devoid of corrupt acts and with honesty and fairness, in order to deliver value for money for public construction clients (Bowen et al. 2007b). Thus, the Public Procurement Act, 2003 (Act 663) (Government of Ghana 2003) and ancillary codes of conduct promulgated by various construction industry professional bodies (GhIE, GhIS, GIA) invoke an expectation on government / public officials and construction professionals to observe high ethical standards and behaviours. The Act 663 is underpinned by five themes relating to public procurement processes, namely: i) a transparent legal and institutional framework; ii) clear and standardized procurement procedures and standard tender documents; iii) independent control systems; iv) proficient procurement staff; and v) anti-corruption measures (Government of Ghana 2003; Osei-Tutu et al. 2010, p. 246). Therefore, government/public officials within client bodies, professional consultants and private sector firms are expected to adhere to procurement laws and regulations, carry out duties with fairness and competence and avoid or disclose conflict of interest.

The general presupposition of the Ghanaian Government is that this legislative framework and auxiliary codes of professional conduct purge the construction industry of corruption – but this research points to the habitual use of corrupt activities. These findings support the assertions

400 of previous studies in other countries (Brown and Skitmore 2015; Dorée 2004; Bowen et al.
401 2012; Tabish and Jha 2011; CIOB 2006; Vee and Skitmore 2003). The prevalence of corruption
402 is the result of widespread secrecy (or a lack of transparency), from high level political
403 connections in the award of public construction projects, excessive and reckless sole sourcing
404 of public contracts, and absence of commitment by contractors in addressing corruption. These
405 factors have led to intense and unfair competition among professional consultants and
406 contractors in winning government contracts in order to stay in business (Zhang et al. 2016;
407 Doh et al. 2003). Unfortunately, such competition maintains high pricing because the motive
408 is for economic survival rather than economic efficiency. This situation presents opportunistic
409 corruption – construction and consulting firms resort to offering kickbacks and bribes to
410 public/government officials in exchange for public contracts (see Table 3 and 5).
411
412 The research findings indicated a high level of pathological corruption amongst government
413 officials and contractors compared to other construction industry stakeholder groups. Several
414 reasons include: top-level political connections coupled with excessive sole sourcing breed
415 secrecy in awarding contracts; the complexity and huge costs of construction projects that
416 provide opportunity to conceal procurement-related malpractices and their extensive
417 involvement throughout the construction contract lifecycle – from project planning and design
418 to contract close-out. As Jamie et al. (2009) observed, membership in, and support for, political
419 parties serve as a vehicle for promoting willingness to engage in corrupt activities by ignoring
420 legal proscription on corruption. Consequently, government and public officials are frequently
421 identified as being inveterate fraudsters by awarding contracts to 'dummy' companies or family
422 and friends of state officials/ politicians. They also abuse their positions of power and influence
423 to advance political affiliations by using contract awards to extort funds for the ruling party,
424 especially during elections (Bowen et al. 2012). The perceived high level of corrupt contractors

allows them to compete effectively, avoid becoming disadvantaged and/or insolvent, to get things done and to do business with government/public officials (World Bank Enterprise Survey 2013).

The various corrupt practices and behaviours identified in this research emanate from improper market function (c.f. Dorée 2004) with concomitant late delivery of projects, sub-standard workmanship and late payment or non-payment of employees, suppliers and subcontractors costing more money to the industry stakeholders. Economic growth and social equity can be achieved by addressing market failures and ensuring a corruption-free society (United Nations 2006; OECD 2006).

Culture is a vehicle for corruption (Beets 2005; Husted 1999; Robertson and Watson 2004; Maingot 1994) and may partly explain widespread corruption in Ghana's construction industry. In traditional Ghanaian contexts, traditions of gift-giving and gift-taking are 'expressed in customary exchanges whose functions are primarily symbolic.' Gift-giving involves various 'material and symbolic goods provided as part of the services due a chief [traditional ruler]' (Le Vine 1975, p. 49). Wrath and Simpkins (1964) and Mends (1970) contend that these customary practices have been 'abused' (converted to reasons far removed from their traditional ones) within business environments, and this partly explains the widespread corruption in society today. For example, World Bank Enterprise Surveys (2013) found that businesses in Ghana are expected to give gifts to government procurement officials to secure public contracts. Gifts are used as a mechanism to improve the responsiveness of, and to enhance and maintain relationships with, government officials for present and future favourable contract opportunities.

Further, a strong tradition of familial ties in Ghana could explain the prevalence of corrupt behaviours. A government official's decisions may be affected by family members or friends, and there is tendency to favour one's ingroup (i.e., family and friends) in awarding public construction contracts (Husted 1999; Hooper 1995). This research found that government officials frequently engage in conflict of interest (Table 7) by awarding contracts to family members and/or friends. Officials of construction firms with familial ties to these government officials may engage in corrupt transactions to secure competitive advantage, favourable opportunities and contract terms (Jamie et al. 2009).

Maingot (1994) indicates that certain aspects of social structures of some countries provide a tendency to resort to acts of corruption to attain socially approved status and/or personal gain. In some cultures, material success is paramount, with little regard to ethics (Gonzalez-Fabre, 1996; Beets 2005; Husted 1999). Adinkrah (2016, pg. 40) notes that a consumerist ethos has engrossed the Ghanaian society, evident by an uncontrolled pursuit for material prosperity "*and the obstentious display of opulence in the form of handsomely furnished mansions, luxury automobiles, electronics, clothes, jewellery …"* This focus on material prosperity is more likely to lead to a greater willingness of both government officials and construction professionals to engage in ill procurement transactions in the quest for material riches.

Again, the prevalence of corrupt acts may be seen as a mechanism to avoid or minimise uncertainty (Husted 1999), regarding outcomes of contract awards at tendering and bid evaluation phases of project development. The research findings showed that corruption is widespread at both phases, and that contractors frequently offer bribes or pay kickbacks to government officials (see Table 6) to secure a more certain outcome of public procurement exercises. Rashid (1981) concludes that bribery minimises uncertainty in public utility services

contracting in developing countries. Government officials may cause delays and uncertainty in approving construction permits for potentially lucrative contracts, with the intention to obtain speed payments from contractors (Martin et al. 2007; DeSoto 2000).

To the consternation of both government and the general public, corruption remains a major concern (CDD-Ghana, 2000; Mensah et al., 2003; Abbey, 2005). Strategies to control corruption are myriad and include: whistle-blowing facilities and effective protection of whistle-blowers; increased transparency in government procurement processes; internal audit and monitoring of public contracts; good governance and accountability; sanctioning corrupt individuals and companies; and effective implementation of codes of conduct within public and private organisations (Gordon and Miyake 2001; Osei-Tutu et al. 2010; Le et al. 2015; Tabish and Jha 2011; Sohail and Cavill 2008). An intricate network of political affiliations and the personal financial rewards that these offer may prove difficult to eradicate particularly because government officials are implicated. Nevertheless, and despite immense challenges ahead, concerted and prodigious effort by both government and industry would radically change the corruption culture within Ghana's construction industry and in so doing, transform economic performance and concomitant prosperity.

CONCLUSIONS

This research presents evidence of widespread corruption within the Ghanaian construction industry; this is despite the Public Procurement Act and ancillary codes of conduct for industry professional bodies. Because corrupt officials within government represent the industry's biggest and most prominent client, contractors are more concerned about placating these officials to secure business survival than observe procurement rules/ laws. These inextricably linked political-industry connections and the operating environment of construction projects restrict competitive pressure in the construction industry to yield poor performance. Based

upon a survey of construction industry practitioners, the most endemic corrupt practices were revealed to be: kickbacks, bribery, tender rigging and collusion, and conflict of interest which predominantly occur at bid evaluation and tendering phases of project development.

The results hold practical implications for detecting and tackling corruption in the construction industry across developing countries. A major observation from this study is the ease with which corruption occurs (high incidence of corruption) in public infrastructure works procurement in Ghana. This situation is facilitated by high-level political connections in awarding contracts, the excessive and reckless sole sourcing for public contracts and contractor's lack of commitment in tackling corruption. Addressing these challenges requires improvement in the transparency and accountability environment in public procurements throughout the project development phases, including a strict enforcement of the Public Procurement Act (Act 663). This will help to create an environment for fair competition, enabling contracts to be won and awarded on merit. Another critical issue to tackling corruption is to give priority to certain aspects of the Ghanaian culture/traditions that influence corruption in public procurements; these include gift-giving and gift-taking and strong familial ties.

The results show that the strategies used by project stakeholders to engage in corruption are wide-ranging, including approving/awarding contracts for political and personal gains, leaking confidential information for payment (by government officials); collusion among contractors and sub-contractors, production of fraudulent invoices and timesheets (by contractors and subcontractors); and delayed issuance of payment certificates, deliberate conflict of interest situations (by quantity surveyors). The extant literature illustrates that these corruption strategies are equally applicable to other countries.

526 Successful implementation of anti-corruption measures is beyond the scope of the research
527 reported herein. Hence, given the widespread of corruption, further research is needed to
528 explore and develop appropriate anticorruption measures to address corrupt practices and
529 behaviours. The research should also collaborate more closely with public and private sector
530 organisations provided robust ethical controls and procedures can be implemented. Strategies
531 to be explored should include adequate protection of whistle-blowers, tightened procurement
532 procedures, use of codes of conduct and detection of corrupt activities. Controlling the
533 influence of cultural and traditional practices on corruption in public infrastructure works
534 procurements in Ghana is currently lacking, and further empirical investigation of its role in
535 corruption is needed to provide a deeper understanding of corruption and improve efficacy of
536 anti-corruption strategies.
537
538 The research has some limitations. First, it is exploratory and does not consider any theoretical
539 or philosophical approach to investigating corruption. Second, the work was based upon direct
540 experiences of construction practitioners. Hence, hard facts and evidence of corruption are
541 urgently required to develop and implement effective anti-corruption measures expediently.
542 Third, the survey sample size was relatively small but adequate for an exploratory research that
543 deals with a highly sensitive subject (Vee and Skitmore 2003; Tabish and Jha 2011). Future
544 research will address these issues, and greater collaboration with industry and government will
545 present the best opportunity to achieve success in this respect and engender much needed
546 cultural change.
547
548 **Supplemental Data**
549 Table S1 Sample Questionnaire Template is available online on the ASCE Library (asce.org).
550

551 **REFERENCES**

552 Abbey, J.L.S. (2005) *The growth and corruption correlation: its impact on the achievement of*
553 *middle income status*, report prepared by Centre for Policy Analysis in Collaboration with
554 The World Bank Ghana Office, Ghana Anti-Corruption Coalition,

555 National Governance Programme, Ghana Integrity Initiative, Accra.

556 Adinkrah, M. (2015) *Witchcraft, witches, and violence in Ghana*, Berghahn Books, USA.
557 Ameer, A.L.M. (2015) *Handbook for technical auditors of the construction industry*, Notion
558 Press, Chenai, India.
559 Alutu, O. (2007) Unethical practices in Nigerian construction industry: prospective engineers'
560 viewpoint. *Journal of Professional Issues in Engineering Education and Practice*, 133(2), 84-
561 88.
562 Amundsen, I. (2000) Analysis and definition of corruption and its common forms, Chr.
563 Michelsen Institute Development Studies and Human Rights, Utstein Anti Corruption
564 Resource Centre, Norway.
565 Bajari, P. (2001) Comparing competition and collusion in procurement auctions: a numerical
566 approach. *Economic Theory*, 18(1), 187-205.
567 Beets, S.D. (2005) Understanding the demand-side issues of international corruption. *Journal*
568 *of Business Ethics*, 57(1), 65-81.
569 Bowen, P.A., Edwards, P.J. and Cattell, K. (2012) Corruption in the South African construction
570 industry: a thematic analysis of verbatim comments from survey participants. *Construction*
571 *Management and Economics*, 30(10), 885-901.
572 Bowen, P., Akintoye, A., Pearl, R. and Edwards, P.J. (2007a) Ethical behaviour in the South
573 African construction industry. *Construction Management and Economics*, 25(6),
574 631-648.

575 Bowen, P., Pearl, R. and Akintoye, A. (2007b) Professional ethics in the South African
576 construction industry. *Building Research & Information*, 35(2), 189-205.
577 Bribery Act (2010) *Bribery Act 2010*, United Kingdom Government, London.
578 Brown, J. and Skitmore, M. (2015) Behavioural factors influencing corrupt actions in the
579 Australian construction industry. *Engineering, Construction and Architectural Management*,
580 22(4), 372–389.
581 CDD-Ghana (Centre for Democracy and Development) (2000) *Ghana Governance and*
582 *Corruption survey: Evidence from Households, Enterprises and Public Officials*, World Bank,
583 Centre for Democracy and Development, Accra.
584 Chotibhongs, R. and Arditi, D. (2012) Detection of collusive behavior. *Journal of*
585 *Construction Engineering and Management*, 10.1061/(ASCE)CO.1943 7862.0000542, 1251-
586 1258.
587 CIOB (Chartered Institute of Building) (2006) *Corruption in the UK construction industry*,
588 available at http://www.ciob.org.uk/document/corruption-uk-construction-industry (accessed
589 5 July 2016).
590 de Jong, M., Henry, W.P. and Stansbury, N. (2009) Eliminating corruption in our
591 engineering/construction industry. *Leadership and Management in Engineering*, 9(3),
592 105–11.
593 DeSoto, H. (2000) *The mystery of capital: why capitalism triumphs in the west and fails*
594 *everywhere else*, Basic Books, New York.
595 Doh, J., Rodriquez, P., Uhlenbruck, K., Collins, J. and Eden, L. (2003) Coping with corruption
596 in foreign markets. *Academy of Management Executive*, 17(3), 114-127. Donohoe, S. (2011)
597 The Bribery Act 2010: implications for building surveyors. *Structural Survey*, 29(1), 26-34.
598 Dorée (2004) Collusive in the Dutch construction industry: an industrial organisation
599 perspective. *Building & Information*, 32(2), 146-156.
600 European Union (2013) *Identifying and reducing corruption in public procurement in the*

601 *EU*, PwC EU Services, Brussels, Belgium.
602 Fantaye, D. (2004) Fighting corruption and embezzlement in third world countries. *Journal of*
603 *Criminal Law*, 68(2), 170–6.
604 FMI/CMAA (2004) *Survey of construction industry ethical practices*, Construction
605 Management Association of America, McLean, Virginia.
606 Gordon, K. and Miyake, M. (2001) Business approaches to combating bribery: a study of codes
607 of conduct. *Journal of Business Ethics*, 34(3), 161–73.
608 Government of the Republic of Ghana (2003) *Public Procurement Act 663 (2003)*, Republic
609 of Ghana, Accra.
610 Hartley, R. (2009) Fighting corruption in the Australian construction industry: the National
611 Code of Practice. *Leadership and Management in Engineering*, 9(3), 131–6.
612 Heywood, P.M. and Rose, J. (2014) Close but no cigar: the measurement of corruption.
613 *Journal of Public Policy*, 34, 507-529.
614 Hooper, J. (1995) *The new Spaniards*, London: Penguin Books.
615 Hoxley, M. (2008) Questionnaire design and factor analysis, In: A. Knight and L. Ruddock,
616 eds., *Advanced research methods in the built environment.* Chichester: Wiley Blackwell, pp.
617 122-134.
618 Husted, B.W. (1999) Wealth, culture and corruption. *Journal of Internationals Business*
619 *Studies*, 30(2), 339-359.
620 Jannadi, M.O. (1996) Factors affecting the safety of the construction industry. *Building*
621 *Research and Information*, 24(2), 108-112.
622 Jamie, C.D., Uhlenbruck, K. and Rodriguez, P. (2009) Why firms engage in corruption: A top
623 management perspective. *Journal of Business Ethics*, 87, 89-108.
624 Le Vine, V. (1975) Corruption in Ghana. *Transition*, 47, 58-61.
625 Le, Y., Shan, M., Chan, A.P.C. and Hu, Y. (2014) Overview of corruption research in
626 construction. *ASCE Journal of Management in Engineering, 30(4), (published online).*

627 Shan, M., Le, Y., Chan, A., and Hu, Y. (2015) Investigating the causal relationships between
628 causes of and vulnerabilities to corruption in the Chinese public construction
629 sector. *Journal of Construction Engineering and Management*,
630 10.1061/(ASCE)CO.1943-7862.0000886,05014007.
631 Maingot, A. P. (1994) Confronting corruption in the hemisphere: a sociological perspective.
632 *Journal of International Studies and World Affairs*, 36, 49-63.
633 Martin, K.D., Cullen, J.B., Johnson, J.L. and Parboteeah, K.P. (2007) Deciding to bribe: a
634 cross-level analysis of firm and home country influences on bribery activity. *Academy of*
635 *Management Journal*, 50(6), 1401-1422.
636 May, D., Wilson, O.J. and Skitmore, R.M. (2001) Bid cutting: an empirical study of
637 practice in South East Queensland. *Engineering, Construction and Architectural*
638 *Management*, 8(4), 250-256.
639 Mends, E. (1970) Traditional values and bribery and corruption. *The Legon Observer*, 5(25),
640 13-14.
641 Mensah, S., Aboagye, K., Addo, E. and Buatsi, S. (2003) *Corporate governance and*
642 *corruption in Ghana – Empirical findings and policy implications*, paper presented at African
643 Capital Markets Forum, Johannesburg, 27-29 October.
644 Murphy, M.E., Perera, S. and Heaney, G. (2015) Innovation management model: a tool for
645 sustained implementation of product innovation into construction projects.
646 *Construction Management and Economics*, 33(3), 209-232.
647 Osei_Tutu, E., Badu, E. and Owusu_Manu, D. (2010) Exploring corruption practices in public
648 procurement of infrastructural projects in Ghana. *International Journal of Managing*
649 *Projects in Business*, 3(2), 236 – 256.
650 Pillay, S. (2004) Corruption – the challenge to good governance: a South African perspective.
651 *International Journal of Public Sector Management*, 17(7), 586–605.

652 Rashid, S. (1981) Public utilities in egalitarian LDC's: the role of bribery in achieving pareto
653 efficiency. *Kyklos*, 34, 448-460.
654 Robertson, C.J. and Watson, A. (2004) Corruption and change: the impact of foreign direct
655 investment. *Strategic Management Journal*, 25, 885-396.
656 Shakantu, W. (2006) Corruption in the construction industry. *Civil Engineering* [Magazine
657 of the South African Institute of Civil Engineering], July, pp. 43–7.
658 Shakantu, W. and Chiocha, C. (2009) Corruption in the construction industry: the case of
659 Malawi. Paper presented at the RICS COBRA 2009 Research Conference, University of Cape
660 Town, Cape Town, South Africa.
661 Sohail, M. and Cavill, S. (2008) Accountability to prevent corruption in construction projects.
662 *Journal of Construction Engineering and Management*, 134(9), 729–38. Sampford, C.,
663 Shacklock, A. and Connors, C. (2006) *Measuring corruption*, Ashgate Publishing, Hampshire,
664 England.
665 Svensson, J. (2003) Who must pay bribes and how much? evidence from cross-section firms.
666 *The Quarterly Journal of Economics*, 108, 599-617.
667 Tabish, S.Z.S. and Jha, K.N. (2011) Analyses and evaluation of irregularities in public
668 procurement in India. *Construction Management Economics*, 29(3), 261–274.
669 Tabish, S.Z.S. and Jha, K.N. (2012) The impact of anti-corruption strategies on corruption free
670 performance in public construction projects. *Construction Management*
671 *Economics*, 30(1), 21–35.
672 Transparency International (2016) *Corruption perceptions index 2016*, available at:
673 http://www.transparency.org/news/feature/corruption_perceptions_index_2016
674 (accessed 08 February 2017).
675 Transparency International (2013) *Preventing corruption on construction projects*, available
676 at: http://archive.transparency.org/tools/contracting/construction_projects (accessed 04 June
677 January 2016).

678 Transparency International (2011) *Bribe payers index 2011*, Transparency International,
679 Berlin.
680 Transparency International (2005) *Preventing corruption in construction projects – examples*
681 *of Corruption*, Available at: www.transparency.org (accessed June 2016).
682 Tullock, G. (2001) Efficient rent seeking, In: Efficient rent seeking: *Chronicle of an intellectual*
683 *quagmire*, A. A. Lockard and G. Tullock, eds., Springer, Boston, 3-16.
684 Uneke, O. (2010) Corruption in Africa south of the Sahara: bureaucratic facilitator or handicap
685 to development? *Journal of Pan African Studies*, 3(6), 111–28.
686 United Nations (2006) *UN procurement practitioners' handbook*, available at:
687 https://www.ungm.org/Areas/Public/pph/channels/PPH.pdf (accessed 02 November
688 2015).
689 UNDP (United Nations Development Programme) (2008) *Primer on corruption and*
690 *development*, United Nations Development Programme, New York.
691 Vee, C. and Skitmore, R.M. (2003) Professional ethics in the construction industry.
692 `*Engineering, Construction and Architectural Management*, 10(2), 117–27.
693 Westring, G. (1997) *Ghana public procurement reform*, an Audit Report Prepared for the
694 World Bank, Advokatfirman Cederquist KB, Stockholm.
695 World Bank (1997) *Helping countries combat corruption: the role of the World Bank,* World
696 Bank, Washington, DC, available at http:www.worldbank.org (accessed 9
697 May 2016).
698 World Bank Enterprise Surveys (2013) *Ghana: What businesses experience*, World Bank,
699 available at: http://www.enterprisesurveys.org/data/exploreeconomies/2013/ghana (accessed
700 11 November 2016).
701 World Economic Forum (2013) *Building resilience in supply chains*, available at:
702 http://www3.weforum.org/docs/WEF_RRN_MO_BuildingResilienceSupplyChains
703 _Report_013.pdf (accessed 9 May, 2016).

World Economic Forum, International Chamber of Commerce, Transparency International and United Nations Global Compact (2012) *Clean business is good business – the business case against corruption*, available at: http://www.weforum.org/pdf/paci/BusinessCaseAgainstCorruption.pdf (accessed 9 May, 2016).

Wrath, R. and Simpkins, E. (1964) *Corruption in developing countries* (New York; W. W. Norton), 317-330.

Zarkada-Fraser, A. and Skitmore, R. M. (2000) Decision with moral content: collusion. *Construction Management and Economics*, 18(1), 101–11.

Zhang, B., Le, Y., Xia, B. and Skitmore, M. (2016) Causes of business-to-government corruption in the tendering process in China. *Journal of Management in Engineering*, 10.1061/(ASCE)ME.1943-5479.0000479, 05016022.

Zou, P.X.W. (2006) Strategies for minimizing corruption in the construction industry in China. *Journal of Construction in Developing Countries*, 11(2), 15–29.

Table 1 Respondents' background and experience in the construction industry

Item	Category	Count	%
Years of experience	1 – 10	0	0.00
	11 – 20	7	20.00
	21 – 30	23	65.71
	Above 31	5	14.29
	Total	35	100
Job level	Director level	19	54.29
	Senior management level	16	45.71
	Total	35	100
Affiliation	Construction company	14	40.00
	Public sector agency/department	12	34.29
	Professional consulting firm	9	25.71
	Total	35	100
Professional association	Ghana Institution of Surveyors (GhIS)	14	40.00
	Ghana Institute of Architects (GIA)	11	31.43
	Ghana Institution of Engineers (GhIE)	9	25.71
	Not indicated	1	2.86
	Total	35	100
Job sector (profession)	Quantity surveying*	11	31.43
	Engineering**	7	20.00
	Project/Construction management***	8	22.86
	Architecture and design****	9	25.71
	Total	35	100

*Quantity surveyors; **Engineers; ***Project/Construction managers; ****Architects/designers

Table 2 Prevalence of corruption in industry and project phases associated with corruption

(a) How widespread is corruption?	Mean	Index	Standard deviation
Prevalence of corruption	4.40	0.88	0.76

(b) Project phases	Mean	Index	Rank	Standard deviation
Bid evaluation	4.31	0.86	1	0.95
Tendering	4.25	0.85	2	0.94
Contract implementation and administration	3.84	0.77	3	0.62
Project planning and design	3.03	0.61	4	1.07
Contract close out (final account)	2.91	0.58	5	0.91

Likert sale: (a): 1 – 5 (strongly disagree to strongly agree); (b): 1 – 5 (never to very frequently)

Table 3 Prevalence of forms of corruption ta

Corrupt acts	Mean	Index	Rank	Standard deviation
Kickbacks	3.97	0.79	1	1.16
Bribery	3.91	0.78	2	1.07
Tender rigging and collusion	3.76	0.75	3	1.03
	3.63	0.73	4	1.16
Conflict of interest	3.41	0.68	5	0.90
Fraud	3.22	0.64	6	1.14
Fronting	3.00	0.60	7	0.84
Embezzlement				

Likert scale: 1 – 5 (Never to Very frequently)

Table 4 Personal experience and/or witness of corruption

	Conflict of interest	Bribery	Tender rigging and collusion	Kickbacks	Fraud	Fronting	Embezzlement
Yes: 1	25	25	25	24	17	14	13
No: 2	6	7	7	7	11	13	15
Total	31	32	32	31	28	27	28
Yes %	81	78	78	77	61	52	46
No%	19	22	22	23	39	48	54
Rank	1	2	2	4	5	6	7

Table 5 Industry participants to corruption

Participants	Mean	Index	Rank	Standard deviation

Government officials	4.23	0.85	1	0.72
Contractors	3.82	0.76	2	0.86
Sub-contractors	3.79	0.76	3	0.99
Quantity surveyors	3.57	0.71	4	0.87
Material suppliers	3.55	0.71	5	0.86
Project managers	3.49	0.70	6	0.84
Professional architects/engineers	3.43	0.69	7	0.84
Developers/investors	3.31	0.66	8	0.92

Likert scale: 1 – 5 (Never to Very frequently)

Table 6 Industry participants' association with forms of corruption

	Government officials	Developers / investors	Project managers	Professional architects	Professional engineers	Quantity surveyors	Contractors	Subcontractors	Material suppliers	Total	%
Fraud	10	9	4	3	4	5	17	12	8	80	10.88
Collusion and bid rigging	18	5	11	10	15	18	9	9	4	104	14.15
Embezzlement	16	1	8	6	3	3	7	7	4	62	8.44
Fronting	7	6	5	6	4	3	11	8	8	61	8.30
Bribery	16	11	15	16	18	15	21	17	15	167	22.72
Kickbacks	21	9	20	16	18	17	14	12	13	155	21.09
Conflict of interest	22	7	11	11	14	14	3	4	9	106	14.42
Total scores	110	48	74	68	76	75	82	69	61	735	
%	14.97	6.53	10.07	9.25	10.34	10.20	11.16	9.39	8.30		100.00
Rank	1	9	5	7	3	4	2	6	8		

Table 7 Government officials' involvement in corrupt activities

Corrupt acts	Mean	Index	Rank	Standard deviation
Approval/awarding contracts for political gain	4.47	0.89	1	0.65

Extortion of bribes from contractors, sub-contractors or suppliers as an inducement for awarding of contracts	4.26	0.85	2	0.70
Leaking of confidential information to a bidder in return for payment or payment in kind, thereby giving the bidder unfair advantage	3.82	0.76	3	1.01
Awarding contract to a family member, friend or business, where there is conflict of interest	3.74	0.75	4	1.09
Reject qualified contractors, sub-contractors, or suppliers without valid reason	3.61	0.72	5	1.01

Likert scale: 1 – 5 (Never to Very frequently)

Table 8 Contractors' participation on corrupt activities

Corrupt acts	Mean	Index	Rank	Standard deviation
Collusion with other contractors in order to dictate the markets	3.70	0.74	1	1.09
Production of fraudulent invoices	3.67	0.73	2	1.12

Production of fraudulent timesheets	3.58	0.72	3	1.13
Provision of false extra costs to a contract claim as a "negotiation margin" **	3.55	0.71	4	1.23
Employment of illegal workers	3.24	0.65	5	1.26
Refusal to work with a subcontractors or supplier unless some benefit is provided to the contractor	3.21	0.64	6	1.01

**The claimant's logic in including this margin may be that it believes that the opponent will attempt to reduce the claim, and so a sufficient margin must be added to enable negotiations to arrive at the correct figure. Likert scale: 1 – 5 (Never to Very frequently)

Table 9 Sub-contractors' participation on corrupt activities

Corrupt acts	Mean	Index	Rank	Standard deviation
Production of fraudulent timesheets	3.58	0.72	1	1.13
Collusion with other subcontractors in order to dictate the markets	3.36	0.67	2	1.07
Production of fraudulent timesheets	3.27	0.65	3	1.11
Providing lesser standard of work rather than what was stated in the contract specification	3.24	0.65	4	1.10
Employment of illegal workers	3.06	0.61	5	1.20

Likert scale: 1 – 5 (Never to Very frequently)

Table 10 Quantity surveyors' participation on corrupt activities

Corrupt behaviours	Mean	Index	Rank	Standard deviation
Deliberate delayed issuing of payment certificates to the contractor	3.26	0.65	1	1.02*
Working for both the client and contractor on a project, creating a conflict of interest	3.26	0.65	2	1.08*
Deliberate under-payment of interim payments to the contractor	3.24	0.65	3	1.14
Biased decision-making in the expectation of additional contracts from clients (such as withholding valid payments, or extension of time, or claims to which the contractor is entitled)	3.23	0.65	4	1.10
Willingness to issue improper payment certificates or approve invalid claims and extensions of time, due to fear of repercussion for negligence (e.g. over-measurement)	3.14	0.63	5	1.25

Preparation of unfair final accounts, favouring the client	3.09	0.62	6	1.16

Likert scale: 1 – 5 (Never to Very frequently); *When different factors have the same mean score, the highest rank is assigned to the factor with the least standard deviation

Table 11 Facilitators of corruption in the construction industry Corruption facilitators

	Mean	Index	Rank	Standard deviation
High political connections enhance secrecy in the award of public contracts	4.28	0.86	1	0.98
Excessive and reckless sole sourcing for public procurement contracts breeds corrupt practices*	4.06	0.81	2	0.97
The lack of commitment by construction firms in addressing the issue of corruption in their mission statement contributes to the prevalence of corruption within the industry	3.94	0.79	3	0.90
The operating environment of construction projects provides opportunity to conceal corrupt activities	3.88	0.78	4	0.96
Private opening of tenders provides more opportunities for corrupt practices to occur by modifying the result during the tender adjudication period	3.84	0.77	5	0.91

The lack of accountability through the use of internal auditing on construction projects is a reason for the existence of corruption within the industry	3.81	0.76	6	0.98
Lack of transparency in awarding of contracts (no reason provided for unsuccessful bidders in a non-competitive procurement system)	3.75	0.75	7	1.03
The absence of high competition between locally-based foreign and Ghanaian firms promotes corrupt practices	3.44	0.69	8	1.00

*e.g., inflated cost prices
Likert scale: 1 – 5 (strongly disagree to strongly agree)

Table 12 Barriers to reporting corruption practices

Barriers	Mean	Index	Rank	Standard deviation
Fear of dismissal (or other occupational penalty) imposed by your employer	4.42	0.88	1	0.70
The perception that the 'whistle-blower' is not well protected and may be exposed	4.38	0.88	2	0.60
No confidence in the national anti-corruption agencies and the judicial system	4.22	0.84	3	0.70
Loyalty to friends or organisation prevents individuals from reporting any illicit activity	4.16	0.83	4	0.75
A belief that it will be a waste of time as no serious action will be taken	4.03	0.81	5	0.90

Do not want to be seen as a “whistle blower” syndrome (stigma)	3.94	0.79	6	0.90
The fear of physical harm to one’s self and/or one’s family	3.81	0.76	7	0.95
Do not know the reporting procedures to be followed	3.75	0.75	8	0.90

Likert scale: 1 – 5 (strongly disagree to strongly agree)

Figure

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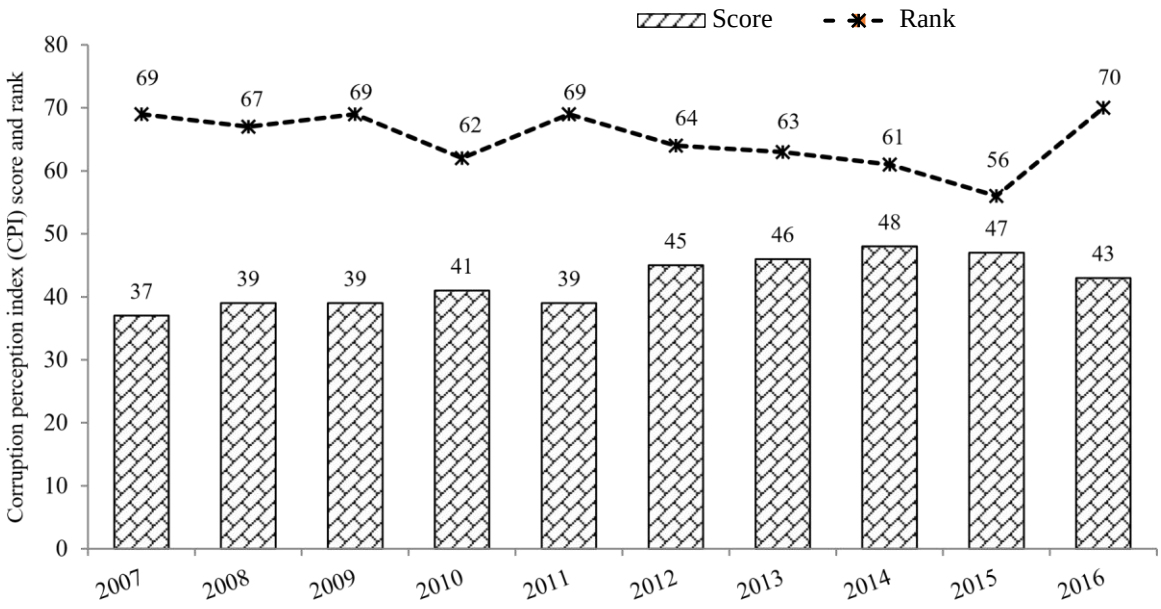

Figure 1 Transparency International corruption scores and ranks for Ghana (2007–2016)

Figure Caption List

Figure 1 Transparency International corruption scores and ranks for Ghana (2007–2016)

Response to Queries - letter of authorship

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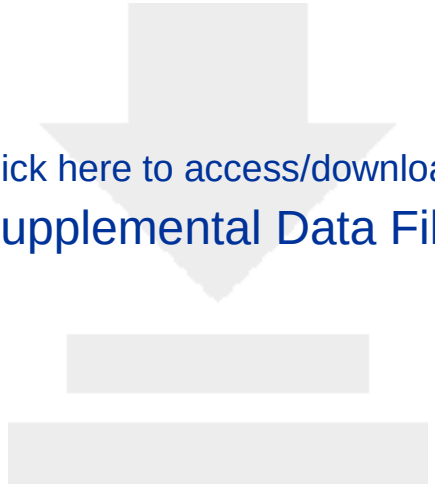

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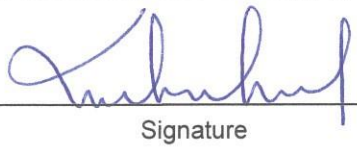
Ernest Ameyaw		25/02/2017
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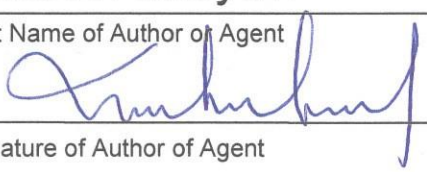

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Title: Corrupt Practices in the Construction Industry: A Survey of Ghanaian Experience

The authors wish to thank the referees for their constructive comments and suggestions which aimed at improving the paper. Each individual comment has either been addressed or defended as appropriate (refer below) and a final file resubmitted for your consideration. Once again, thank you.

Reviewers' Comments	**Authors' response**
All authors	
This manuscript was submitted as a Case Study. Does the reviewer think this is the appropriate article type? To see descriptions of the article types, Click Here.	
Reviewer #1: Yes. The author is using the correct article type. Reviewer #2: Yes. The author is using the correct article type. Reviewer #4: Yes. The author is using the correct article type.	We thank the Reviewers for the agreement
Reviewer #3: No. The author should revise as a Technical Paper.	We believe that it is appropriate to present this research as a Case Study given its specific focus on a developing country.
Reviewer #1	
This is a well written case study that addresses an important construction issue in developing countries. A copy of the questionnaire used for data collection needs to be added as an appendix to the paper to enhance reader understanding of the tabular data presented.	The authors are delighted to read this comment - thank you. As recommended, we have also made available a copy of the questionnaire to enhance readers' understanding of the tabular data.
Reviewer #3	
This is a fine written paper, following the classical IMRaD methodology. The abstract is well written and so is the inner text.	We thank the Reviewer for the comment.
There are just couple of concerns before the paper could be recommending for final acceptance:	We thank the Reviewer for the following comments.

1. it would be interesting to use Transparency International findings on Ghana (incl. the global rank) and include it in this research - when giving the intro, but also discussing the results.	We thank the reviewer for the comment. We have included Transparency International's corruption index scores and ranks on Ghana in the Introduction (Lines 63 – 69) and in presentation of results (Lines 225 – 225). Figure 1 is also included to show trends in the scores and ranks over the last 10 years (2007 to 2016)
2. the research community would benefit from attaching the sample of the survey to the appendix, so it could be used in and compared with the other developing countries.	We thank the reviewer for the comment. A copy of the Questionnaire is provided (uploaded).

3. the tables 4 and 6 could be omitted. The text is more then grateful...	Thank for the observation. Although the main text provides details of the results, inclusion of tables 4 and 6 provide further details. For example, Table 6 indicates associations between various forms of corruption and industry stakeholders. As the text highlights only corrupt acts associated with government officials, Table 6 further informs the reader of various malpractices in which other stakeholders are involved in.
4. the public procurement act is not put to referenced or is referred wrong.	The Public Procurement Act is referenced where it first appears (in Discussion section) (Lines 385 – 386).
5. the conclusions declared at ln 425-428 are a bit bold, considering the citation from 1975 (!?)	We submitted that culture **may** explain the widespread corruption in Ghana's construction industry. The point about gift-giving and gift-taking in the Ghanaian culture still holds in today's cultural practices/traditions of the country. And therefore, our emphasis is on the abuse of these cultural practices in the business environment, which is supported by the World Bank Enterprise Surveys (2013): *"... businesses in Ghana are expected to give gifts to government procurement officials ...Gifts are used as mechanism to improve the responsiveness of, and to enhance and maintain relationships, with government officials for present and future favourable contract opportunities"* (see Lines 446 – 449). The above violates the traditional purpose of gift-giving and gift-taking in Ghana. Hence, the declaration is still valid within the Ghanaian context regarding corruption.

6. explain how to impose such anti-corruption measures (ln 490-492). This is important for the readers	Thank you for the comment. Given the scope of this paper, and space limitation imposed by the Journal, implementation of the anti-corruption measures mentioned is recommended for further research. This aspect will appear in a subsequent publication as part of the research project being undertaken by the researchers. We submit that (Lines 528 – 531): *"Successful implementation of anticorruption measures is beyond the scope of the research reported herein. Hence, given the widespread of corruption, further research is needed to explore …".*
Just an advise… When using the Likert scale it's better if the even scale would have been used. Hence the respondents	We thank the reviewer for the advice, it is accepted.

would have been averted from using the neutral and middle value.	
Lastly, this paper is clearly written in a research fashion and should not be classified as case study.	We believe that it is appropriate to present this research as a Case Study given its specific focus on a developing country.
Reviewer #4	
This type of research is needed to make these practices and their extent of use known to the society. It also serves as an alert to locals and foreigners doing business in Ghana. The research can also inform actions that need to be taken to combat corruption.	We are grateful to the Reviewer for the comment – thank you.
The paper is very well organized and easy to read. The tables are necessary but Figure 1 could be removed, as it is not informative.	Thank you for the comment. Figure 1 is removed from the manuscript.

The methodology is explained but it is not clear how the main sections of the questionnaire were defined and/or how they directly relate to a review of the literature reviewed. It would be useful to know how the authors singled out specific questions and whether or not they were reviewed or pretested. The literature is well covered and integrated throughout the paper, and could be better used to explain the method as well.	Thank you for the comment and the authors are pleased to read that the literature is well covered. The key sections of the questionnaire were based on the literature and guided by the overall objectives of the research. The main aspects covered in the current paper are: prevalence and forms of corruption, parties involved in corruption, enablers or facilitators of corruption, and barriers to reporting corruption. Further, the questionnaire was reviewed and modified by the research team to ensure its suitability for the study Ghanaian environment, particularly the construction industry. Hence, the authors report that: Lines 219 – 220: *The results are structured to iteratively report upon key sections of data collected from the questionnaires.* The research methods are well explained, connecting to relevant literature. We describe our overall approach to the study, highlighting the identification and selection of experienced construction practitioners as survey respondents (Lines 186 – 212).
The results need to be evaluated to check their significance, from an Statistics standpoint. The tables present the frequency of responses and the analysis is shallow in terms of what could be done with this dataset. Which types of correlations can be verified in the dataset. Are there bias in the responses? Or certain participants tended to answer in one way or another. For instance, contractors pointing to problems with owners, and owners pointing to contractors. There seems to be a lot of blame assigned to public servants/officials, however, were they given a chance to fill this questionnaire? Is this a one-sided assessment of the situation? There needs to be some comment on that.	The authors thank the reviewer for the comment. This paper – which emanates from a larger-scope, ongoing corruption research – is exploratory, based on direct experiences of construction practitioners/professionals. This helps to build and inform the next stage of the research project. Also, advanced/sophisticated statistics are not employed in the analysis of data due in part to the small sample size (this limitation is acknowledged in the '*Conclusions'* section). Despite their simplicity, the methods of analysis used

	are appropriate for a study of this genre, and have been used in previous studies (e.g., Tabish and Jha 2011; Bowen et al. 2007). We are of the view that the respondents were fair and drew on their lived experiences of corruption and professional knowledge; recall that the respondents were experienced construction professionals from private construction companies, public sector agencies/departments and professional consulting firms, and with affiliations to the construction industry professional bodies in the country (see Table 1: GhIS, GIA, and GhIE)). Hence, there was no one-sided assessment of corruption situation. Drawing on the professional knowledge and lived experiences of corruption of the professional respondents is a major strength of this paper. We have commented on this: Lines 193–195: *In order to avoid bias in the survey responses, respondents were selected from private construction companies, professional consulting firms and public sector agencies/departments (refer to Table 1). This selection strategy was adopted … and to guarantee credible and balanced feedback.*
The discussion could be organized in subtopics to make the points clearer and more impactful and also make a more directly link to what is presented in the conclusions.	We thank the reviewer for the comment. We structured the paper as follows. The survey results are structured into four broad subheadings under 'The Survey Results', namely: • Prevalence and forms of corruption • Participation in corruption • Facilitators of corruption • Control of corruption This structure helps to report upon key sections of data collected from the questionnaires (see Lines 219 – 221). Following the above, we provide a discussion that integrates ad reflects results of the four key subheadings.

The conclusions should reflect the results of the paper. How specific results should be addressed, instead of some blanket statements about the need for ethics reform or regulation. Address results separately, as well as address the results that point to the most frequent problems/barriers/facilitators.	We thank the review fort the comment. We have revised/re-written the Conclusions section so that the results are reflected. Blanket statements are removed or revised. Further research is recommended to address relevant issues that are beyond the scope of this
	research, including development of anticorruption strategies and the role of cultural and traditional practices in facilitating corruption in public procurements (Lines 501–529; 534 – 538).
Editor's comments	
Editor: First of all, I would like to thank you for considering Journal of Management in Engineering to publish your work. I have read the paper and the comments of the reviewers. The reviewers have recommended revise and resubmit the manuscript. Based on my own reading of the paper and the comments of review team and AE, I agree with the reviewers to invite you to revise your manuscript. During the revision process, I strongly recommend that you conduct a thorough literature review on the subject to discuss your work's importance/significance and clearly explain why your work is appropriate for the diverse readership of Journal of Management in Engineering.	We thank the Editor for the interest in our research. We have responded to the reviewers' comments, and where necessary, further clarification is provided. In our concluding remarks, we state the study's potential contribution to practice and transparency and accountability environment in public procurements, and the role of local cultural/traditional practices in the tackling corruption in the construction industry.
Please incorporate all reviewers' comments thoroughly and fully and submit a revised manuscript along with the detailed response to reviewers' comments for full re-review. Thanks for your interest in the Journal of Management in Engineering. We look forward to receiving the revised manuscript from you. The reviewer comments are listed below.	We have responded to the reviewers' comments point-by-point as shown in this Response sheet. As requested by the reviewers, we have uploaded a sample of our questionnaire template under 'Supplemental Data' section: *Table S1 Sample Questionnaire Template is available online on the ASCE Library (asce.org).*
Associate Editor's comments	
Associate Editor: Thanks for your submission to JME. The paper was reviewed by three experts who acknowledged its value. However, the same reviewers also suggested various remarks to hone the quality of the paper. The authors should address these comments in their revision.	We thank the AE for the interest in this paper. Each individual comment is either addressed or defended as appropriate.

References

Tabish, S.Z.S. and Jha, K.N. (2011) Analyses and evaluation of irregularities in public procurement in India. *Construction Management Economics*, 29(3), 261–274.

Bowen, P., Akintoye, A., Pearl, R. and Edwards, P.J. (2007) Ethical behaviour in the South

African construction industry. *Construction Management and Economics*, 25(6), 631-648.

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