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RESEARCH ARTICLE

Health and Safety Integration into the Procurement Stages of Public Construction Projects in Developing Countries: A Case of Ghana

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Abstract

The potential to promote health and safety (H&S) through public procurement has resulted in increased expectation for public sector clients to integrate H&S matters into their procurement decisions and practices. Developing countries are however far behind in this endeavour. Using qualitative research, therefore, this study explored how public clients integrate H&S into the procurement of public works. Data was collected through semi-structured interviews with 20 contractors and public sector clients who have vast experience in the procurement of public works. The data was analysed using both inductive and deductive thematic analyses. The findings show that the extent of H&S integration into the procurement process depended on the funding source(s) for public projects. H&S matters are generally overlooked in the various procurement stages for public projects funded by the government, while in those funded by international development agencies, H&S matters are prioritized, and therefore, given considerable attention. The research contributes to construction H&S improvement research in developing countries by giving insight into the extent of H&S integration into public

procurement. It also contributes to the understanding of the influence of funding sources on the extent to which H&S matters are integrated into public procurement in developing countries.

Keywords

Health and Safety; Construction Industry; Integration; Public Projects; Construction Procurement; Developing Countries

Introduction

Health and safety (H&S) record in the construction sector in developing countries is widely acknowledged to be poor. For instance, in Ghana, the [Ghana Statistical Service \[GSS\] \(2016\)](#) reported that, in 2015, occupational injuries occurred at a frequency of 43 per 1,000,000 hours worked; incidence rate of 63 injuries per 1,000 workers and severity rate of 418 days lost per 1,000,000 hours. To put this into context, work-related accident fatality rate in Ghana is 21.1 per 100,000 workers ([Hämäläinen, Takala and Kiat, 2017](#)), while that of the UK and Germany are 0.55 and 0.81 per 100,000 workers respectively ([Health and Safety Executive \[HSE\], 2017](#)). Considering that many non-fatal accidents in workplaces go unreported ([Colak, Etiler and Bicer, 2004](#)), the actual accident and fatality rates are likely to be higher in developing countries such as Ghana. Without a doubt, these statistics and situations call attention to the need to improve the H&S implementation within the construction industry in developing countries.

This poor performance has been attributed to unique industry characteristics such as labour-intensive work, the use of hazardous materials, long work hours, workers exposure to harsh weather conditions ([International Labour Organization \[ILO\], 2018](#)), poor government commitment and inadequate regulatory regimes in developing countries ([Eyiah, Kheni, and Quartey, 2019](#)). Many studies have concluded that one of the ways to improve H&S outcomes on public projects is by integrating H&S issues into the construction procurement process ([Boadu, et al., 2022](#); [Boadu, Sunindijo and Wang, 2021a](#); [Worksafe Victoria, 2017](#); [Votano and Sunindijo, 2014](#); [Wells and Hawkins, 2011](#)). The sheer size and importance of public procurement in the delivery of infrastructure endows it with the capacity to influence markets and improve H&S standards ([Lingard, Wakefield and Walker, 2020](#)).

The critical leadership role of public sector clients in incorporating H&S requirements into the procurement of public construction projects has been emphasised ([Lingard, Wakefield and Walker, 2020](#)). Clients have enormous influence over the way their projects are run because they have substantial contractual control ([Health and Safety Commission \[HSC\], 2007](#)). For instance, clients appoint project teams, and assign duties to them ([HSC, 2007](#)). Such decisions within the construction procurement process have consequences for H&S implementation on projects ([Gibb, et al., 2014](#)).

While public clients, especially in the developed countries are successfully reforming their procurement systems to incorporate H&S considerations, the opposite exists in the case of developing countries ([Wells and Hawkins, 2011](#); [Boadu, et al., 2021](#)). Several studies focusing on H&S promotion in public construction procurement in the developing countries' context (e.g., [Boadu, et al., 2022](#); [Benviolent and Smallwood, 2016](#); [Boadu, Sunindijo and Wang, 2021b](#)) have indicated that public clients are yet to fully integrate H&S considerations in public procurement. Where this has been done, H&S issues are assigned low priority in the process. Previous studies, including [Boadu, et al. \(2022\)](#) and [Benviolent and Smallwood \(2016\)](#) have emphasised the need to integrate H&S into procurement decisions, however, none considered the impact of the funding sources on the extent of H&S consideration in public works procurement.

The need to address this problem notwithstanding, research on H&S integration into public works procurement in the developing countries' context are scarce ([Umeokafor, Windapo and Olatunji, 2020](#)). This has obscured an understanding of critical issues surrounding H&S integration in public procurement. Using Ghana as a case study to represent the developing countries, this research aims to assess the extent to which

H&S matters are integrated into each stage of the construction procurement process for public projects. Specific attention was given to funding sources because this appears to be a major factor influencing the integration level. Ghana is an ideal case for this study because it has the major features of the construction industry in developing countries (Boadu, Wang and Sunindijo, 2020). First, its partnership with developed economies and international organisations on investments in the delivery of public infrastructure is growing rapidly (Economic Corporate Network, 2015; Frimpong, Sunindijo and Wang, 2020). Second, as a middle-income country, Ghana exhibits the economic, political, and social characteristics associated with developing countries. These characteristics include rapid urbanization, huge deficit in infrastructure, large informal sector participation, youthful population, among others (World Bank, 2016).

This study, therefore, can help to identify and understand some of the critical issues that must be considered by government, international private and public investors, donors, and construction firms when preparing to engage in publicly procured projects in developing countries. It is acknowledged that many public projects in developing countries are funded by multi-lateral public-private partnership arrangements (Organization for Economic Cooperation and Development [OECD], 2012; Osei-Kyei and Chan, 2018). Often, these arrangements must meet the internal social and safety standards of the different partner organisations (e.g., development banks, private donors, and governments) as well as the policies of international bodies (e.g., the ILO and WHO) responsible for the promotion of occupational H&S (Dansoh, Frimpong and Oppong, 2020). This study assesses the level of H&S integration into public works procurement, either funded by government or international partners; thereby ascertaining the commitment of government and international partners to construction H&S. Recommendations from this study are also useful to procurement agencies for developing strategies to enhance H&S integration in public procurement.

Promoting H&S through public procurement

As a public administration tool, public procurement has been used as a vehicle for achieving socioeconomic objectives, such as minimising unemployment, providing opportunities for small and local businesses, and improving working conditions (McCrudden, 2004). Typically, a large percentage of public sector spending goes into public procurement, demonstrating its huge economic significance. Globally, public procurement amounts to US\$ 11 trillion, and contributes at least 13 percent of global GDP (Ali, 2020). In Africa, it accounts for over 15 percent of GDP (World Bank, 2013). In respect of Ghana, it accounts for around 17 percent of GDP each year (Public Procurement Authority, 2013).

In relation to H&S in construction, public procurement provides opportunity to promote H&S beyond the statutory requirements and drive H&S improvements through procurement practices (CIDB, 2011). For example, Ju and Rowlinson (2020) commented that in Hong Kong, public sector clients have spearheaded the implementation of systematic management of H&S within the construction industry through public procurement. This has been made possible through their choice of procurement strategies, contractual requirements, and monitoring of contract implementation. However, to date, little attention has been paid to determining the extent of H&S integration into the procurement of public works, particularly in developing countries.

In the UK, HSE (2007) and HSE (2011) examined H&S in public works procurement with the aim of assessing how well public clients fulfil their H&S obligations within the procurement process. A survey (HSE, 2007) and interviews (HSE, 2011) revealed that most public clients in the UK reasonably considered H&S during the procurement of their projects. Also, Lingard, Oswald and Le (2019) explored the approaches used by public clients in Australia to drive H&S performance improvements on public infrastructure projects. Further, a number of reports issued by several government agencies in developed countries including the Australian Government's Office of the Federal Safety Commissioner [OFSC].

(2008), [Work Safe Victoria \(2017\)](#), the [Australian Safety and Compensation Council \[ASCC\] \(2006\)](#), and the [Government Health and Safety Lead \(2019\)](#) provided practical guidance for integrating H&S matters into public procurement. These studies and reports focused on developed countries with established H&S regulatory, enforcement and guidance systems.

On developing countries, studies such as [Benviolent and Smallwood \(2016\)](#), and [Donkor, Adinyirah and Aboagye-Nimo \(2015\)](#) evaluated the implications of decisions and practices in public procurement on H&S implementation in Zimbabwe and Ghana, respectively. Also, [Umeokafor, Windapo and Olatunji \(2020\)](#), explored the opportunities, barriers, and strategies for integrating H&S into labour-only procurement system, while [Boadu, et al. \(2021\)](#) delved into the factors constraining the integration of H&S matters into public procurement in developing countries. [Table 1](#) compares these existing studies across multiple dimensions including location, methods, context, and findings. Generally, these studies emphasised the need to integrate H&S into procurement decisions but did not provide the extent to which H&S is integrated into each stage of construction procurement.

[Boadu, Sunindijo and Wang \(2021b\)](#) addressed this research gap by providing an evidence-based assessment of the extent of H&S consideration in decision-making and activities in each stage of the procurement process for public projects in Ghana. Their research identified that unlike the findings in the UK context ([HSE, 2007](#); [HSE, 2011](#)), H&S matters are accorded low priority and therefore, not adequately integrated into decision-making and practices in public procurement. [Boadu, Sunindijo and Wang \(2021b\)](#) specifically found that within the construction procurement process for public works, H&S objectives are not clearly set, and consequently, public clients do not usually consider H&S matters in each stage of the procurement process. Nonetheless, the use of a quantitative survey approach by [Boadu, Sunindijo and Wang \(2021b\)](#) retained the limitation of being unable to obtain an in-depth exploration of the critical issues underlying the phenomenon of low H&S integration in the public procurement process. This study therefore seeks to address this issue through a qualitative research approach.

Table 1. Summary of studies on H&S in public works procurement

Study	Location	Method	Context	Findings
HSE (2007)	UK	Survey	H&S in public sector construction procurement	Found that many public sector clients performed reasonably well in meeting their H&S obligations during the procurement of construction, however, there is more that could be done.
HSE (2011)	UK	Interview	H&S in public sector construction procurement (A follow-up study to the HSE (2007) above)	Similarly found that while some public clients performed reasonably well in meeting their H&S obligations during the procurement of public works, there remains more that could be done.
Lingard, Oswald and Le (2019)	Australia	Interview	Approaches of public clients to drive H&S performance improvements in public projects.	Found that client behaviour was consistent with elements of New Public Management (NPM) and reflected a managerialist logic in the pursuit of efficiency, the use of targets, incentives, and performance measurement.

Table 1. continued

Study	Location	Method	Context	Findings
Benviolent and Smallwood (2016)	Zimbabwe	Survey	Assessed the implications of public sector procurement on H&S management in Zimbabwe	The study found that traditional factors such as bid amount, financial status, and project delivery time are given preference ahead of H&S when procuring contractors for public sector projects.
Donkor, Adinyirah and Aboagye-Nimo (2015)	Ghana	Interview	Explored practical measures to improve construction H&S through public works procurement	The findings showed that H&S does not form part of the criteria for evaluating tenders, and the public procurement act (Act 663) has no clause that addresses construction H&S.
Boadu, et al. (2021)	Developing countries/ Ghana	Mixed methods (Interview & Survey)	Identified factors constraining the promotion of H&S in public works procurement in developing countries	The following were identified as constraints to promoting H&S in public works procurement; regulatory, budgetary, human resource constraints, lack of management commitment, lack of H&S knowledge and education, unethical procurement practices, political influence, absence of guidance materials, and poor attitude towards H&S.
Boadu, Sunindijo and Wang (2021b)	Ghana	Survey	Evaluated the extent of H&S consideration in the procurement of public projects	Found that H&S matters are accorded low priority and therefore, not adequately integrated into decision-making and practices in public procurement.

Research methods

DATA COLLECTION

Qualitative research approaches are explanatory and exploratory in nature and aim principally to answer the how and why questions ([Creswell, 2014](#)). Thus, this method affords researchers the opportunity to obtain better insights into a situation from the perspective of research participants ([Saunders, Lewis and Thornhill, 2016](#)). Within the realm of qualitative research, this research adopted semi-structured interviews to seek detailed insights into the extent to which H&S matters are integrated into the procurement of public works. The semi-structured interviews were appropriate for this study because though a schedule of predetermined topics were to be explored, there was also the need for the exploration of spontaneous or unexpected issues that may emerge from the discussions ([Berg, 2009](#)).

Interview participants were selected through a purposive sampling technique, a non-random sampling technique widely used for the identification and selection of experienced, knowledgeable, and information-rich participants (Creswell, 2014). The interviewees were carefully chosen on the basis of their clear and active participation in the procurement of public projects in Ghana and in other developing countries. This ensured that a correct picture of the level of H&S integration into public works procurement was provided to a reasonable degree, thereby guarantying data validity. A total of 20 interviews, comprising 10 each from public sector clients and contractors were conducted face-to-face. The profile of interviewees is shown in Table 2. The number of interviewees (i.e., 20) are typically adequate to ensure a thorough coverage of the issues and reach saturation of data (Galvin, 2015). Also, on average, the participants in this research have over 20 years work experience in the construction industry. This ensured that these sampled participants could give better insights and rich perspectives in the study.

Table 2. Profile of interview participants

Code	Job title/ Position	Industry experience (years)
Contractors		
C01	Health and Safety Officer	19
C02	Quantity Surveyor	16
C03	Project Engineer	14
C04	Civil Engineer & CEO	13
C05	Project Manager	32
C06	Quantity Surveyor & Managing Director	24
C07	Civil Engineer & CEO	13
C08	Quantity Surveyor & CEO	17
C09	Project Engineer	15
C010	Project Manager	17
Public clients		
PC1	Head of Civil Works Dept.	29
PC2	Principal Consultant, Buildings	26
PC3	Head of Structural Eng. and Safety	25
PC4	Municipal Roads Engineer	24
PC5	Senior Quantity Surveyor	20
PC6	Contracts Manager	21
PC7	Snr. Works & Development Officer	15
PC8	Principal Quantity Surveyor	28
PC9	Head of Works Procurement	16
PC10	Snr. Works & Development Officer	18
Average industry experience		20.1

The questions for the interviews were designed to delve into how H&S matters are integrated into decisions and actions within the procurement process. The questions focussed on:

- Setting and communicating project objectives relating to H&S. Sample questions were: “Does your organisation set clear H&S targets or objectives for its projects? If yes, what are some of the specific H&S objectives set? How are these H&S objectives/ targets communicated/emphasised to prospective contractors? At which stages of procurement are these objectives communicated?”
- How H&S issues are integrated into decisions and practices at each stage of construction procurement (see [Figure 1](#)). Sample questions were: How much weight do you assign to H&S against other tender evaluation criteria? How do you treat tender offers that make little or no provisions for H&S implementation? Describe the H&S requirements in the contract document(s) that your organisation adopt for its projects. In what ways do you track and monitor H&S implementation during the construction phase of your projects?



Figure 1. Stages of construction procurement (adapted from [Boadu, Sunindijo and Wang, 2021b](#))

Considering that public clients and contractors play different roles within the procurement process, there was the need to have two different sets of questions; one set was for public clients while the other was for contractors. For instance, public clients could be asked about the factors that influence the choice of procurement or tendering methods for their projects. Such a question cannot be answered correctly by contractors because they are not normally involved in the planning phase of projects. All interviews were digitally recorded and ranged between 30-50 minutes. Also, the data was collected and analysed simultaneously until additional data did not produce new information, suggesting data saturation has been reached ([Boadu, et al., 2022](#)).

Before the interviews, participants were contacted, either physically or by phone to arrange for appropriate date, time, and place for the interview. Several days prior to the interview, the interview questions and other information were sent to the participants. This ensured that participants had the basic information and the context of the interview. Moreover, in line with research ethics, participants were briefed about the research, and informed consent was sought before any interview. During the interviews, steps were taken to ensure any possible biases were avoided. These steps include ([Patton, 2014](#)) (i) asking one question at a time; (ii) remaining neutral as far as possible by trying not to show strong emotional reactions to responses, for instance; and (iii) taking control of the interview by sticking closely to questions of interest.

DATA ANALYSIS

Data were manually analysed, beginning with a verbatim transcription of each interview recording. Follow-ups were made with interviewees, ensuring that the transcripts fit their stories. After, the transcripts were expanded, cross-compared, and merged into a single master transcript, thereby enhancing the descriptive and interpretative data validity ([Krueger and Casey, 2009](#)).

The master transcript was subjected to thematic analysis in accordance with the six stages recommended by [Braun and Clarke \(2006\)](#) viz: data familiarisation; generating initial codes; searching for themes;

reviewing themes; defining, and naming themes; and writing up. Thematic analysis was adopted because of its ability to produce detailed, rich, and nuanced qualitative data analysis. The themes were generated both deductively and inductively. First, a pre-set format involving each stage of construction procurement was applied to analyse the data (see [Figure 1](#)). However, though the themes were deductively linked to the stages of construction procurement, inductively, other themes were allowed to directly emerge from the data.

Stage one, *data familiarisation* involved reading the master transcript several times to get a clearer understanding of the data and the overall picture it painted about the issues under investigation. In the second stage, *generating initial codes*, the basic labels, or codes into which data would be categorised were developed both intuitively and from the predetermined structure (see [Figure 1](#)). Stage three, *searching for themes*, was undertaken by examining the text line-by-line, extracting relevant participants' statements, and assigning each to the specific code to which they were related.

After populating the codes, stage four, *reviewing themes*, was undertaken by grouping similar codes into a single category. Codes that added significant information to at least one of the main issues in the analytical framework were retained. Additionally, those that contradicted the general picture were also retained and clustered under new categories. [Table 3](#) presents examples of the themes and some of the related quotes. The next stage (stage five) was *defining and naming themes*. In this stage, similar categories were merged under respective themes, and a thematic map was developed as shown in [Figure 2](#). Relevant quotes from participants were edited and used to support each of the categories under a specific theme.

Table 3. Examples of themes and related quotes

S/n	Theme description	Example quotes
1	H&S in evaluation criteria	<p>Quote 1A: Having evaluated tenders for many public projects, I can tell you that H&S is usually not evaluated at all. As I said, it is mostly not a requirement in public projects, so there is no basis for evaluating it.</p> <p>Quote 1B: On state-funded projects, we normally do not consider H&S as a priority, so it accounts for less than 5% of weighted criteria. On the other hand, on the donor-funded projects, H&S accounts for between 15-20% of the weighted criteria because premium is placed on it.</p> <p>Quote 1C: Honestly, even when H&S is considered in our tender evaluation, it weighs little (less than 5%)</p>
2	Ramifications for H&S implementation	<p>Quote 2A: For the normal public projects, there are no explicit penalty but sometimes our engineers and consultants can give warnings to contractors who fail to put in place H&S measures during the construction period.</p> <p>Quote 2B: On the DFP, the conditions of contracts make provisions for graduated penalties, including formal warnings, withholding payments, forfeiting performance security to contract termination, but this is usually not the case for normal SFP</p> <p>Quote 2C: On the SFP, no penalty or incentive are given for H&S but on the DFP, the conditions of contract prescribe some penalties for H&S breaches.</p>

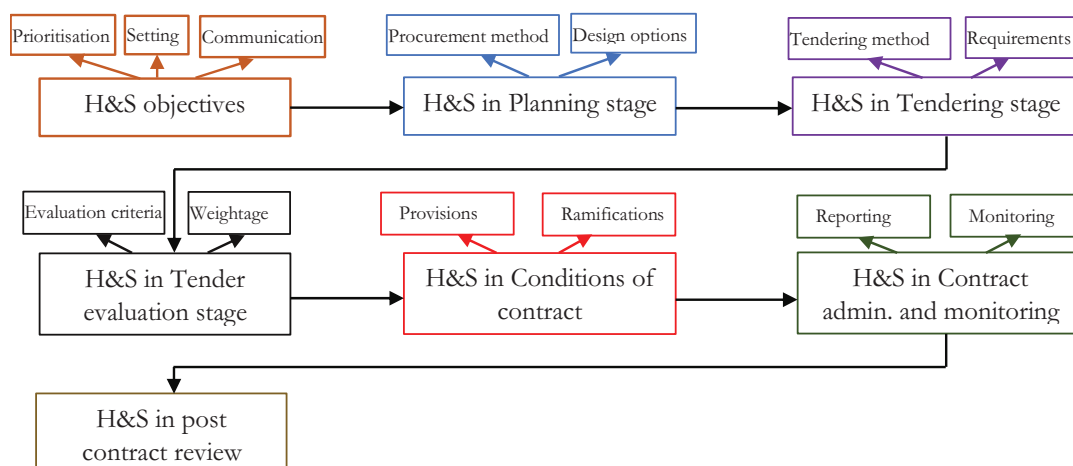


Figure 2. Thematic map showing themes and related sub-themes.

Finally, stage six was *writing up*. After developing, naming, and thoroughly revising all the themes, a write up was produced by summarising all the key issues emerging from the thematic analysis. Multiple validation procedures were employed at this stage to ensure soundness and objectivity of the results (Creswell, 2014). First, two researchers analysed the data to balance out the subjective influences of individuals (Flick, 2018). Second, the results were reviewed by one of the researchers who was not involved in data collection and analysis, in order to provide fresh perspective and new insights (Boadu, et al., 2022). Subsequently, follow-ups were made with three participants to validate how precisely the draft report reflected their accounts. Few and minor changes were made based on their feedback.

Results and discussion

The interviews revealed that within the context of public projects, two distinctions could be made depending on the source of project funding. These are the public projects funded by the government, either through the local or central government (herein referred to as state-funded public projects [SFP]), and those funded by foreign donor agencies or international development partners such as the World Bank and United Nations Development Programme (UNDP) (herein referred to as donor-funded public projects [DFP]).

SETTING H&S OBJECTIVES

On SFP

The responses suggested that project objectives and targets related to H&S are mostly not set. One participant stated “frankly, H&S has never been considered as a key objective on our projects. In fact, most of the contracts I have worked on previously had nothing on H&S, right from the planning stage and throughout the whole procurement process” (PC2). Another public client also asserted “we do not explicitly set H&S objectives or targets on our projects” (PC10).

The non-setting of explicit objectives relating to H&S on projects has been linked to the low priority given to construction H&S (Boadu, Sunindijo and Wang, 2021b; Alkilani, Jupp and Sawhney, 2013). The responses implied that public clients are mostly concerned with delivering their projects within budget, time, and performance parameters, and thus, treat H&S as an add-on (Sunindijo, 2015). The non-prioritisation of H&S objectives could be attributed to the inadequate H&S provisions in the governing instrument for public procurement. This was succinctly put forward by one participant who stated, “as an architect, I know

that my designs must be safe and meet the standards specified in the applicable design codes and manuals. However, H&S issues are not expressed in the available tender specifications and documents that we work with” (PC7).

Further, all the contractors interviewed made it clear that there are no H&S targets to achieve on public projects. For instance, CO2 said “safety targets are not set for us, but as a company we strive to achieve the best in terms of H&S.” Another contractor stated that “no, there are no targets on H&S. In fact, issues of H&S may come up only when someone dies on the job, or a serious accident happens” (C10). Without setting clear H&S objectives, the expectations for public clients to satisfactorily integrate H&S into the subsequent procurement decisions would be farfetched.

On DFP

Contrary to the conditions on SFP, the participants mentioned that the DFP usually express a significant level of H&S objectives. One public client answered, “usually, we set clear H&S objectives for our projects which are funded by donor partners ... On the other hand, we generally overlook H&S matters when it comes to the projects which are funded purely from the government coffers” (PC6). This situation was corroborated by some of the contractors. For instance, CO7 stated “... on the projects funded by international partners, mostly targets like zero harm or zero-tolerance for accidents are specified and, they usually refer you to abide by some international standards”. According to the participants, the H&S objectives are communicated in many ways, including, notices to tenderers, during pretender meetings, through the conditions of contract and emphasised during site meetings.

Interestingly, some public institutions administer both the SFP and DFP. Therefore, it was quite curious that H&S issues are considered differently on these projects. One public client vividly explained:

Usually, the DFP come with their own conditions and specific procurement requirements and procedures, and the implementing institution will have to strictly abide by the conditions. In fact, if these conditions are not complied with, the donor partners would not release the funds for the project. So, although the same public institution implements both the SFP and DFP, the difference is the premium which is placed on H&S by the donor partners. Also, because H&S is a priority for the donor partners, they allocate budget to implement it, but on SFP, we try to reduce cost by not spending on matters such as H&S (PC6).

[Quartey, et al. \(2011\)](#) support this position highlighting that most donor-funded programmes and projects in Ghana are driven by key decisions on requirements, scheduling and procedures taken at the donor partner’s headquarters. Presumably, the priority given to H&S by the donor partners may have been influenced by their policies in their respective countries.

PLANNING STAGE

In the selection of procurement method, H&S matters are not considered. The traditional procurement method is the primary method of procurement, primarily due to the promotion of this method by the procurement act. One participant attested “the main reason is that the traditional method is firmly rooted and dictated by the Public Procurement Act...” (PC7). In corroborating the above, PC6 mentioned “basically, the regulation we work with promotes the use of the traditional method...”. The demand for openness and public accountability in public projects, and the familiarity of the traditional procurement system have resulted in an overwhelming use of the traditional procurement method ([Boadu, Wang and Sunindijo, 2020](#)).

Other peripheral reasons such as the need for cost certainty, price competition, need to get value for money, the need for quality, capacity of local contractors and the availability of key personnel were also outlined for the dominance of the traditional procurement method. Conspicuously, the need to promote H&S on the project was not mentioned. The traditional procurement method has adverse implications for H&S because it tends to isolate the designers as a stand-alone party and therefore, the designers assume that there is no direct benefit to them from making their designs safer (Boadu, Wang and Sunindijo, 2020). Consequently, H&S risks that could have been dealt with during the design stage, only surface during the construction, operation, and maintenance phases of the project (Boadu, Wang and Sunindijo, 2020).

Furthermore, consideration of H&S in the choice of design options has been acknowledged to have a considerable impact on reducing construction site injuries and fatalities (Lingard, et al., 2014). However, the responses revealed that H&S was not one of the priority criteria in selecting design options. PC2 explained “generally, the most influential criterion is the project cost ...”. Also, one participant retorted “...in my honest opinion, cost has always been the major driving force for the choice of our design options” (PC7). The focus on cost is understandable given the budgetary constraints faced by public institutions, yet the neglect of H&S in the choice of design options could result in accidents and poor constructability, which can have detrimental impact on construction and maintenance costs, and other project objectives.

TENDERING STAGE

Tendering method

The responses indicated that H&S matters are not considered in the selection of tendering method and competitive tendering is mostly used for procuring public projects in Ghana because the method is promoted by the procurement act. According to PC5 “the default method per the legal regime is the national open competitive tendering”. Generally, the law requires (except in exceptional situations) that all public sector contracts be awarded through competitive tendering with a focus on tender price, because this method is deemed to promote accountability and eliminate favouritism.

Though it is the default per the law, there is a counter argument that competitive tendering may have a detrimental effect on H&S (Smallwood, 1996; Boadu, Wang and Sunindijo, 2020). Competitive tendering creates a fierce competition among contractors, compelling some to under-price their bids. Likely, contractors who under-price their bids may, in part, intend not to comply with labour or H&S laws (Asian Development Bank, 2018).

H&S considerations in tendering

Tendering typically provides opportunity for clients to secure suitable contractor(s) to undertake the proposed works to achieve the set objectives. Best practice indicates that tenders for high-risk works set out requirements for H&S and call for tenderers to demonstrate their H&S competence.

On SFP

The responses reveal that on SFP, H&S requirements are mostly not specified, and prospective tenderers are barely required to demonstrate their H&S competence at the tendering stage. For instance, PC10 explained “we do not have separate requirement for H&S as a stand-alone requirement; the closest we come to requiring contractors to address H&S is the provision of contractor’s all-risk insurance”. The contractors among the interview participants shared the same view. One contractor explained “... we have never been asked to demonstrate our safety competence before getting a government construction project. During tendering, the emphasis is mostly on cost, I can say that H&S is not on their minds” (CO9).

Due to intense competition for projects, contractors are already unwilling to make the necessary allocations in their tender submissions to manage H&S. Therefore, if there is no requirement for them to

demonstrate their H&S capabilities, they will simply overlook the H&S aspects of tender submissions. This has the tendency to negatively impact on H&S implementation during the construction stage, as the needed resources are not allocated prior to its commencement.

On DFP

Contrary to the practice in SFP, tender conditions in DFP mostly require tenderers to clearly demonstrate their H&S competence. For instance, CO1 stated “in my experience of tendering and working on public project, no such demand to show H&S competence has been made on our company; however, on some public projects which were funded by international organisations such as DANIDA, EU, The World Bank, etc., H&S is a strict requirement” (CO1). Evidently, for the DFP, public clients attach importance to H&S and emphasises it in the invitation to tender by setting out detailed requirements in the terms of reference. Also, the pretender meetings afford the clients another opportunity to stress on the H&S requirement at the tendering stage.

TENDER EVALUATION

It was found that the common criteria for evaluating tenders included tender price, past performance and experience, financial capabilities, managerial and technical resources, construction period, and quality assurance. H&S competence of contractors does not play a key role in the process. The choice of the evaluation criteria is reinforced by the public procurement law (Act 663 and 914) which provides the basis for the qualification and evaluation criteria for public projects. Unfortunately, H&S is not explicitly stated in any of the qualification or evaluation criteria, and thus, it does not play a key role in the evaluation.

Having found that H&S was not a key tender evaluation criterion for public projects, it was important to ascertain whether H&S is considered at all in any way in the evaluation process, and to what extent. The participants were asked to provide the average weight given to H&S criterion (if any) in tender evaluation and, explain the consequences of a tenderer failing to make the necessary allocations for H&S in their tender submission.

On SFP

On the SFP, usually H&S criterion is neither a mandatory criterion nor a weighted criterion. Even in the instances where H&S is set as one of the evaluation criteria, it is usually given little weighting. For instance, PC7 mentioned, “to be frank, it is less than 5%, that is even when provision is made for H&S in the evaluation criteria, because H&S is mostly not a requirement”. PC8 corroborated by stating, “I am not aware of any instance in our tender evaluation where H&S was given any weightage. It is mostly not part of our requirements.”

These statements attest to the fact that H&S is neglected at the tender evaluation stage of procurement for SFP. This finding supports [Harding \(2014\)](#) and [Okorie, et al. \(2014\)](#) who remarked that the H&S criterion is mostly overlooked when choosing a contractor for projects.

On DFP

The extent of H&S consideration in tender evaluation for DFP was higher than that of the SFP. The responses showed that there is a significant weight allocation to H&S. For instance, PC6 stated that “we normally do not consider H&S in our normal projects but on the donor-funded projects, H&S accounts for between 15-20% of the weighted criteria because premium is placed on it”. Another interviewee asserted that “...on large scale projects and those funded by donor agencies, H&S weighs between 10-15% during evaluation” (PC6).

Some of the interview participants confirmed that sometimes H&S is made a mandatory criterion and therefore failure to address it disqualifies a tenderer from further consideration. CO1 attested to this practice

by saying that “when we work on projects funded by international partners, it is necessary that we make adequate allocations for H&S because it is a requirement and mostly specified in the BOQ. If you fail to do that you will be disqualified.” This in line with best practice guidelines, as it offers the client the opportunity to assess tenderers’ H&S competence and their understanding of the project’s H&S requirements ([Wells and Hawkins, 2011](#)).

CONDITIONS OF CONTRACT

Standard contract documents and H&S provisions

The use of standard forms of contract is a common practice in construction works procurement because the standardisation makes them suitable for different types of projects ([Murdoch and Hughes, 2007](#)). The participants were emphatic that they commonly use the standard forms of contract provided by the Public Procurement Authority. However, their subsequent responses indicated that the H&S provisions are inadequate. For instance, PC6 stated “the H&S provisions are highly inadequate. Although, it refers that the contractor has a duty to ensure the safety of its workers, it falls short of making a comprehensive provision including providing minimum standards and making provisions for consequences for poor H&S on projects.”

The findings are consistent with [Sharkey, et al. \(2014\)](#), [Wells and Hawkins \(2011\)](#), and [Office of the Federal Safety Commissioner \[OFSC\] \(2008\)](#), who concluded that most standard forms of contract do not have adequate provisions for H&S. Even the standard forms of contracts that make some provisions for H&S do not establish specific H&S requirements beyond compliance with relevant H&S legislation ([OFSC, 2008](#)). For this reason, the H&S clauses in many standard forms of contract used in the Australian construction industry are amended to deal with the project H&S requirements ([Sharkey, et al., 2014](#)).

Best practice suggests that clients could add project specific conditions of contract to promote H&S. The responses indicated that special conditions of contract related to H&S are rarely developed, but some interviewees made an exception for DFP. For instance, CO8 stated “...the contracts for the international donors... usually have additional attachments like addendum which talk about H&S matters into detail, but you do not see that with the government-funded projects”.

The lack of H&S specifications in contracts for public projects implies that contractors are not contractually required to implement H&S measures besides those obliged by H&S legislations. Unfortunately, the existing H&S laws in Ghana are described as generic, fragmented, inadequate, and limited in scope ([Annan, Addai and Tulashie, 2015](#); [Boadu, Wang, and Sunindijo, 2021](#)). Also, there are no H&S legislations developed specifically for the construction sector in Ghana. This situation suggests that the H&S legislation cannot be relied upon as they do not provide adequate H&S specifications and standards for construction activities. Considering the high-risk nature of construction projects, the failure of public clients to specify H&S requirements in contracts can have negative implications for H&S implementation.

Contractual ramifications for H&S implementation

With respect to H&S, the failure to perform to the agreed H&S standard or specification may constitute a breach. It is acknowledged that the punitive clauses in contracts are aimed at ensuring that the contracting parties perform to the terms of the contract.

On SFP

The conditions of contract for SFP hardly specify any consequence with respect to H&S. The contracts do not make provision for incentives for better H&S implementation either. The participants argued that

the lack of comprehensive H&S specifications in the contracts makes it practically impossible to prescribe penalties or incentives.

However, some participants added that although the contract conditions do not make explicit provisions for penalties for H&S breaches, there are usually implicit ramifications for poor H&S. A contractor's failure to perform the work safely may have a ripple effect on other areas such as quality, schedule, and cost; thus, applying penalties for the effect of poor H&S in those areas implies an indirect punishment for poor H&S. PC10 explained "indirectly there can be penalties for poor H&S. For instance, if an accident results in project delay or rework, the contractor may not be granted an extension of time, and this may result in liquidated damages." Research shows that there is significant relationship between H&S performance and other project objectives like time, cost, and quality ([Wanberg, et al., 2013](#)). However, clear and specific provisions relating to potential ramifications for H&S breaches would send a strong signal to the contractor about the need to work safely.

On DFP

Participants indicated that usually the contract conditions for DFP specify ramifications for H&S performance. For example, PC6 mentioned "... but on the donor-funded projects, the conditions of contract prescribe some penalties for H&S breaches". Generally, the responses revealed that the sanctions or remedies are varied, depending on the type, frequency and the severity of the violations. PC6 explained "on the donor-funded projects, normally the conditions of contracts make provisions for graduated penalties, including formal warnings, withholding payments, forfeiting performance security, and even contract termination". One contractor interviewee corroborated this by stating "yes, some of the sanctions include fines, suspension of contract and even termination of contract" (CO1).

CONTRACT ADMINISTRATION AND MONITORING

In construction contracts, best practice indicates that contractors' implementations should be monitored to be assured that their performances are satisfactory and all requirements in the contract are being met. One valuable tool used in contract monitoring is appraising the contractor's reports and documentations such as progress reports, shop drawings, and construction blueprints ([Office of Federal Procurement Policy, 1994](#)), because they help to uncover potential problems. Thus, it was important to ascertain whether public clients require contractors to periodically submit reports to enable them to appraise their H&S performance.

On SFP

The responses showed that submitting periodic H&S reports is not a requirement on SFP. One public client stated "we do not take specific reports relating to H&S... On some occasions the contractors may decide to add a few H&S issues" (PC3). This was confirmed by contractor CO2 "I do not remember a situation where we had to submit periodic reports on safety for public projects." This finding is supported by [Donkor, Adinyirah and Aboagye-Nimo \(2015\)](#) who asserted that clients do not usually concern themselves with H&S issues when managing and monitoring contractors.

On DFP

On DFP, periodic H&S reports are required. For example, CO7 stated "when we worked on public projects funded by foreign donors, they took regular safety reports from us". Another contractor (CO1) corroborated that "yes, it is done on donor-funded projects but not on the pure public project. ... we are required to provide periodic reports and the clients monitor and carry out H&S audits to assess our H&S performance and provide recommendations."

Further, the findings suggested that the reports are collected on monthly basis, particularly during site meetings. Typically, the report includes both the leading and lagging indicators. This best practice allows

for the contractor's H&S implementations to be monitored, which helps to uncover potential problems in the H&S implementation so that corrective actions can be taken. Moreover, apart from assisting the public client to track H&S performance against the set objectives, the reports may also serve as evidence in situations where there is a breach of H&S requirements.

EVALUATION/ POST CONTRACT REVIEW

Best practices suggest that the post contract review should evaluate how the H&S requirements of the contract were delivered and how the contractor implemented their H&S management systems ([ASCC, 2006](#)). In this regard, the study sought to find out whether public clients conduct post contract evaluations, particularly on the H&S implementations.

On SFP

The responses showed that post contract evaluation is not carried out on public projects. Many of the participants from government organisations (PC1, PC2, PC3, PC5, PC7 and PC10) confessed that, as far as they are aware their organisations never undertook post-contract evaluation on any of their SFP. Even on the public projects where post-contract reviews were carried out, the client failed to evaluate the H&S issues. PC8 explained "mostly the reviews are along the lines of cost, time, quality, and scope. In fact, we have never considered any H&S aspect in our project reviews." According to [HSE \(2011\)](#), many public clients fail to undertake post contract reviews, and recommended that such reviews, including H&S performance, should be undertaken for each public project, regardless of size.

On DFP

Unlike the situation on SFP, post contract evaluation is usually carried out on DFP. Attesting to this position, PC6 explained "on projects financed by foreign agencies like The World Bank, we do comprehensive evaluation of all aspects of the project including H&S and submit those reports to the financiers".

This presents a good practice situation because H&S issues are addressed in the final report. Since many DFP are mostly subject to financial and technical reviews, these reviews should include special sections to report on H&S ([Wells and Hawkins, 2011](#)). Typically, the review involves comparing the client's pre-tender expectations and performance indicators against the contractor's actual performance on the project ([Griffith and Watson, 2004](#)). Consequently, the result of this evaluation process may advise the client on the suitability of the contractor for future projects.

SUMMARY OF FINDINGS

Overall, the extent of H&S consideration in public procurement was found to depend on the source of project funding, that is, state-funded or donor-funded. The extent of H&S consideration in SFP differed significantly from those funded by international donor agencies or development partners. [Table 4](#) summarises the findings of the study across the two different types of projects.

IMPLICATIONS

This study provides an understanding of the key issues that ought to be given critical attention by public clients, international development partners, and foreign investors in the development of H&S management strategies during the procurement process of public projects in developing countries. Generally, this research has revealed that H&S is not a priority when public clients are making decisions in the procurement of public works in Ghana, which is consistent with the practices in many other developing countries. For instance, [Mwanaumo, Thwala and Pretorius \(2014\)](#) remarked that in Botswana, H&S matters are usually

Table 4. Summary of findings

Stage of procurement	On state-funded projects	On donor-funded projects
Objectives and planning	<p>H&S objectives and targets are seldom set for projects</p> <p>H&S is accorded low priority</p> <p>The impact of procurement methods and design options on H&S is overlooked</p> <p>There is a limited, if any, budget allocation to manage H&S</p>	<p>H&S objectives and targets are usually set for projects</p> <p>H&S is considered important</p> <p>H&S is sometimes considered in the selection of designers and design options</p> <p>Allocations are normally made within project budget to manage H&S</p>
Tendering	<p>H&S requirements are not clearly specified in tenders.</p> <p>Tenderers often are not required to demonstrate their H&S competence</p>	<p>H&S requirements are usually specified in tenders.</p> <p>Tenderers are required to demonstrate their H&S competence</p>
Tender evaluation	<p>H&S does not have adequate weight in the tender selection criteria</p> <p>H&S submissions do not play a role in a tenderer winning a bid</p>	<p>H&S is assigned adequate weight in the tender selection criteria</p> <p>H&S submissions can contribute to a tenderer winning a bid</p>
Contract award and conditions of contract	<p>Additional project specific conditions of contract to manage project H&S risks are non-existent or very limited</p> <p>Contract conditions do not usually prescribe penalty clauses for poor H&S performance</p>	<p>Additional project specific conditions of contract are usually provided to manage project H&S risks</p> <p>Contract conditions prescribe penalty clauses for poor H&S performance</p>
Contract administration and monitoring	<p>Periodic reports on H&S are rarely collected to track H&S implementation during the construction phase</p>	<p>Periodic reports on H&S are collected during the construction phase to track H&S implementation</p>
Evaluation/ post contract review	<p>H&S implementations are seldom reviewed at the end of projects</p>	<p>H&S implementations are usually reviewed at the end of projects</p>

not incorporated into project planning, while [Smallwood \(1996\)](#) noted that in South Africa, contractors who make allocations for H&S in tenders do not gain any competitive advantage. Likewise, [Alkilani, Jupp and Sawhney \(2013\)](#) revealed that H&S objectives are usually given low priority in works procurement in Jordan. Given that the client's procurement strategies have influence on H&S implementation ([Gibb, et al., 2014](#)), the inadequate integration of H&S matters into the procurement process may have undesirable consequences for H&S on projects.

In contrast, the findings reveal that on public projects which are funded by foreign partners (mostly based in developed countries), H&S matters are taken seriously. This demonstrates the influence and

commitment of the funding agency to H&S in public procurement. This commitment stems from the well-established H&S regulatory, enforcement and guidance systems that may exist in their respective countries. For instance, in the UK, under the Construction (Design and Management) Regulations 2015, clients are required to consider and make appropriate arrangements for H&S by making the necessary allocations within the procurement process. Therefore, though the developed countries may have the same procurement methods, it leads to better H&S implementation, due to the existence of appropriate legal, guidance, and support systems.

In response to the various H&S legislations in their respective developed countries, these foreign partners have established policies and systems to ensure that H&S is taken seriously on projects in which they fund, including those in developing countries. Also, because poor H&S performance on projects they sponsor may impact negatively on their reputation, the foreign agencies make allocations to cater for H&S implementation. Thus, to fully comply with their established policies and maintain their reputation, foreign agencies sponsoring public projects in developing countries may need to always allocate budget for H&S implementation and ensure that adequate consideration of H&S in the procurement process becomes a key condition for accessing project funding.

Furthermore, the consideration given to H&S on DFP suggests that developing countries, with the right incentives and motivators can successfully institutionalise the integration of H&S within public procurement. For instance, as mentioned earlier, the foreign donors who fund public projects usually budget for H&S implementation and ensure that the conditions for the release of project funds include satisfactory H&S considerations within the procurement process. This suggests that with the right motivators, such as appropriate legislation, guidance, budgeting, and conditions for project funding, it is possible to afford H&S issues the required priority in public procurement in developing countries.

Typically, public clients have both legal and ethical obligations to ensure that their projects are delivered safely. Thus, it is important for them to adequately consider H&S throughout the procurement process and allocate sufficient resources to H&S implementation. For instance, objectives give clients something to work towards, and direct their energy and efforts, suggesting that setting clear H&S objectives would ensure that the client's decisions and actions within the subsequent stages would consider H&S matters ([Boadu, Sunindijo and Wang, 2021a](#)). Further, at the planning stage, it is essential to identify the H&S risks associated with the project and subsequently make all planning stage decisions such as choice of procurement method, and design options by considering the H&S risks associated with the project.

Unlike countries such as the UK and Australia which have regulations and policy initiatives relating to design for safety, the construction industry in many developing countries such as Ghana is noted for limited implementation of design for safety by designers ([Abueisheh, et al., 2020](#)). This requires that clients carefully select competent designers and ensure that safety issues are taken seriously in their project designs. Furthermore, in the tender and tender evaluation stages, it is important for clients to explicitly specify H&S requirements in the tender documents and make H&S a mandatory criterion and/or a significant weighted criterion in tender evaluation, and ultimately select contractor(s) who can execute the project to the required H&S standard.

Unfortunately, the findings show that the standard conditions of contract used for public projects in Ghana usually do not make adequate provisions for H&S implementation. Also, the H&S legislations are inadequate to deal with H&S matters in the construction industry. Therefore, it is critical for public clients to develop project specific conditions of contract to adequately specify H&S requirements. The H&S requirements may be based on the project H&S objectives/targets, and the kind of risks identified. To further emphasise the importance of H&S on projects, the contract conditions could specify penalties for poor H&S performance and/or payment of bonuses for better performance.

Contract administration and monitoring provides clients with the opportunity to ensure that all parties comply with their contractual responsibilities. Clients should collect and appraise contractor's reports and documentations to ensure that the H&S responsibilities of the contracting parties as provided in the contract reflect in the H&S implementation on the construction site. Finally, once the project is completed, clients should conduct a detailed review to evaluate how H&S matters were effectively integrated into the various stages of the procurement process in order to gain valuable lessons.

Conclusion and recommendations

The practices and decisions made by clients at each stage of construction procurement have implications for the management of project H&S. Given that public sector clients constitute major procurers of construction projects, they are well positioned to use their enormous procuring power to drive improvement in construction H&S through their decisions and practices in the procurement process. Based on these, the current study explored the extent of H&S integration into the procurement of public projects in Ghana.

This study fills a critical gap in the literature by identifying and providing an in-depth understanding on the influence of funding sources and the existence of legal and guidance frameworks that influence the extent of H&S integration into the procurement process. While H&S matters are generally overlooked in the various procurement stages for SFP, the findings suggest that on DFP, H&S is prioritised in the procurement process. Further, because of the absence of legal frameworks and proper guidance, public clients' have the propensity to omit H&S requirements to reduce project cost. To enhance their reputation and H&S outcomes in developing countries, foreign project actors (e.g., international development partners and foreign investors) must strengthen the mechanisms for prioritising H&S integration as a funding condition for the procurement of public projects. Local procurement agencies should develop legal and guidance frameworks that are not just punitive, but innovative enough, to prevent public clients and project contractors from sacrificing H&S requirements as a means to cost cutting during the procurement of public projects.

There are few research limitations worth acknowledging. The findings of this study are primarily based on the viewpoint of the industry professionals in Ghana. Only five of the participants have experience in public work procurement in other developing countries. Thus, although the construction industries in developing countries have comparable characteristics, the findings should be generalised carefully. Further research, especially multi-country studies, is therefore recommended. Also, the study did not explore guidelines for integrating H&S matters into public works procurement. These limitations notwithstanding, this study provides a strong basis for understanding the practices and constraints affecting the extent of H&S integration at each stage of procurement for public construction projects. It is recommended that future research can seek to build on this by exploring the key barriers constraining public clients from adequately considering H&S in state-funded projects.

References

- Abueisheh, Q., Manu, P., Mahamadu, A-M. and Cheung, C., 2020. Design for safety implementation among design professionals in construction: The context of Palestine. *Safety Science*, [e-journal] 128(2020), <https://doi.org/10.1016/j.ssci.2020.104742>
- Ali, N.I., 2020. Can public procurement bring socio-economic empowerment policies into implementation? *World Bank Blogs*, [blog] 10 November. Available at: <https://blogs.worldbank.org/governance/can-public-procurement-bring-socio-economic-empowerment-policies-implementation> [Accessed 24 May 2021].

- Alkilani, S.Z., Jupp, J. and Sawhney, A., 2013. Issues of construction health and safety in developing countries: a case of Jordan. *Australasian Journal of Construction Economics and Building*, 13(3), pp.141-56. <https://doi.org/10.5130/AJCEB.v13i3.3301>
- Annan, J.S., Addai, E.K. and Tulashie, S.K., 2015. A Call for Action to Improve Occupational Health and Safety in Ghana and a Critical Look at the Existing Legal Requirement and Legislation. *Safety and Health at Work*, [e-journal] 6(2), pp.146–50. <https://doi.org/10.1016/j.shaw.2014.12.002>
- Asian Development Bank, 2018. *Abnormally Low Bids: Guidance Note on Procurement*. Philippines: Asian Development Bank.
- Australian Safety and Compensation Council (ASCC), 2006. *Guidance on occupational health and safety in government procurement*. Australian Safety and Compensation Council. Canberra ACT: ASCC.
- Benviolent, C. and Smallwood, J., 2016. Assessing the implications of public sector procurement on construction health and safety management in Zimbabwe. In: Windapo, A.O, Odediran, S.J and Adediran, A., eds. *Proceedings of the 9th CIDB Conference. Emerging trends in construction organisational practices and project management knowledge areas*. University of Cape Town, South Africa, 2-4 February 2016. Cape Town: DCEM University of Cape Town.
- Berg, B.L., 2009. *Qualitative research methods for the social sciences*. Boston, USA: Allyn and Bacon.
- Boadu, E.F., Sunindijo, R.Y. and Wang, C.C., 2021a. Promoting Health and Safety in Construction through the Procurement Process. *Buildings*, [e-journal] 11(10), p.437. <https://doi.org/10.3390/buildings11100437>
- Boadu, E.F., Sunindijo, R.Y. and Wang, C.C., 2021b. Health and safety consideration in the procurement of public construction projects in Ghana. *Buildings*, [e-journal] 11(3), p.128. <https://doi.org/10.3390/buildings11030128>
- Boadu, E.F., Wang, C.C., and Sunindijo, R.Y., 2021. Challenges for Occupational Health and Safety Enforcement in the Construction Industry in Ghana. *Construction Economics and Building*, [e-journal] 21(1), pp.1–21. <https://doi.org/10.5130/AJCEB.v21i1.7482>
- Boadu, E.F., Sunindijo, R.Y., Wang, C.C. and Frimpong, S., 2021. Factors constraining the promotion of health and safety in public works procurement in developing countries. *International Journal of Construction Management*, [e-journal] <https://doi.org/10.1080/15623599.2021.1990716>
- Boadu, E.F., Sunindijo, R.Y., Wang, C.C. and Frimpong, S., 2022. Client-led promotion of health and safety through the procurement process on public construction projects in developing countries. *Safety Science*, [e-journal] 147, p.105605. <https://doi.org/10.1016/j.ssci.2021.105605>
- Boadu, E.F, Wang, C.C and Sunindijo, R.Y., 2020. Characteristics of the construction industry in developing countries and its implication for health and safety; an exploratory study in Ghana. *International Journal of Environmental Research and Public Health*. [e-journal] 17(11), p.4110. <https://doi.org/10.3390/ijerph17114110>
- Braun, V. and Clarke, V., 2006. Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), pp.77-101. <https://doi.org/10.1191/1478088706qp0630a>
- Colak, B., Etiler, N. and Bicer, U., 2004. Fatal occupational injuries in the construction sector in Kocaeli, Turkey, 1990-2001. *Industrial Health* 42, pp.424-430. <https://doi.org/10.2486/indhealth.42.424>
- Construction Industry Development Board (CIDB), 2011. *Delivery Management Guidelines: Practice Guide 2 – Construction Procurement Strategy*. CIDB. Pretoria.
- Creswell, J. W., 2014. *Research Design: Qualitative, Quantitative and Mixed Methods Approaches* (4th ed.). Thousand Oaks, CA: Sage

- Dansoh A., Frimpong S., and Oppong, G.D., 2020. Exploring the dimensions of traditional authority influencing stakeholder management at the pre-construction stage of infrastructure projects. *Construction Management and Economics* 38(2), pp.189–206. <https://doi.org/10.1080/01446193.2019.1589647>
- Donkoh, D., Adinyirah, E. and Aboagye-Nimo, E., 2015. An exploratory study into promoting construction health and safety in Ghana through public works procurement. In *Benefitting Workers and Society through Inherently Safe(r) Construction* (Behm M and McAleenan C (eds) CIB, Belfast, UK, pp. 289–297.
- Economic Corporate Network (ECN), 2015. Spanning Africa's infrastructure gap: how development capital is transforming Africa's project build-out. Available from: http://ftp01.economist.com.hk/ECN_papers/Infrastructure-Africa [Accessed 12 Jan 2019].
- Eyiah, A.K., Kheni, N.A. and Quartey, P.D., 2019. An Assessment of Occupational Health and Safety Regulations in Ghana: A Study of the Construction Industry. *Journal of Building Construction and Planning Research*, 7(2), pp.11–31. <https://doi.org/10.4236/jbcpr.2019.72002>
- Flick, U., 2018. An introduction to qualitative research. 6th Ed. Sage. <https://doi.org/10.4135/9781529716641>
- Frimpong, B.E., Sunindijo, R.Y., Wang, C., 2020. Towards improving performance of the construction industry in Ghana: A SWOT approach. *Civil Engineering Dimension* 22 (1), pp37–46. <https://doi.org/10.9744/ced.22.1.37-46>
- Galvin, R., 2015. How many interviews are enough? Do qualitative interviews in building energy consumption research produce reliable knowledge? *Journal of Building Engineering*, 1, pp. 2–12. <https://doi.org/10.1016/j.job.2014.12.001>
- Ghana Statistical Service, 2016. 2015 Labour force Report. Ghana Statistical Service, Accra.
- Gibb, A., Lingard, H., Behm, M. and Cooke, T., 2014. Construction accident causality: learning from different countries and differing consequences. *Construction Management and Economics*, 32(5), pp.446–459. <https://doi.org/10.1080/01446193.2014.907498>
- Government Health and Safety Lead, 2019. Health and Safety: A Good Practice Procurement Guide for Improving Health and Safety. Government Health and Safety Lead, New Zealand.
- Griffith A. and Watson P., 2004. *Post-Contract Review*. In: *Construction Management*. Palgrave, London. https://doi.org/10.1007/978-0-230-50021-1_12
- Hämäläinen, P., Takala, J. and Kiat, T.B., 2017. Global Estimates of Occupational Accidents and Work-Related Illnesses. Workplace Safety and Health Institute, Ministry of Manpower Services Centre: Singapore. (Accessed on 28 March 2020) Available online: <http://www.icohweb.org/site/images/news/pdf/Report%20Global%20Estimates%20of%20Occupational%20Accidents%20and%20Work-related%20Illnesses%202017%20rev1.pdf>
- Harding, T., 2014. Procurement and health and safety: has health and safety been forgotten in all the bureaucracy. Public Services Group and Yorkshire Branch Joint Networking Event, IOSH.
- Health and Safety Commission, 2007. Managing health and safety in construction. Construction (Design and Management) Regulations 2007. Approved Code of Practice. Health and Safety Commission, Norwich.
- Health and Safety Executive, 2007. Health and safety in public sector construction procurement. Health and Safety Executive, London.
- Health and Safety Executive, 2011. Health and safety in public sector construction procurement, A follow-up study. Health and Safety Executive, London.
- Health and Safety Executives, 2017. European Comparison; Summary of UK Performance; Health and Safety Executives: Bootle, UK.
- International Labour Organization (ILO), 2018. Improving the safety and health of young workers. Geneva: International Labour Office.

- Ju, C. and Rowlinson, S., 2020. The evolution of safety legislation in Hong Kong: actors, structures and institutions. *Safety Science*, 124, 104606. <https://doi.org/10.1016/j.ssci.2020.104606>
- Krueger, R. and Casey, M., 2009. *Focus Groups: A Practical Guide for Applied Research*. Sage Publications, Thousand Oaks, CA.
- Lingard, H., Oswald, D. and Le, T., 2019. Embedding occupational health and safety in the procurement and management of infra-structure projects: Institutional logics at play in the context of new public management. *Construction Management and Economics*, 37, pp.567–583. <https://doi.org/10.1080/01446193.2018.1551617>
- Lingard, H., Wakefield, R. and Walker, D., 2020. The client's role in promoting work health and safety in construction projects: balancing contracts and relationships to effect change. *Construction Management and Economics*, 38(11), pp.993–1008. <https://doi.org/10.1080/01446193.2020.1778758>
- Lingard, H., Piezadeh, P., Harley, J., Blismas, N. and Wakefield, R., 2014. *Safety in Design*; RMIT: Melbourne, Australia.
- McCrudden, C., 2004. Using public procurement to achieve social outcomes. *Natural Resources Forum* 28, pp.257–267. <https://doi.org/10.1111/j.1477-8947.2004.00099.x>
- Murdoch, H. and Hughes, W., 2007. *Construction Contracts*. 3rd Ed. Routledge, pp.101-117.
- Mwanaumo, E., Thwala, W.D. and Pretorius, J., 2014. Assessing health and safety requirements in construction contracts in Botswana. *Journal of Economics and Behavioral Sciences*, 6(1), pp. 37-43. <https://doi.org/10.22610/jeb.v6i1.468>
- Office of Federal Procurement Policy (OFPP), 1994. *A guide to best practices for contract administration*. Washington, DC. (Available at <https://www.gsa.gov/cdnstatic/best-practices-contract-administration-ofpp.pdf>, accessed on 25 March 2021)
- Office of the Federal Safety Commissioner, 2008. *The Model Client Framework: The model client: Promoting safe construction*. Office of the Federal Safety Commissioner. Australia.
- Okorie, V., Emuze, F., Smallwood, J. and Van Wyk, J., 2014. The influence of clients' leadership in relation to construction health and safety in South Africa. *Acta Structilia*, 21(2), pp. 44-68.
- Organization for Economic Cooperation and Development (OECD), 2012. *Mapping support for Africa's infrastructure investment, NEPAD-OECD Africa Investment Initiative Report*.
- Osei-Kyei R., and Chan, A.P.C., 2018. Comparative study of governments' reasons/motivations for adopting public-private partnership policy in developing and developed economies/countries. *International Journal of Strategic Property Management*, 22(5), pp.403–441. <https://doi.org/10.3846/ijspm.2018.5223>
- Patton M.Q., 2014. *Qualitative research and evaluation methods*. 4th Ed. Sage Publications, Thousand Oaks, CA: 2002.
- Public Procurement Authority (PPA), 2013. *Building a resilient private sector. The Procurement Digest*. PPA. Accra.
- Quartey, P., Ackah, C., Dufe, G. and Agyare-Boakyee, E., 2011. Evaluation of the implementation of the Paris Declaration on aid effectiveness: Phase II. Ghana Country Report. Available on <https://www.oecd.org/countries/ghana/47651795.pdf> (accessed 16 February 2021).
- Saunders, M., Lewis, P., and Thornhill, A., 2016. *Research methods for business students* (7th ed). England: Pearson Education Limited.
- Sharkey, J.A.M, Bell, M., Jovic, W. and Marginean, R., 2014. *Standard Forms of Contract in the Australian Construction Industry: Research Report*. The University of Melbourne. Available on https://law.unimelb.edu.au/_data/assets/pdf_file/0007/1686265/Research-Report-Standard-forms-of-contract-in-the-Australian-construction-industry.pdf (accessed on 11 September 2020)

Smallwood J.J., 1996. The role of project managers in occupational health and safety. In Dias, L.A. and Coble, R.J.(Ed). Proceedings of the First International Conference of CIB Working Commission W99 Implementation of Safety and Health on Construction Sites, Lisbon, Portugal, pub Balkema, Rotterdam. pp. 227-236.

Sunindijo. R.Y., 2015. Improving safety among small organisations in the construction industry: key barriers and improvement strategies. *Procedia Engineering* 125, pp. 109 – 116. <https://doi.org/10.1016/j.proeng.2015.11.017>

Umeokafor, N., Windapo, A. and Olatunji, O., 2020. Integrating health and safety into labour-only procurement system: opportunities, barriers and strategies. In: Manu, P., Emuze, F., Saurin, T. and Hadikusumo, B. H. W., (eds.). *Construction health and safety in developing countries*. Abingdon, U.K., Routledge, pp. 140-151. <https://doi.org/10.1201/9780429455377-10>

Votano, S. and Sunindijo, R. Y., 2014. Client Safety Roles in Small and Medium Construction Projects in Australia. *Journal of Construction Engineering and Management*. 140(9), [https://doi.org/10.1061/\(ASCE\)CO.1943-7862.0000899](https://doi.org/10.1061/(ASCE)CO.1943-7862.0000899)

Wanberg, J., Harper, C., Hallowell, M. and Rajendran, S., 2013. Relationship between Construction Safety and Quality Performance. *Journal of Construction Engineering and Management*. 139. 04013003. [https://doi.org/10.1061/\(ASCE\)CO.1943-7862.0000732](https://doi.org/10.1061/(ASCE)CO.1943-7862.0000732)

Wells, J. and Hawkins, J., 2011. Briefing: Promoting construction health and safety through procurement. Proceedings of the Institution of Civil Engineers – *Management, Procurement and Law*. 164(4): pp.165–168. <https://doi.org/10.1680/mpal.10.00001>

Worksafe Victoria, 2017. A handbook for the public sector. Health and safety in construction procurement. 2nd Ed. Worksafe Victoria. Australia.

World Bank, 2013. Ghana's Comprehensive Approach to Public Procurement Reform. <http://www.worldbank.org/en/news/feature/2013/02/04/Ghana-8217-s-Comprehensive-Approach-to-Public-Procurement-Reform> (Accessed April 1, 2019).

World Bank, 2016. GNI per capita, Atlas method (current US\$). Available from <http://data.worldbank.org/indicator/NY.GNP.PCAP.CD>. (Accessed 6 March 2019).