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Competitive Tendering Method and its Effect on Project Performance

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COMPETITIVE TENDERING METHOD AND ITS EFFECT ON PROJECT PERFORMANCE

by

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COMPETITIVE TENDERING METHOD AND ITS EFFECT ON PROJECT PERFORMANCE

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Abstract

This study examined the impact of competitive tendering methods including open-competitive, open-restrictive, and selective – on construction project performance using a quantitative approach. A total of 400 questionnaires were sent, and 318 usable responses were collected. Descriptive and inferential statistical methods were employed, and data were analyzed in CB-SEM utilizing pairwise correlation analysis, hierarchical regression, and SEM. The SEM results revealed positive relationships between all three competitive tendering strategies and project performance. However, open-restrictive was not statistically significant. Findings suggest that competitive methods of contractor selection yield positive project outcomes for the Ghanaian construction industry. Firms in the industry can harness these benefits by ensuring favorable organizational culture, effective governance, and readily available resources during project implementation. The study recommends that employers assess their tender evaluation systems for competitive tenders to reduce inefficiencies.

Keywords: *Competitive tendering, Open tendering, Open-restrictive tendering, Selective tendering, Project performance.*

1. Introduction

It is an undeniable fact that the construction industry makes a significant contribution to a country's socioeconomic development (Akinradewo et al., 2019). Every country's economic progress is aided by the construction sector, which provides the necessary infrastructure (Doloi et al., 2012; Yong & Mustaffa, 2012; Zhou et al., 2013; Xiong et al., 2014; Thacker et al., 2019). This is shown in its great potential for, among other things, increasing produce exports, building key infrastructure, providing shelter for society, encouraging prosperity, and creating jobs. The industry's contribution to the gross domestic product (GDP) in Ghana is about 10% (Ofori-Kuragu et al., 2016). Because of the nature of the construction business, numerous major stakeholders are involved in its activities, with the primary characters being the employer community (both private and public), as well as principal contractors and sub-contractors of all tiers (Ofori, 2012; Osei–Kyei & Chan, 2016). Therefore, the end-product of construction projects delivered in the right quality, within scope, time, and expected cost is crucial for the infrastructural development of every economy. Essentially, the quality, cost, and scope of a project, delivered within the specified time frame are what drive construction project performance (Ahadzie et al. 2008; Aziz et al., 2013; Ahadzie et al., 2014; Ngacho & Das, 2014; Grabher & Thiel, 2015; Love et al., 2016).

With a surge in Ghana's population of about 30 million (Ghana Statistical Services, 2019), there is pressure on the government to construct or facilitate the development of infrastructures to speed up the economic development of the country. The government of Ghana, which owns a majority of the most expensive housing, infrastructure, and tertiary buildings in the country, is the construction industry's greatest customer and consumer. Even though the government is responsible for most of the construction industry's activities, contractors are the driving force behind the industry's growth and performance. The tremendous growth of contractors in the construction industry has been witnessed, but unfortunately, the employer organizations' growth does not commensurate with that of the contractor organizations. Thus, selecting the appropriate contractor organization to undertake a specific construction project is a daunting task.

Project performance, according to Costa et al. (2006) and Zaman et al. (2019), is the extent to which success is attained with the amount of work invested that relates to the prescribed goals or

objectives that form the project parameters. The accomplishment of projects carried out in the construction sector is determined by their performance. However, numerous factors impact the success or failure of project performance in the construction industry (Saraf, 2013). Notable among these factors, that either positively or negatively influence the performance of project works, are lack of needed labor, materials, and equipment, as well as setbacks due to inadequate supplies, poor leadership abilities, substandard equipment quality, and high cost of supplies (Enshassi et al., 2010; Sweis et al., 2014). Memon et al. (2010) and Suprapto et al. (2016) both also reported that performance is directly influenced by the cost of the project.

The three dominant areas of the construction industry in Ghana are the building, road, and railway sectors, respectively. The road construction sector alone has over 4000 contractor organizations that are registered with the Ministry of Roads and Highways (Ministry of Roads and Highway, 2016). This makes the use of the appropriate selection method as well as the selection of the right contractor a very critical aspect of project success (Kpamma & Adjei-Kumi, 2010). Owing to the numerous contractor organizations in the construction industry, most construction projects are saddled with inappropriate contractor selection. Thus, increasing the chances of time delays, cost overruns, poor-quality work, and disputes, leading to poor project performance. The objective was to assess the impact of competitive tendering methods, including open-competitive, open-restrictive, and selective on project performance.

2. Literature review

2.1 Overview of Tendering Methods and Project Performance

Construction projects and activities have huge impacts on several aspects of human life, including health, safety, and even the environment (Yong & Mustaffa, 2012; Allen & Iano, 2019). Researchers have also extolled the significant economic benefits of the construction industry by emphasizing its contributions to job creation and its consequent implications for national development and social security (Doloi et al., 2012; Yong & Mustaffa, 2012; Gan et al., 2015). Due to the far-reaching effects of construction on society, calls have been made by researchers and practitioners for critical attention to be paid by all countries to the maintenance of well-functioning systems as they relate to construction (Eriksson & Westerberg, 2011).

Despite these calls, many countries including Ghana have been severely criticized for lapses and failures in the construction industry. According to Oloo (2013) as well as Ngacho (2013) and many other researchers, cost overruns, low-quality outcomes, contractors' inability to meet customer expectations as well and deficiencies in meeting timelines remain some of the challenges facing the industry in many countries. For the industry to improve and become more successful, researchers have suggested an urgent need for various actors to engage in significant attitudinal and behavioral changes (Hardie, 2010; Davis & Love, 2011; Dansoh et al., 2017). Furthermore, construction processes and procedures must see drastic improvements for industry outcomes to meet required standards and user expectations (Davis & Love, 2011; Dansoh et al., 2017; Verstraete et al., 2017). There is a wide range of challenges to enhancing industry outcomes from constantly growing complexities and uncertainties associated with construction works to time constraints as has been highlighted by Anvuur and Kumaraswamy (2007) as well as the traditionally competitive and conflictual relationships that have characterized the industry exposed by Dza (2013), Oshin-Martin (2014) and Adetola (2014).

Larsson et al. (2018), for instance, have suggested that the extent of improvement in the construction industry, project outcomes, and its subsequent success will depend largely on the ability and willingness of actors to effectively collaborate and work towards addressing the defects in, and challenges associated with procurement procedures. Also, the removal of the impediments to project success is only attainable if certain negative attitudes of employers are effectively dealt with. According to Laedre et al. (2006), most employers have consistently demonstrated the habit of preferring some procurement procedures despite the inherent deficiencies, even where there may be no differences in project outcomes between alternative procedures. Eriksson and Westerberg (2011) attributed this attitude to a certain lack of understanding among employers regarding the various procedures. For change to occur and to ensure enhanced project performance, therefore, there is the need to explore ways and means by which to enhance the understanding of key actors, especially employers, concerning procurement procedures as well as their unique impacts on specific metrics of project performance (Eriksson & Westerberg, 2011).

Several kinds of literature available on the impacts of procurement methods and procedures on project performance have been largely focused on correlations between one or a limited number of methods and project performance (Eriksson & Westerberg, 2011). However, the durable solution proffered by Eriksson and Pesämaa (2007) and shared by Eriksson (2017), which has the potential to result in the proper management and successful delivery of construction project objectives consists in the adoption of a more "holistic and systematic approach" in exploring the relationships between procurement procedures or tendering methods and the performance of contracts. What all these calls and suggestions point to is the unanimous admission among both scholars and practitioners that the quality and success of works executed by contractor organizations in the construction industry significantly depend on the tendering methods or procurement procedures used for contractor selection. In effect, the suggestion is that where very effective and efficient tendering methods are employed in the selection of contractors, project performance in terms of quality, scope, cost, timeliness, and other metrics is largely guaranteed.

2.2 Tendering Methods

Kang et al. (2015) defined tendering as an employer's choice, among a group of contractors who have been publicly or directly invited, of the most appropriate contractor to execute a specific construction project. Ogunsanmi (2013) defines tendering as the procedure of selecting a suitable contractor organization at a time appropriate to the circumstances and obtaining from the contractor organization an acceptable offer or tender upon which the contract can be let. According to Lysons and Farrington (2010), tendering denotes a process of procurement during which all prospective suppliers or contractors are publicly invited to submit tenders regarding the cost and general terms guiding the rendering of services, supply of goods, or the execution of works so advertised. It could be inferred from Lysons and Farrington (2010), Ogunsanmi (2013), and Kang et al. (2015) definitions that, tendering is a technique in which a consumer makes an informed selective decision among competing suppliers or contractors fairly and transparently. Webb (2008) highlighted the basic objectives of tendering as the need to ensure transparency, integrity, fairness, equal accessibility, and especially competition in the award of public services and works. These objectives are in line with those identified in the Global Trade Negotiation (2006) which recommended that public procurements must be done through competitive

tendering to avert the occurrence of waste, fraud, and similar practices that deviate from ethics (Stempel & Knutsen, 2015).

A typical tendering process, according to Creswell and Garrett (2008), comprises the following steps. First, the client or employer organization determines the type of tendering method to employ in selecting a suitable contractor for the project. Secondly, all relevant documents as required by law, are prepared to contain all necessary information in pursuit of fair competition among applicants. The third stage involves a public announcement or advertisement in national and/or international media inviting all prospective contractors to apply. In the fourth stage, potential applicants purchase the needed documents and attend any briefings that may be organized to provide further clarifications. This is followed by the submission of tenders. Thereafter, a specially constituted tender opening committee opens the tenders and takes the necessary records, followed by a determination concerning the responsiveness of each tender. The evaluation process begins, and the best tender, measured against predetermined criteria, wins the contract. Notification of contract award is served, and the process ends. Extant literature classified all tendering methods into three broad methods, namely, competitive tendering, negotiation tendering, and composite tendering. Kang et al. (2015) asserted that competitive and negotiation tendering methods have been more pervasive than composite tendering.

2.3 Competitive Tendering

Competitive tendering is where public notification is put in popular media, be it online, in newspapers, etc., by the employer organization, inviting contractor organizations who are interested in carrying out a project, to purchase tender documents (Harris et al., 2021). It thus involves a situation where an employer or client organization chooses a particular contractor organization to execute a construction project after carefully assessing tenders from several contractors who have expressed interest in the project (Kang et al., 2015). Competitive tendering within construction circles refers to the situation where prospective contractor organizations submit firm price offers regarding advertised projects as well as terms and conditions under which they intend to execute those projects if they are selected (Douh, 2015). If successful, the proposed terms and conditions become the contract conditions regulating the employer-contractor relationship, although sometimes negotiations may lead to significant changes eventually. Its

competitiveness consists of the fact that the submission of tenders by all contractors is guided by the same terms and is assessed based on similar criteria (Douh, 2015). According to Douh (2015), competitive tendering ensures that employer organizations, through the interactive forces of demand and supply, acquire projects at the lowest costs possible at a time. Competitive tender documents are typically prepared to highlight key project information in areas such as the scope, quality, and time of completion of the project as well as other relevant details and requirements from prospective contractors.

2.4 Negotiation Tendering

Comparative to competitive tendering, negotiation tendering takes away the element of competition. It is the tendering method whereby, the employer organization approaches a contractor organization for discussion on parameters such as the scope, cost, quality, and time of providing the facility (Buildings, 2018). The agreement on these parameters ensures the basis of the contract and its performance. Some merits of the negotiation tendering method are that it saves time, there is the assurance of work quality, and it adequately takes care of emergencies (Harty, 2012; Smotrova-Taylor, 2012; Balogun, 2019).

2.5 Composite Tendering

Composite tendering, however, is where the employer organization engages in the use of principles involved in both competitive and negotiation tendering methods (Barasa, 2014; Buildings, 2018; Busu & Busu, 2020). It is normally employed in circumstances where the nature of construction work is complicated and early involvement of a contractor is much desired at the design stage by the employer. The contractor is brought on board through competitive means to participate in the design stage of the work. The contractor is made to price the work on completion, participate in the design stage, and later negotiate the price and other conditions to arrive at an agreeable contract by both parties. The composite method of tendering is believed to have both merits and demerits in the two methods: competitive and negotiation (Filippini et al., 2015; Lee et al., 2017; Merkert et al., 2018).

Although it has been adequately proven that all the contractor selection methods, namely, competitive, negotiation, and composite could impact either positively or negatively on project performance, only the impacts of competitive tendering will extensively be investigated in line with the objectives of this research. As such, detailed discussions on each of the three methods of competitive tendering and their strengths, as well as weaknesses, are presented below.

2.6 Competitive Tendering Methods

The ensuing sub-sections are dedicated to the discussion and impacts of the three methods of competitive tendering on project performance with special emphasis on the construction industry. The independent and direct impacts of open tendering, open-restrictive, and selective tendering on project performance, have been well explored.

2.7 Open tendering

Open tendering refers to a competitive tendering process in which prospective suppliers or contractors are invited through national and/or international media and where there are no limits to the number of applicants (Kang et al., 2015). In open tendering, the employer organization includes key details of the project alongside the standards of assessment. King (2008) described open tendering as one that attempts to decrease the cost of contracts by increasing competition. Put differently, open tendering follows the principles of free market competition. King (2008) outlines the fundamental processes of open tendering beginning with a public advertisement in the media inviting interested contractors to submit applications; payment of bonds by applicants and collection of tender documents; and finally, the submission of tenders.

Of the three competitive tendering methods discussed here, Batoev and Schlosser (2013) opine that open tendering has been the most widely used, especially in the European Union, accounting for up to 73% of announcements relating to tenders. The source highlighted the processes involved in open tendering as,

- establishment of project specifications on which basis applicants will submit their tenders,
- the advertisement of the project contract in the media,

- receipt of tenders from prospective contractors, and
- the subsequent evaluation of the same (Batoev & Schlosser, 2013).

Unlike selective tendering which may involve a two-stage process, open tendering is typically a one-stage tendering process without any limits to the number of contractors who may express interest.

One major strength of the open tendering process has been its ability to generate maximum competition among applicants and drive project costs down (Batoev & Schlosser, 2013). Thus, due to the large number of tender applicants involved, interactions between demand and supply within an atmosphere of perfect competition will certainly cause tenderers to reduce tender prices to increase their chances of winning the contract (Batoev & Schlosser, 2013). A similar argument has been made by (King, 2008) who explained that open tendering is most desirable in construction because it can avert costs and time wastage which are inherent in prequalification processes observed in other tendering methods. The challenge associated with the large numbers however is how cumbersome the tender evaluation process may become. It has also been argued that the free-for-all nature of the open tendering method could become a disincentive for otherwise serious contractors to apply. This according to Batoev and Schlosser (2013), is because of the low chances of winning the contract resulting from the numbers which may further damage the seriousness of the competition. Additionally, the promise of low project costs which has often been cited as the main strength of open tendering may be negated by the high costs incurred in evaluating the huge number of tenders, if fairness is to be maintained (Batoev & Schlosser, 2013). And because it is impossible to determine beforehand, the number of tenderers who will express interest, planning in terms of the duration the entire evaluation process will take will be negatively affected. Thurbon and Bouyssou (2014) as well as Tremblay and Boyle (2018) have lamented the possibility of tenderers taking advantage of the numbers and submitting tenders that fall short of the required quality standards. Despite referring to it as the default method of procuring construction contracts and projects which ensures the best value for money, the Manual for Procurement of Works, India (2019) has admitted like many other sources that open tendering is relatively more complex and prolonged. And because systemic costs may create situations of cost overruns, the source advised that it is not recommended for projects that are relatively smaller in value (Manual for Procurement of Works, India, 2019). King (2008) as well as, Khan and Khan

(2015) describe open tendering as the "low-tender method". Based on their studies regarding tendering methods in the United States, Jarkas and Bitar (2012) concluded that open tendering leads to 'extensive delays in the planned schedule, cost overruns, very serious problems in quality, and an increased number of claims and litigation.

2.8 Selective tendering

Selective tendering is a form of competitive tendering in which the employer picks a few contractors from a long list and invites them to tender. The final tender list may contain 6-8 firms depending on the size and type of the proposed project (Chou et al., 2013; Chou et al., 2015; Faraji et al., 2020). As a result of the weaknesses inherent in open tendering procedures, researchers have called for a shift towards inviting tenderers through a restrictive procedure that selects only suitable tenderers based on demonstrable capacity in diverse metrics (Batoev & Schlosser, 2013). Kang et al. (2015) described the selective tendering method as one that invites only a few prospective contractors to participate in the tender process toward the award of a contract. Thus, clients or employer organizations based on their own established pre-selection criteria, invite only those contractors they perceive as suitable for executing the specific project (Kang et al., 2015). The most remarkable point of departure for selective tendering from open tendering therefore consists in the former's introduction of a prequalification process where all interested applicants are expected to satisfy certain criteria before they are included in the actual tendering process (King, 2008). King (2008) defined prequalification as a practice by which employer organizations on their own or through a team of competent representative screens or assesses the competence and abilities of prospective tenderers against a set of predetermined qualification criteria towards the commencement of an actual tendering process. King, (2008) also asserted that these prequalification criteria may result from standardized prototypes or templates that have been developed by employers over a period in line with industry requirements and scholarly recommendations. According to employer organizations, the freedom to target and select only suitable tenderers for evaluation is undertaken with the hope that many of the challenges associated with open tendering may be resolved (Batoev & Schlosser, 2013). For instance, the purpose of the prequalification process is usually to prevent the possibility of "incompetent" tenderers hiding behind large numbers or manipulating prices and winning

contracts that they cannot deliver. Contractors who successfully go through the prequalification process will then be permitted to tender for the specific project or list of projects, depending on whether the prequalification process itself is based on a general or project-specific criterion (King, 2008). The basic indicators of prequalification under the selective tendering method as has been reported by Batoev and Schlosser (2013) within the EU for instance include contractors' financial strength, competence, or expertise with the project, and ability to deliver within the stipulated timeframe. Batoev and Schlosser (2013) also observed within the same jurisdiction that although no capping exists for the maximum number of tenderers that must be permitted to tender for a contract, the number of prequalified contractors must not fall below five. This the researchers noted is necessary to ensure some appreciable level of competition in the process.

Selective tendering may be presented in either of two forms: single-stage or two-stage. It is a single-stage selective tendering when the eventual winner is chosen from either a prequalification process or from a standing list (King, 2008). On the other hand, the two-stage approach requires a first stage where contractor assessments are done in addition to the second stage of negotiations between the employer organization and the contractor.

Researchers have unanimously consented to the superiority of selective tendering to open tendering in many areas. First, the pre-selection of contractors usually means that fewer numbers will be involved. This allows for shorter tender durations and ensures a more accurate prediction regarding the tendering process: specific timeframes may be easily determinable. Secondly, selective tendering has been praised for placing a significant premium on the quality of tenders and by extension, projects (Batoev & Schlosser, 2013). This is because as has been hinted earlier, the reliance on prequalification processes minimizes the risk of low-quality tenders significantly. Extant literature also supports the view that the selective nature of the tender process and the limited number of applicants involved will translate into increased chances of every tenderer winning the contract. The argument follows that with perceptions of high winning chances and an emphasis on quality, very competent and capable contractors will be attracted to selective tendering methods leading to a more qualitative competition than what characterizes open tendering methods (Batoev & Schlosser, 2013). This review holds the opinion that what the foregoing discussions and revelations about the two tendering procedures seek to communicate is not a total condemnation of either method but rather the acknowledgment of each method's

strengths and weaknesses in contributing toward project delivery and performance. The observations contained in extant literature thus convey the understanding that each method is suitable for specific situations depending on the nature of the contract and the employers' objectives regarding the choice between lowering project costs and an insistence on quality. Consequently, researchers have therefore refrained from drawing conclusions regarding which method is ultimately better than the other (Batoev & Schlosser, 2013). What has been observed across the literature during this review is a cautious recommendation for the argument to be shifted from "superiority" to "suitability" although it has been acknowledged extensively that open tendering is more flexible and may apply to a wider range of contracts than selective tendering (European Commission, 2011). To the question of what will constitute the criteria for determining "suitability" in each circumstance, Batoev and Schlosser (2013) suggested certain key considerations. First, is the level of competition expected by the employer organization indicated both in terms of value and quality differences among the offers received, and second, the expected differences in the number of tenders if open or selective tendering is employed. They held the view that high levels of competition between these two factors will enhance process efficiency and reduce costs significantly (Batoev & Schlosser, 2013). The logical conclusion is that where there is an anticipated large spread of tenders, open tendering processes will yield significant cost benefits due to the intensive competition. On the contrary, where it is envisaged that the number of tenders will not significantly differ between the two methods, then, the possibility of incurring higher costs during the evaluation will tilt the odds in favor of selective tendering (Barnard, 2017; Dementiev & Han, 2020).

In support of this deduction, the Public Procurement in Europe, Cost and Effectiveness (2011), which comprises a list of procurement regulations designed for the European Commission observed that while open tendering procedures have been mostly adopted for works-related contracts, service contracts tend to attract the selective tendering method. The explanation for these preferences has been attributed to the fact that contract specification in the service industry is often far more complex and difficult than in construction (Batoev & Schlosser, 2013). As such, employer organizations are encouraged to pay attention to the quality of contractors by using selective rather than open tendering where the procurement of services is involved and vice versa (Batoev & Schlosser, 2013).

Batoev and Schlosser (2013) also suggested that in determining the suitability of the two tendering methods, the relative differences in tendering costs should be considered. This according to them is because, whereas fixed costs in terms of cost of tender documents, specifications, and advertisements may be the same for both methods, the variable components of the cost may be significantly different. Similar suggestions have been documented by Chegut et al. (2019) who supported the use of selective tendering under such circumstances since the variable costs associated with it are relatively more marginal.

Considering time as a determining factor of suitability, Batoev and Schlosser (2013), as well as Khoso and Md Yusof (2020), have suggested further that consequent to the introduction of a prequalification process, open tendering appears more suitable where time is of the essence. It is reported for instance that while the minimum duration for open tenders is fifty-two days, selective tendering takes a minimum of seventy-seven days to execute in the European Union (Batoev & Schlosser, 2013).

2.9 Open-restrictive tendering

Open-restrictive tendering also uses advertisements to invite applications from firms that wish to be considered for tendering, out of which a selection list is generated, and tenders are invited from this restricted list of firms (Cooke & Williams, 2013; Douh, 2016). As has been explained earlier, the choice between the open and restrictive tendering processes in selecting project contractors is most often not a straightforward and simple decision for employer organizations to make due to their circumstantial weaknesses, strengths, and complexities (OECD, 2011). As such, employer organizations face a plethora of difficulties in determining what the most appropriate methods should be for specific construction procurements. Their difficulties according to OECD (2011) are further complicated by the need to adhere to the requirements of competition even in instances where the complexities and special nature of projects may not encourage competition.

Thus, this review observed that the challenges and limitations associated with the independent application of either open or selective tendering methods to construction contracts constitute the underlying reasons for ignited calls for new procurement strategies aimed at optimizing the strengths of existing approaches toward enhancing the performance of projects. These calls have

led to a combination of the positive features of both the open and selective tendering methods in what is now referred to as open-restrictive tendering. The open-restrictive tendering approach is therefore a hybrid of open and selective tendering methods (Ogunsanmi, 2013). According to Douh (2016) and Jones (2021), it refers to a two-stage open tendering procedure that comprises characteristics of both open tendering and restrictive processes in selecting a construction project contractor. Thus, the tender process begins as a competitive process that is open to all interested contractors. However, where the specific requirements of the project or prices offered are such that no contractor satisfies them, a second stage may be entered which applies the principles of the selective or restrictive approaches (Mathonsi & Thwala, 2012; Jones, 2021). In the second stage, adjustments may be made to the requirements of the procurement process, and designated contractors are thereafter invited to submit their tenders for consideration.

Although extant literature on the open-restrictive tendering method as a stand-alone procurement mechanism, and the extent of its application in the award of construction projects is extremely scanty, the common position among the few sources available has indicated that it seeks to ensure the selection of the most capable and competent contractors by restricting the procurement process to those who have demonstrated competencies that align with specified project requirements while at the same time maintaining appreciable levels of competition through an open tendering process (Ogunsanmi, 2013). As it were, the unique strengths of the open-restrictive tendering method are the combined advantages of the open tendering method (i.e., ensuring competition, averting corruption or abuse, ensuring accountability, transparency, etc.) and the restrictive method which emphasizes project quality among others (Ayoti, 2012).

2.10 Open Competitive Tendering and Project Performance

When firms are faced with fierce rivalry, they are forced to offer services or works at lower market pricing (Al-Omiri and Drury, 2007). According to Sawalim (2015), competitors will strive to win over employer organizations to maintain their operations and win new contracts. This could involve significant cost reductions, enhanced project quality, and other factors that are crucial in gauging project performance. The performance of organizations and competitive open tendering were found to be significantly positively correlated in the studies by Al-Shareem et al. (2015) and Ababa (2019). Kaunyangi (2014), found strong relationships between competition and firm

performance, as buyers or employer organizations frequently do so to obtain goods and services at lower costs and of higher quality by pitting competing suppliers and contractors against one another. Kaunyangi (2014) claims that this will have favorable effects on organizational performance. In the study by Nickell (2006), there were strong positive correlations between industry competition and organizational performance. Al-Rfou (2012), reported a significantly positive and strong influence of intense competition on firms' performance.

However, Mwikali and Kavale (2012), cautioned that excessive competition may become a disincentive for the most competent contractors to participate in the tendering process as each contractor's chances of winning are extremely limited under the circumstances. In addition to the initially slow processes involved, Tadelis and Bajari (2006), opined that the method may lead to poor quality and safety shortcuts as well as stifle research and development due to low-profit margins resulting from reduced tender prices which are necessitated by intense competition. Despite their expressed acknowledgment of the strengths of open tendering and its impacts on project performance, Manu et al. (2015), Adedokun et al. (2013) and Douh (2015) have all noted with concern that open-competitive tendering, like all other procurement methods, has its weaknesses which may be significant to project delivery and performance depending on several other factors and circumstances.

The first of many relationships proposed in the conceptual model in figure 1 is the direct relationship between the open-competitive tendering method and project performance. This study conceptualized open tendering as a competitive procurement strategy in which tender invitations are made available to an unlimited number of contractors who may wish to express interest, through national and international media advertisements (King, 2008; Kang et al., 2015). As may have been observed in earlier sections of this work, empirical support for this assertion is both profound and compelling. Chong and Rundus (2004) as well as Al-Omiri and Drury (2007), grounded their arguments on the fundamental tenets of market competition to advocate strong correlations between open tendering and project performance indicators such as cost-effectiveness and improvements in project quality. Empirical evidence from Kaunyangi (2014) is in favor of the significant influence exerted by market competition, which is a key component of open tendering, on the performance of not only construction projects but the provision of services and products as well. There were also empirical findings documented by Obembe and Soetan

(2015) to indicate the existence of strong positive correlations between industry competition and organizational performance including the performance of construction works.

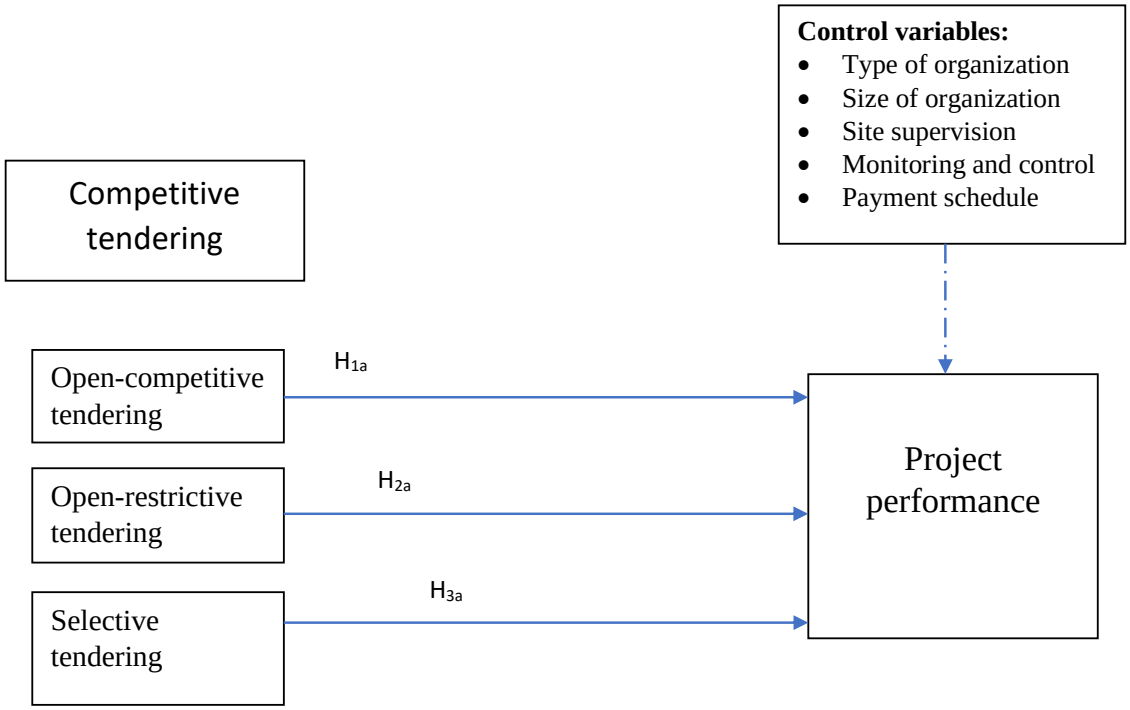

Figure 1: Conceptual model

According to Batoev and Schlosser (2013), the abstention of proven contractors may further damage the seriousness of the competition. Additionally, the promise of low project costs which has often been cited as the main strength of open tendering may be negated by the high costs incurred in evaluating the huge number of tenders, if fairness is to be maintained (Batoev & Schlosser, 2013). The impossibility to determine beforehand, the number of tenderers who will express interest makes it difficult to determine the duration of the evaluation process. Thurbon and Bouyssou (2014) and Tremblay and Boyle (2018) argued that tenders fall short of the required quality standards. Over-emphasizing the need to reduce project costs, often tends to compromise the quality of construction projects. Finally, based on studies by Jarkas and Bitar (2012), open-tendering leads to 'extensive delays in the planned schedule, cost overruns, low quality and an increased number of claims and litigation. This latter conclusion is especially worrying since

timely delivery, cost-effectiveness, and quality are the core measures of project performance in this study. Based on these findings, this study hypothesized that:

> **H_{1o}:** *Open competitive tendering will not have a negative relationship with project performance.*
>
> **H_{1a}:** *Open competitive tendering will have a negative relationship with project performance*

2.11 Open-Restrictive Tendering and Project Performance

The relationship between the open-restrictive tendering method and project performance may be explained in terms of the positive influences exerted by both methods on the performance of construction projects (Cooke & Williams, 2013). On the one hand, the element of open tendering ensures that the procurement process is characterized by the required levels of competition to ensure superior performance in terms of quality, cost reductions, and improved innovation in the execution of projects (Al-Omiri & Drury, 2007; Kaunyangi, 2014; Liu et al., 2016; Ates et al., 2018; Goncalves Filho & Waterson, 2018; Harris et al., 2021). It has also been found in sources such as Tonge and Willett (2009) as well as, Douh (2015) that by making the first phase of the procurement process open to all interested contractors, the expected competition will help to reduce corruption, favoritism, and nepotism as well as to secure the lowest costs possible; to promote principles of fairness, accountability, and transparency in the award of public contracts. Further inferences made by Dagba and Dagba (2019) have also indicated that open invitations to tenderers will go a long way to complement the advantages of restrictive tendering and enhance the chances of project performance. Intensive competition among contractors coupled with high perceptions of fairness and transparency as is the feature of open-restrictive tendering processes will correlate positively and in significant proportions with the performance of construction projects (Al-Rfou, 2012; Banahene et al., 2014; García-Andrade, 2016). On the other hand, the restrictive nature of the process ensures that employer organizations reap the benefits of open tendering without any significant compromises on project performance indicators such as quality, time, and environment (Douh, 2015). Some sources have asserted that the restrictive elements ensure that the key disadvantages of open tendering are averted to improve project performance. In Mwikali and Kavale (2012) as well as Delmon (2017) for instance, it was suggested that the possibility of open tendering to scare away many competent contractors by attracting too many

applications thereby reducing their chances of winning will be effectively mitigated if these contractors have the assurance that their core competencies will increase their suitability during the second (restrictive) stage. In extolling the significant positive correlation between restrictive tendering and project performance, Tadelis and Bajari (2006) argued that the likelihood of open tendering resulting in poor quality projects, safety problems, and consequently low project performance may be effectively addressed by restricting the actual tendering stage to only those contractors who are competent and demonstrate the desired capacity to deliver projects per stated performance standards. Considering the ability of both open and restrictive tendering processes to positively influence project performance, this review adopts the position that the effective combination of the desirable qualities and features of both methods will impact the performance of construction projects in even more profound ways than when these methods are employed individually.

The second relational assumption in the conceptual measurement model proposes that a direct positive correlation exists between open-restrictive tendering and construction project performance. In this study, open-restrictive tendering denotes a competitive procurement process that combines the elements of open tendering (unlimited invitation characterized by intense competition) and restrictive tendering, (where tendering is limited to one or a few contractors based on factors such as demonstrable performance, competence, financial capacity, etc.). The empirical evidence discovered during this review suggests a strong foundation for the proposed relationship. As indicated earlier, most researchers have explored the individual impacts of open and restrictive tendering on project performance and found significantly strong correlations (Al-Omiri & Drury, 2007; Kaunyangi; 2014; Lim & Loosemore, 2017; Wu et al., 2017). Among the specific means by which project performance is enhanced by open tendering are through its ability to minimize corruption, favoritism, and nepotism while enhancing cost performance and innovativeness within environments of fairness, accountability, and transparency (Al-Rfou, 2012; Douh, 2015; Dagba & Dagba, 2019). Combining the above-mentioned positive impacts of open tendering with some critical elements of restrictive tendering, extant empirical literature holds the view that project performance will be significantly enhanced. This study drew support for the foregoing assertion from findings reported by Tadelis and Bajari (2006), Mwikali and Kavale (2012), Douh (2015), and several other sources. Consequently, the study proposed the second hypothesis:

H_{2o}: *Open-restrictive tendering will not have a positive relationship with project performance.*

H_{2a}: *Open-restrictive tendering will have a positive relationship with project performance.*

2.12 Selective Tendering and Project Performance

During this review, a significant volume of findings on the relationship between the selective tendering method and project performance has been uncovered. A review of a list of previous sources documented by Eriksson and Westerberg (2012) suggested varying degrees of correlations between the two variables. In that source, Liu et al. (2016) as well as Stanford and Molenaar (2018) were reported to have observed that selective tendering ensures relatively shorter tendering processes and hence shorter contract durations because it invites only a limited number of contractors. Other sources including Manley (2008) and Elsayah (2016) have also argued that selective tendering positively affects project performance by enabling employer organizations to develop long-term cooperative relationships with successful contractors. Similar findings on the benefits of long-term relationships to project performance was found by Meng (2012). The sources further indicated that such durable relationships have the advantage of providing selected contractors with in-depth knowledge regarding the specific project needs of their employer organizations. Eriksson and Westerberg (2009) argued that the development of such knowledge helps project contractors to better satisfy the demands of their employers and therefore is essential for the attainment of project performance. Conceptualizing project performance in terms of how safe and healthy project work environments are Eriksson and Westerberg (2012) asserted that selective tendering has the potential to create a safer and healthier work environment for construction projects than open competitive processes. This is because, in their view, proper management of the work environment, as well as best practices of sustainable development, are more likely under circumstances of long-term cordial relationships which are a feature of the selective tendering method. Additional evidence-based arguments have also been adduced by Eriksson and Westerberg (2012) to the effect that although open tendering mechanisms have been largely touted as great in ensuring cost-effectiveness, selective tendering may perform better. They held the view that limiting the tendering process to fewer tenderers

often takes away contractors' motivations to deliberately underestimate project costs thereby preventing cost overruns. In their concluding statement, Eriksson and Westerberg (2012), justified their initial hypothesis with empirical evidence that the invitation of a limited number of tenderers will lead to superior project performance in terms of time, quality, and innovation as well as improved work environment.

Ng (2001), Kadefors (2005), Alderman and Ivory (2007), Makovšek and Veryard (2016) as well as Hu et al. (2019), have maintained that placing too much premium on low tender prices is the objective of open tendering will undermine project performance by creating room for opportunistic behaviors which make cost performance targets extremely difficult to attain. And because selective tendering emphasizes a more careful selection of contractors who must meet certain clearly defined prequalification standards in terms of their competence, experience, resource capability, etc., key indicators of performance such as cost, time, innovation, environment, and quality are far better guaranteed (Manley, 2003; Iyer & Jha, 2005; El Wardani, 2004; Bosch-Sijtsema & Postma, 2009). Assaf and Al-Heiji (2006) and Ogunsanmi (2013) contended that selective tendering is closely associated with the attainment of superior project performance because it averts the likelihood of spiraling project costs through variation orders. Investigations into the suitability of selective tendering to enhanced project performance conducted by Zhang (2004) have indicated the existence of positive and strong correlations.

The adverse findings associated with the ability of selective tendering to positively impact project performance include the concerns that it may be subject to abuse and consequently undermine accountability, transparency, fairness, etc. As such, researchers like Zhang (2004), Mohammed et al. (2010), and Wamae (2016) have recommended its use only under circumstances such as in the case of highly complex and specialized projects where open competition may not produce the desired project outcomes.

Adopting Khang et al. (2015) definition of selective tendering as a procurement practice of limiting tender invitations to only a few contractors who must meet certain prequalification criteria to be considered for contract awards, this study observed abundant empirical evidence in support of the positive influence of selective tendering on the performance of projects in the construction industry. Sources including Eriksson and Westerberg (2012) as well as Walker (2015), have adequately explored the relationship and concluded that there is in fact, a positive

strong relationship between selective tendering and project performance measured by the former's ability to cut down significantly on project duration for example. Compelling arguments grounded in empirical findings have also suggested the existence of meaningful correlations between restricting tender processes to a limited number of highly qualified contractors and the performance of construction projects (Manley, 2008; Croucher et al., 2013; Hussain & Hadi, 2017). The sources argued that there are knowledge-based resources and capabilities associated with long-term relationships between employer organizations and contractors which are selected based on their qualifications which will be important for enhancing project performance (Eriksson, 2009). In addition to quality, cost, time, and other traditional performance indicators, some researchers have moved further to ground their arguments on the capability of selective tendering to improve other performance metrics such as safety, health, and environmental factors (Eriksson & Westerberg, 2012). The list of researchers who empirically tested and confirmed the strong influence of selective tendering processes on construction project performance includes Iyer and Jha (2005), Wardani et al. (2006), Manley (2008) as well as, Bosch-Sijtsema and Postma (2009). Based on these convincing empirical arguments, the researcher hypothesized that:

H_{3o}: *Selective tendering will not have a positive relationship with project performance.*

H_{3a}: *Selective tendering will have a positive relationship with project performance.*

The variables that were controlled in the study included the kind and size of the employer organization, the level of site supervision, the type of monitoring and control employed, and the payment schedule employed by the employer organizations since these variables were known to influence performance.

3. Methodology

3.1 Study Population and Context

The population of this study was individuals in public organizations in Ghana that initiate procurement in the construction industry. Thus, the population included personnel within the procurement divisions in institutions such as the Ministry of Roads and Highways, Ministry of Works and Housing, Ministry of Transport, and their attendant Agencies and other similar

procurement divisions of government organizations. The key informants included procurement officers, consultants, engineers, and quantity surveyors, to help fully grasp the impact of competitive tendering on performance. At present, an official comprehensive list of these individuals does not exist in any publicly available database. However, the researcher has access to informal sources from which the researcher generated a representative sample of respondents for this study.

3.2 Sample Size Determination

The accuracy of the research at a particular confidence level, desired by the researcher in estimating the population parameter will determine the sample size. Moreover, there is no doubt that a larger sample size is likely to be a good representation of the population (Taherdoost, 2016). Johnson and Gill (2010) indicated that although larger sample sizes are likely to result in unbiased research outcomes, care must be taken to balance sample size against the resources of the researcher. Several factors are important when determining the sample size for survey studies (Taherdoost, 2016). These include what the researcher's objectives or aims are, the types of statistical maneuvering that will be used in data analysis, as well as the total size of the sample selected relative to the complication of the population (Taherdoost, 2016). Johnson and Gill (2010) indicated that the main objective of calculating sample size is to obtain both a suitable precision and a desirable confidence level with minimum cost.

The formula used to calculate the sample size for this study is the kind used for categorical data as proposed by Taherdoost (2017),

$$n = \frac{p\,(100 - p)\,z^2}{E^2}$$

where,

n is the required sample size

p is the percentage occurrence of a state or condition

E is the percentage maximum error required, and

z is the value corresponding to the level of confidence required

In social and management research, typical values of a 5% margin of error (i.e., E value equal to 0.05) and 95% level of confidence (i.e., z value equal to 1.96), are acceptable (Taherdoost, 2016). Moreover, extant literature suggests that researchers should use 50% as an estimate of P, as this will result in the maximization of variance and produce the maximum sample size (Bartlett et al., 2001). Using the suggested values in the formula proposed by Taherdoost (2017),

$$n = \frac{50\% \, (100\% - 50\%) \, (1.96)^2}{(0.05)^2}$$

$$n = 384.16$$

An initial sample of 400 respondents was selected based on the calculated sample size value of 384 (Taherdoost, 2017) to complete the questionnaires and to compensate for non-response respondents.

3.3 Description of Sampling Procedure

There are various sampling procedures, which are broad categories into probability sampling and non-probability sampling. Probability sampling allows precise descriptions and statistical analyses of large sample sizes. Olofsson et al. (2014) opine that the logic behind probability sampling theory is to obtain an accurate representation of the population of interest, and the sample must contain the same variation that is present in the general population (Etikan et al., 2016). On the other hand, in some instances, it is impossible or inappropriate to achieve a precise representation of population characteristics. In such cases, non-probability sampling is useful for obtaining data. The study used a non-probability sampling procedure because the target population was construction professionals in a particular sector of the construction industry. In this approach, the researcher selects from the target population specific individuals who possess characteristics of interest to the study purposes, such as specific employee types or persons with specific lived experiences (Farrokhi & Mahmoudi-Hamidabad, 2012). This is a useful method for selecting a sample when the required characteristics are easily identifiable within a population which may not be easily randomized.

3.4 Questionnaire Design

The study variables were measured through the application of the technique of a survey questionnaire (Burns & Grove, 2005; Kim et al., 2013). In this study, the researcher designed a structured questionnaire as the main instrument for data collection for the quantitative study. Find the sample questionnaire in Appendix I. The items in this questionnaire were based on reviews of relevant literature.

The questionnaire focused on the three types of competitive methods, thus, open-competitive, open-restrictive, and selective tendering methods, respectively. Respondents were made to evaluate the effect of the respective competitive methods of contractor selection on project performance. Respondents' preference as far as this section of the questionnaire was concerned was measured on a 5-point Likert scale, where 5-denotes strongly agree, 4-agree, 3 neutral, 2-disagree and 1-strongly disagree. Respondents were also allowed to add or make any suggestions to the identified contractor selection methods.

3.5 Data Collection Procedure

The study employed a primary source of data using research instrument survey questionnaires. These questionnaires were administered to the respondents either by mail for those who were outside of the Greater Accra region or personally for those within the Greater Accra region. Questionnaires were sent to all 16 regions of the country. The questionnaires contained structured and semi-structured questions. The researcher adopted a structured questionnaire to reduce string responses which necessitated extensive data cleaning after the survey. Respondents were allowed to answer the questions and return them at their leisure. For respondents who participated in the survey remotely, telephone calls were employed to clarify concepts and to remind them to answer all questions in the survey. Also, where necessary, the researcher made efforts to offer case-specific explanations to respondents during personal interviews.

3.6 Response rate

The ratio of completed and returned questionnaires to the total questionnaires (i.e., sample size) sent out is referred to as response rate (RR), normally expressed in percentage. Whereas we should not expect 100 percent RR in studies where responding is voluntary (Rogelberg & Stanton, 2007; Gazes et al., 2013), it is advantageous for researchers exploiting questionnaires to have

high RR. Of the four (400) hundred administered questionnaires, 318 complete responses were received after reminders to survey participants, exclusive of 3% of the mailed total questionnaires returned with missing data and were not used in the analysis. This gave a complete response rate of about 80% which is reasonably high and sufficient for this study (Harangozó & Zilahy, 2015).

3.7 Data Analysis Procedure

The collected raw survey data were edited by analyzing them for errors and omissions and correcting them where possible (Kothari, 2004). The exercise was carried out to ensure that the information gathered is correct, compatible with other information gathered, uniformly entered, and as complete as possible. After editing, numerals were assigned to responses to categorize and classify them into a small number of categories that applied to the research problem in question. The edited surveys were then coded into groups based on the research questions, taking these inherent characteristics as aforementioned into account (Kothari, 2004). The next in line after coding was data classification, involving grouping data into classes based on shared characteristics so that meaningful relationships can be drawn or inferred from the data (Kothari, 2004). Finally, the large amount of data was condensed into a tabular format for further statistical analysis.

Descriptive statistics were used to give general overview information of the constructs under review as well as the demographic and organization-specific data. The Kaiser-Meyer-Olkin (KMO) test of sampling adequacy and Bartlett's test of sphericity were run to ensure that the sample was adequate for factor analysis to be done and, secondly, to ensure that the dataset provided contained unique factors in each case. A KMO test score of 0.5 or higher and Bartlett's score with a p-value less than 0.05 is considered appropriate and renders data ideal for an exploratory factor analysis to be carried out. Exploratory factor analysis, a data reduction procedure was used to gather information concerning the interrelationships among the set of variables (Pallant, 2020). It was used to group the volume of indicators into a smaller number of coherent subscales.

4. Results

4.1 Demographic information

The analyzed results in Table 1 show that the survey was dominated by male respondents with nearly 90% of representation in the sample. As indicated, the target sample in the survey was project managers and procurement officers in the Ghanaian construction industry. This result, therefore, indicates that the top management of construction organizations in the national construction industry is male-dominated.

Table 1: Demographic Characteristics of Respondents

Bio-data	Frequency	Percent (%)
Gender		
Female	35	11
Male	283	89
Total	318	100
Age (Years)		
18-24	18	5.7
25-30	45	14.2
31-35	44	13.8
36-40	43	13.5
41-45	72	22.6
46 and above	96	30.2
Total	318	100
Level of Education		
PhD	2	0.6
Masters	150	47.2
Bachelors	117	36.8

Diploma	47	14.8
SHS	2	0.6
Total	318	100

Respondents' age was measured in year categories. The result indicates that the majority of respondents were older than 45 years. This implies that respondents had substantial experience in the practice of tendering and project management and were thus capable of providing accurate information to this study.

With regards to the level of education, about 85% of respondents had attained a minimum bachelor's degree: the modal category was master's degree with 47% representation. This high level of education, combined with professional experience, gives us confidence in the quality of the information provided in the survey.

The characteristics of organizations in the survey are presented in Table 2. The number of employees is an ideal proxy of firm size. The results suggest that about 62% of organizations in this study are large firms that employ more than hundred (100) permanent staff. About 7% of sampled firms employed between 51 and 99 staff; 18% had 21 to 50 employees; and about 13% had 20 or fewer staff members. Firm size may reflect the scale of construction undertaken and the type of tendering method. However, the specific effect of firm size on project performance is not established in the literature. Therefore, it would be interesting to assess the effect of this control variable on the relationship between competitive tendering and project performance.

Like the findings on firm size, the majority of organizations in the sample have been in business for more than a decade. About 70% of the organizations have been operating for more than 20 years. This high duration of operation signifies tacit experience in performing construction projects. Experience may influence project performance positively if firms have honed their skills in procurement and controlling relevant aspects of the project environment. However, experience may also calcify firms into familiar but inefficient operation activities, which leads to poor project performance.

Respondents in the survey indicated whether their organizations were state-owned, private, or quasi-public enterprises. About 85% of sampled organizations were state-owned; 13% were

private operations, and 2% were joint ventures. Backed by the powers of the state, public enterprises tend to have a higher likelihood of obtaining work. However, they may be plagued by bureaucratic inefficiencies that easily beset the public sector. Private enterprises are more likely to overcome these stated inefficiencies but may lack the material and financial capacity to execute work, especially in their nascent stages. Quasi-public enterprises are, in theory, designed to overcome these challenges by harnessing the strengths of their original models. This will also be further examined. Frequency of project site supervision, nature of project monitoring and control, and nature of adherence to payment schedule jointly examine aspects of organizations' project management practices. The results show that the majority of respondents reported high levels of project site supervision and quality of project monitoring and control but low adherence to payment schedules. We expect these findings to also influence project performance irrespective of the selected competitive tendering methods.

Table 2: Demographic Characteristics of Respondents

	Frequency	Percent (%)
Number of Employees		
Less than 20	43	13.5
21-50	57	17.9
51-99	21	6.6
100 and above	197	61.9
Total	318	100.0
Years of Operation		
0-5	17	5.3
6-10	20	6.3
11-15	32	10.1
16-20	28	8.8
21 and above	221	69.5
Total	318	100.0

Type of Organization		
State-owned	271	85.2
Quasi-Public	6	1.9
Private	41	12.9
Total	318	100.0
Frequency of Site Supervision		
Very Irregular	34	10.7
Irregular	46	14.5
Not sure	23	7.2
Often	93	29.2
Very Often	122	38.4
Total	318	100
Nature of Monitoring and Control		
Very Low Quality	6	1.9
Low Quality	66	20.8
Not sure	27	8.5
High Quality	173	54.4
Very High Quality	46	14.5
Total	318	100
Nature of Adherence to Payment Schedule		
Very Untimely	107	33.6
Untimely	102	32.1
Not sure	42	13.2
Timely	56	17.6
Very Timely	11	3.5
Total	318	100

4.2 Correlation Matrix

A pairwise correlation matrix for the correlations among the variables in the model is presented in Table 3. The values represent the magnitude of correlations between constructs while the signs represent the directions of the correlation. Thus, a negative sign shows an inverse correlation while a positive sign shows a direct relationship. Again, the statistical significance of this correlation was tested at a 5% significance level.

The findings in Table 3 reveal substantial interrelations among the constructs although only a handful of these were statistically significant. Notably, the correlation matrix shows significant negative and positive relations between OCTS and ORTS on one hand ($r=-0.698, p<0.05$) and OCTS and STS ($r=0.413, p<0.05$) on the other. Also, the correlation matrix shows significant positive and negative relations between OCTS and project performance on one hand ($r=0.425, p<0.05$) and OCTS and project performance ($r=-0.258, p<0.05$) on the other.

With regards to the control variables, while years of operation ($r=0.563, p<0.05$) and frequency of site supervision ($r=0.567, p<0.05$) showed positive correlations with project performance, the size of the firm (measured by the number of permanent employees) showed the opposite effect ($r=-0.181, p<0.05$).

These significant inter-item correlations provide further justification for using oblique rotations (rather than orthogonal rotations) to generate the factors used in the regression estimation. According to Watkins (2018), orthogonal rotations assume that there are no underlying correlations among items in the factor-generation process. However, this is hardly ever the case with real-world data and informs the recommendation that empirical researchers adopt oblique rotations when generating factors for confirmatory analysis (Loehlin and Beaujean, 2017; Watkins, 2018).

Table 3: Correlation Matrix for Constructs in the SEM

	Variables	1	2	3	4	5	6	7	8	9
1	Open Competitive Tendering Strategy	1			**0.425***	0.935	0.964	0.198*	0.502*	0.658*
2	Open Restrictive Tendering Strategy	**-0.698***	1		-0.258	0.897	0.922	-0.406	0.996	-0.727*
3	Selective Tendering Strategy	**0.413***	-0.273	1	0.046	-0.834*	-0.918*	0.376*	0.759	-0.367
4	Project Performance	**0.425***	-0.258	0.046	1	-0.181*	**0.563***	0.108	**0.567***	0.911
5	Firm Size	0.935	0.897	-0.834*		1		0.899*	-0.953*	-0.634*
6	Years of Operation	0.964	0.922	-0.918*			1	0.3	0.419	0.658
7	Firm Type	0.198*	-0.406	0.376*				1	0.234	0.771
8	Frequency of Site Supervision	0.502*	0.996	0.759					1	0.673*
9	Nature of Monitoring	0.658*	-0.727*	-0.367						1

***** *Shows statistical significance at the 5% level*

4.3 Regression Results

To assess whether the relationships among variables confirm the hypotheses of this study, we estimated two sequential regression models. Specifically, the study first assessed the effects of the three tendering strategies: open-competitive, open-restrictive, and selective, on firms' project performance. This preliminary estimation (Model 1 in Table 4) helped establish *prima facie* evidence that there exist statistical relationships between the study's primary constructs and the dependent variable.

Following this, the study re-estimated Model 1 in the presence of five control variables; firm size, years of operation, firm type, frequency of site supervision, nature of monitoring, and adherence to a payment schedule, as shown in Model 2 Table 4. The primary unit of analysis in this study is the firm. Therefore, it is important to consider the probable heterogeneity effects of firm characteristics in the study's models. This serves a two-fold purpose: it helps limit potential endogeneity resulting from omitted variable bias and ensures that all estimated effects of interest are attributable to variations in the proposed model.

4.3.1 Effects of OCTS, ORTS, and STS on Project Performance – Model 1

As indicated, Model 1 in Table 4 was estimated to establish primary evidence of statistically significant relationships between each OCTS, ORTS, and STS and Project Performance. The parameter coefficients attached to each variable describe the magnitudes of variation in project performance resulting from a unit change in the respective independent variable while the signs (positive or negative) show the direction of the estimated effects. These estimates are standardized to a common unit for ease of interpretation.

The results from Model 1 indicate that there is a statistically significant relationship between at least one of the three tendering strategies and project performance. Judging by the magnitudes of the standardized coefficients, the selective tendering strategy (STS – 0.127) marginally edges open-competitive tendering (OCTS – 0.124) to show the strongest effect on project performance; open-restrictive tendering strategy (ORTS – 0.084) showed the least effect. The estimated effects of STS and OCTS on project

performance are statistically significant at a 5% level while that of ORTS on project performance is not statistically significant.

4.3.2 Effects of OCTS, ORTS, and STS on Project Performance – Model 2

The results from Model 2 further deepen a statistically significant relationship between the three tendering strategies and project performance. Again, by the magnitudes of the standardized coefficients, the selective tendering strategy (STS – 0.158) marginally edges open-competitive tendering (OCTS – 0.143) to show the strongest effect on project performance; open-restrictive tendering strategy (ORTS – 0.089) showed the least effect. The estimated effects of STS, OCTS, and ORTS on project performance are statistically significant.

Thus, construction firms in Ghana that tender for projects through the selective tendering strategy have a greater likelihood of meeting quality-, time-, and cost-related performance measures than those that rely primarily on open-competitive and open-restrictive tendering strategies. These performance effects, however, may not be reliable for inferential analysis since the study has not controlled for effects stemming from firm-specific characteristics.

Table 4: Standardized Regression Estimates

	Model 1 Estimate (S. E.)	**Model 2** Estimate (S. E.)	**Hypothesis**
Open Competitive Tendering Strategy (OCTS)	0.124**	0.143***	$\mathbf{H_{1a}}$
	-0.06	-0.051	
Open Restrictive Tendering Strategy (ORTS)	0.084	0.089*	$\mathbf{H_{2a}}$
	-0.06	-0.051	
Selective Tendering Strategy (STS)	0.127**	0.158***	$\mathbf{H_{3a}}$ ✝
	-0.06	-0.051	
Firm Size		-0.222***	
		-0.043	
Years of Operation		0.048	
		-0.041	
Firm Type		-0.072	
		-0.072	
Frequency of Site Supervision		-0.033	
		-0.036	
Nature of Monitoring		-0.012	
		-0.047	
Adherence to Payment Schedule		0.373***	
		-0.042	

*, **, and *** represent statistical significance at 10%, 5%, and 1% levels. ✝= confirmed hypothesis based on results from Model 4. Dependent Variable: *Project Performance*

The SEM estimation results did not support the first hypothesis, whose formation was informed by findings in the literature like those of Steven and Patrick (2006). These authors asserted that the open competitive tendering strategy may result in poor quality and safety shortcuts, as well as inhibit research and development, due to low profit margins arising from reduced tender prices necessary by fierce competition. This implied that open competitive tendering will have a detrimental impact on project performance. In addition, Bitar (2012) found that open tendering causes "significant delays in the planned schedule, cost overruns, very substantial quality concerns, and an increase in the number of claims and litigation." Contrary to the study's position, the SEM regression revealed a positive statistically significant effect of OCTS on project performance. This finding aligns with those of Kaunyangi (2014), Sawalim (2015), Al-Shareem et al. (2015), and Ababa (2019).

4.4 Conclusion

With regards to the first hypothesis that open-competitive tendering negatively affects project performance, the results from the SEM regression contradicted this study's position by establishing a statistically significant but positive effect of OCTS on Project Performance.

5. Conclusions and Recommendations

Firstly, the fact that the two tendering strategies that exemplify the extremes of competitive contract offer – open competitive and selective – positively influence project performance is a feather in the cap of the status quo in Ghana where most construction projects are awarded through competitive tendering processes. However, extant literature reviewed for this study outlined several shortcomings of open-competitive tendering including long evaluation durations, submission of unrealistically low tenders, and awards to incompetent firms. Hence, this study recommends that employers assess their system for evaluating tenders from open competitive tenders to iron out all inefficiencies and speed up the process. Contemporary management information systems can be designed and deployed toward this effort. When this is done, serious contractors who might otherwise abstain from tendering because of the cumbersome process will be incentivized to participate. This effort portends benefits for both employers and contractors: employers will limit the costs involved in processing tenders while the renewed interest from competent firms will increase the assurance of timely delivery of quality and affordable projects that meet value-for-money standards.

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Appendices

Appendix I: Survey questionnaire

SECTION A

This section investigates the effect of **competitive tendering methods** (**open**, **open-restrictive,** and **selective tendering**) on **project performance.**

Please indicate the extent to which you agree or disagree with the following statements regarding the competitive tendering strategies indicated.

Circle the appropriate number on the Likert scale of 1 to 5 with:

Strongly Disagree (SD)	***Disagree (D)***	***Neutral (N)***	***Agree (A)***	***Strongly Agree (SA)***
1	***2***	***3***	***4***	***5***

SN		**SD**	**D**	**N**	**A**	**SA**
I	***OPEN COMPETITIVE TENDERING STRATEGY***					
1	Very competitive tenders are obtained	1	2	3	4	5
2	Only interested firms will submit tenders	1	2	3	4	5
3	New firms are able to obtain work and prove themselves	1	2	3	4	5
4	Some firms may not be well equipped, either materially or financially, to execute the work	1	2	3	4	5
5	If a very low tender is submitted and accepted, it may cause difficulties throughout the contract	1	2	3	4	5
6	Submitting tenders cost time and expense, and this cost needs to be recovered	1	2	3	4	5
7	Enables project to be within budget and price certainty	1	2	3	4	5
8	Allows overall cost of the project to be minimized	1	2	3	4	5
9	Life cycle costs are minimized	1	2	3	4	5
10	Offers price competition in terms of value for money	1	2	3	4	5
11	There is risk allocation – knowledge of how risks are shared among parties	1	2	3	4	5
12	The functionality of the project is according to the specification	1	2	3	4	5
13	The expected quality is optimized or achieved	1	2	3	4	5
14	The customer is highly satisfied	1	2	3	4	5

15	Procurement policy is adhered to	1	2	3	4	5
16	Standardized procurement procedures are adhered to	1	2	3	4	5
17	Proficient procurement staff vet and evaluate contractors	1	2	3	4	5
18	Anti-corruption measures are implemented	1	2	3	4	5
19	There is a tendency to accommodate changes during the design and construction phases	1	2	3	4	5
20	Allows time of schedule to be minimized	1	2	3	4	5
21	The project is within the time schedule	1	2	3	4	5
22	There is relative project speed at the design stage	1	2	3	4	5
23	There is relative project speed at the construction stage	1	2	3	4	5

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II	***OPEN RESTRICTIVE TENDERING STRATEGY***					
1	Only interested firms will apply	1	2	3	4	5
2	Only suitable firms are asked to submit tenders	1	2	3	4	5
3	Less overall expense for the tenderer	1	2	3	4	5
4	New firms may be able to obtain work and prove themselves	1	2	3	4	5
5	Less competitive	1	2	3	4	5
6	Can lead to cover pricing being submitted	1	2	3	4	5
7	Enables project to be within budget and price certainty	1	2	3	4	5
8	Allows overall cost of the project to be minimized	1	2	3	4	5
9	Life cycle costs are minimized	1	2	3	4	5
10	Offers price competition in terms of value for money	1	2	3	4	5

11	There is risk allocation – knowledge of how risks are shared among parties	1	2	3	4	5
12	The functionality of the project is according to the specification	1	2	3	4	5
13	The expected quality is optimized or achieved	1	2	3	4	5
14	The customer is highly satisfied	1	2	3	4	5
15	Procurement policy is adhered to	1	2	3	4	5
16	Standardized procurement procedures are adhered to	1	2	3	4	5
17	Proficient procurement staff vet and evaluate contractors	1	2	3	4	5
18	Anti-corruption measures are implemented	1	2	3	4	5
19	There is a tendency to accommodate changes during the design and construction phases	1	2	3	4	5
20	There is a tendency to accommodate changes during the design and construction phases	1	2	3	4	5
21	The project is within the time schedule	1	2	3	4	5
22	There is relative project speed at the design stage	1	2	3	4	5
23	There is relative project speed at the construction stage	1	2	3	4	5

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III	***SELECTIVE TENDERING STRATEGY***					
1	Only firms capable of executing the work will be selected	1	2	3	4	5
2	Selected firms will probably have already proved themselves	1	2	3	4	5
3	Reduction in the time and overall cost of tendering	1	2	3	4	5
4	The price may not be competitive	1	2	3	4	5
5	Can lead to cover prices being submitted	1	2	3	4	5

6	Difficult for new firms to obtain work easily	1	2	3	4	5
7	Enables project to be within budget and price certainty	1	2	3	4	5
8	Allows overall cost of the project to be minimized	1	2	3	4	5
9	Life cycle costs are minimized	1	2	3	4	5
10	Offers price competition in terms of value for money	1	2	3	4	5
11	There is risk allocation – knowledge of how risks are shared among parties	1	2	3	4	5
12	The functionality of the project is according to the specification	1	2	3	4	5
13	The expected quality is optimized or achieved	1	2	3	4	5
14	The customer is highly satisfied	1	2	3	4	5
15	Procurement policy is adhered to	1	2	3	4	5
16	Standardized procurement procedures are adhered to	1	2	3	4	5
17	Proficient procurement staff vet and evaluate contractors	1	2	3	4	5
18	Anti-corruption measures are implemented	1	2	3	4	5
19	There is a tendency to accommodate changes during the design and construction phases	1	2	3	4	5
20	There is a tendency to accommodate changes during the design and construction phases	1	2	3	4	5
21	The project is within the time schedule	1	2	3	4	5
22	There is relative project speed at the design stage	1	2	3	4	5
23	There is relative project speed at the construction stage	1	2	3	4	5

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SECTION B

Biographical information

1. What is your gender?
   [ ] Male [ ] Female
2. What is your age bracket?
   [ ] 18-24 years [ ] 25-30 years [ ] 31-35 years
   [ ] 36-40 years [ ] 41-45 years [ ] 46 and above years

3. What is your level of education?
   [ ] PhD [ ] Masters [ ] Bachelors [ ] Diploma
   [ ] Senior High School [ ] Other If other please specify ……...……
4. What is the total number of employees in your organization?
   [ ] Less than 20 [ ] 21-50 [ ] 50-99 [ ] 100 and above
5. How long has your organization been in business?
   [ ] 0-5 years [ ] 6-10 years [ ] 11-15 years [ ] 16-20 years [ ] Above 21 years
6. How will you describe your type of organization?
   [ ] State-owned organization [ ] Quasi organization [ ] Privately-owned organization
7. How often is the supervision of project sites done?
   [ ] Very irregular [ ] Irregular [ ] Not sure [ ] Often [ ] Very often
8. How will you describe the nature of monitoring and control of projects?
   [ ] Very low quality [ ] Low quality [ ] Not sure [ ] High quality

   [ ] Very high quality

9. How will you describe the nature of adherence to the payment schedule of projects?
   [ ] Very Untimely [ ] Untimely [ ] Not sure [ ] Timely [ ] Very timely