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## The Effects of Procurement Management Practices on Risk Management in Construction Firms

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### Abstract

It is obvious that effective procurement management practices remain the cardinal bridge between reduction of procurement risks and successful delivery of construction projects. In most parts of Africa, construction industry is of paramount importance as an evidence of economic growth and civilization. In Ghana, the construction industry, as in other parts of the world, is huge and a crucial segment in economic development. The performance of the government and an individual is measured by the construction of roads, bridges, housing facilities, etc. This study was conducted within the Ashanti Region of Ghana. The study primarily sought to describe how procurement management practices influences risk management in construction firms, from the context of construction firms in the Ashanti Region. Statistically, there are at least 114 construction companies in Ghana, and about one-third of these firms are within the Ashanti Region. Thus, at least 38 construction firms can be located within the Ashanti Region. These firms include both private, local and foreign firms. In all, a sample frame of 80 participants was drawn for the study. Given that the study primarily sought to describe how procurement management practices influence risk management in construction firms, the study has established that the procurement management practices, for most of the firms, followed a process of risk identification, risk assessment, risk response, and in some few cases there was also a component of risk monitoring. Mostly, the management teams were responsible for risk identification/assessment procedures.

**Keywords:** Procurement; Management; Risk; Procurement Management; Risk Management; Ashanti Region.

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## **1. Introduction**

It is obvious that effective procurement management practices remain the cardinal bridge between reduction of procurement risks and successful delivery of construction projects. Globally, the role of procurement in construction is important in the acquisition, gathering and organisation of multitudes of separate individuals, firms and companies to design, manage and build construction products such as houses, office buildings, shopping complex, road, bridge for specific clients or “customers” [1]. Conversely, procurement in construction have been conceptualise by some reseachers as the acquisition of new buildings, or space within buildings, either by directly buying, renting, or leasing from the open market, or by designing and building the facility to meet a specific need [2]. Within these contexts, procurement management has grown to be an integral part of the contemporary construction firm. A successful construction procurement is considered as a result of a proper procurement management and a project delivered on time, to cost and to the desired quality capable of performing the specific business function of that client [3].

In most parts of Africa, construction industry is of paramount importance as an evidence of economic growth and civilization. In Ghana, the construction industry, as in other parts of the world, is huge and a crucial segment in economic development. The performance of the government and an individual is measured by the construction of roads, bridges, housing facilities, etc. Procurement in construction is guided by a methodology, which refers to the overall approach to procurement including the procurement strategy and procurement system. Procurement strategy outlines the key means by which the objectives of construction projects, either public or private, are to be achieved [4]. It includes contracting arrangements for design, construction, maintenance or operation activities and subcontract arrangements. On the other hand, the procurement system is an organisational system that assigns specific responsibilities and authorities to people and organisations, and defines the various elements in the construction of a project [5]. The selection of the procurement methodology is essentially guiding by establishing the most appropriate overall arrangements or delivery system for the procurement [6]. It also covers establishing a contract system for each of the contract or work packages involved as components of the chosen delivery system and setting up how the procurement will be managed by the agency or management system to suit the selected delivery and contract systems.

Some researchers have elaborated that procurement systems can be classified as traditional, design and construct, management and collaborative systems. They emphasised that a plethora of procurement practices have been developed to assist decision-makers in reaching an informed decision about what is the most appropriate procurement management practice for a given project. Any given procurement management practice seek to obtain an effective use of resources and to maintain critical balance of value for money, cash flow rate, timeliness, quality of design and quality of construction [7].

This study was conducted within the Ashanti Region. Ashanti region is a cosmopolitan region in Ghana. The region shares boundaries with four of the ten political regions, Brong-Ahafo Region in the north, Eastern region in the east, Central region in the south and Western region in the south west. The region is divided into 30 districts, each headed by a district chief executive [8].

Statistically, there are at least 114 construction companies in Ghana, and about one-third of these firms are within the Ashanti Region. Thus, at least 38 construction firms can be located in the region. These firms include both private, local and foreign firms that handles both private and public awarded contracts. The internal procurement management practices associated with these firms may differ, but the external procurement management practices are generally similar for many particular construction firm [9].

### ***1.1. Statement of the Problem***

Procurement management practices in construction, which covers source of funding, partner selection method, price basis, responsibility for design and for management, as well as the amount of subcontracting, requires much attention in risk management due to its centrality to the industry [10]. The choice of procurement option implies different opportunities and risks for the various actors, and also determines the procurement management practice, as well as the extent to which they can reduce the costs, increase profits, maintain brand quality, and avoid business insolvency [11, 7].

In construction, procurement management practice is affirmed as essential due to the unique complexities and stakeholder relations that underlie construction contracts. All forms of construction are associated with various procurement practices. Effective procurement management practice may reduce risks associated with finances, marketing, technology, human resource, or organizational strategy. In some cases, poor procurement management practices have led to the liquidation of construction, such as the Bank for Housing and Construction [12]. It is therefore important for these companies to manage procurement risks and align procurement options to risk management practices, in order to reduce losses and avoid liquidation.

### ***1.2 Objective and Scope of the Study***

The objective of this study is to investigate into the procurement management practices employed by construction firms in Ghana, from the context of construction firms in the Ashanti Region. The scope of this study was limited to assessing the effects of procurement management practices in construction firms. The study involved twenty (20) randomly selected construction companies within the Ashanti Region - Ghana. The study primarily seeks to describe how procurement management practices influences risk management in construction firms.

## **2. Literature Review**

Based on the literature review conducted around the topic of procurement management practices, some researchers have argued that no standard definition and classification of procurement approaches have been acceptable. However, some terms such as contractual arrangement, project delivery system and procurement system are often used to describe the of process that is adopted to procure a construction project and are often considered to be synonymous, though their definitions vary widely [13]. On the other hand, the overall procurement provides strategies to satisfy a client's developmental and/or operational needs with respect to the provision of constructed facilities or a discrete life cycle [2].

From another perspective, procurement has been described as the process of acquiring or obtaining material, property or services, and begins with the determination of a need for a property or service and ends with the completion and close-out of a contract [14].

The first step of procurement practice is making selection from the various procurement strategies. The selection of an appropriate procurement strategy has been reviewed to be in two components, analysis and choice. The analysis refers to assessing and establishing priorities for the project objectives and client attitude to risk, while the choice relates to considering possible options, evaluating them and selecting the most appropriate [15]. The importance of analysis and choice in procurement selection is embedded in the assertions that efficient procurement of a construction project through choice of the most appropriate procurement strategy is a major determinant of construction project success, and that the failure to select an appropriate procurement approach is the primary cause of project dissatisfaction [16, 17].

Procurement options vary widely, but the most commonly adopted ones include:

- design and construct procurement
- management procurement
- collaborative procurement

Design and construct procurement, also refers to as design and build, can be described as using a single contractor to act as the sole point of responsibility to a public sector client for the design, management and delivery of a construction project on time, within budget and in accordance with a pre-defined output specification using reasonable skill and care [18, 19]. With the design and construct procurement, the contractor accepts responsibility for some or all of the design [20]. Unless the contract states otherwise, the liability for design is an absolute liability under which the contractor's warrant fitness for the purpose intended. On the other hand, some design and construct forms limit the design liability of the contractor to the normal professional duty to exercise reasonable care and skill [10].

Five forms of design and construct procurements have been described by researchers, these are; direct, competitive, develop and construct, package deal and negotiation. the direct procurement is the case where there is no competition in obtaining tenders, but some appraisal of the possible competitors may be made before tendering although only one tender is obtained [21]. In the competitive approach, tenders are obtained from documents that are prepared to enable several contractors to offer competition in design and in prices [22]. Consultants may be required to design the building required to a partial stage, often referred to as 'scope design', then competitive tenders are obtained from a select list of contractors to develop and complete the design and construct the building [23]. Modigliani and Miller [24] refer to this as develop and construct procurement.

The design and construct methods are endorse on the assertion that it offers certainty on the contract sum and brings cost benefits [25].

This is because, the close integration of design and construction methods and the relative freedom of the contractor to use their purchasing power and market knowledge most effectively can provide a client with a competitive price [26]. With a design and construct method, it is possible to ensure a quicker start on site, and the close integration of design and construction can result in more effective programming [27]. On the other hand, this can be time-consuming because time is needed by the client's consultants to prepare an adequate set of requirements, and time is needed to compare and evaluate the schemes from competing bidders. notably, some researchers have raise the concern that once a contract is signed, any changes by the client can also prove costly [28].

In the package deal procurement, the contractors competing use a significant part of their own or another proprietary building system or they construct variations of a repetitive theme. This limits the scope for innovation, but some contractors may offer to find a site, to sell, mortgage or lease their product or obtain approvals at a risk to themselves or at a cost to the clients. In contrast, novation procurement allows that the contractor to take over from the client a previous contract for the design work, complete the design and construct the work [27].

Distinctively, management procurement is differentiated as management contracting, construction management and design and manage [29]. In the case of management contracting, the contractor has direct contractual links with all the works contractors and is responsible for all construction work. The client appoints an independent professional team, and also a management contractor to serve as advisors to the team, and during construction, to be responsible for executing the works using direct works contracts [30]. With this type of contract it is possible to make an early start on-site and achieve early completion [31]. Because of its flexibility, it allows the client to change the design during construction because drawings and matters of detail can be adjusted and finalised as the work proceeds.

In construction management, a contractor is paid a fee to professionally manage, develop a programme and coordinate the design and construction activities, and to facilitate collaboration to improve the project's constructability [32]. The basic difference is that works contracts, although arranged and administered by the management contractor, are direct between the client and works contractor. This approach gives the client a greater measure of control, but it also client also assumes a considerable amount of risk. The management contractor is thus, simply an agent, and usually cannot guarantee that the project will be finished to time and cost [22].

A design and manage strategy is similar to management contracting in that the contractor is paid a fee and assumes responsibility, not only for works contractors, but also for the design team [33]. However, instead of a single contractor, a project design and management organisation designs and manages the work, generally for a fee and delivers the project by employing works contractors as its subcontractors to design/or construct [27]. A project designer/manager is often made the client's agent, who represents the consultant responsible for designing and managing the project, also for obtaining subcontract tenders from works contractors, who each enter into a direct contract with the client [18].

The author in reference [34] maintains that management procurement methods are best suited to large, complex, fast moving projects where early completion is desirable. The client has a considerable degree of flexibility on design matters, thus the design can be adjusted as construction proceeds, without sacrificing cost control. This would not be possible with traditional methods. A competitive tendering element is retained for all works contracts, which usually account for most of the overall prime cost [19].

Collaborative forms of procurement require the development of relationships between the various parties [27]. According to Davis, this is an iterative and evolutionary learning process with three important characteristics namely; commitment, trust and cooperation. Relationship contracting thus, involves the identification, establishment and maintenance of particular relationships with project stakeholders in order to meet the objectives of all parties involved [35].

The authors in reference [36] noted that, a relationship-based procurement approach can take many forms. For example, Walker and Hampson differentiate between enterprise networks, partnering and alliances with alignment of objectives towards a common business objects as some common forms of collaborative procurement [37]. However, several authors agree that collaborative procurement differs from other systems in that it involves longer joint planning and monitoring, vision haring by actors and a focus on total costs [38, 37]. In reference [39, 40] the authors suggest that relationship based procurement leads to mutual benefit in construction business-to-business dealings and provides benefits over traditionally forms of procurement with fragmented supply chains both within projects and across projects.

Within the framework of collaborative procurement, there exists a special situation in which a private party, normally a consortium structured around a Special Purpose Vehicle that takes responsibility for financing and long term maintenance or operation of a facility to provide long term service outcomes. The researchers in [39] refer to private-public partnership and maintain that there is a variety of partnership models. The public sector delivers services, considered to be core services, but the provisions made by the private parties may differ. The private party may provide infrastructure-related service only, infrastructure-related services only, infrastructure-related services with ancillary services, infrastructure-related services and ancillary services, together with some services to the community, or a full range of services to the community including infrastructure, such as road and rail projects [10]. In reference [20] the authors elaborate that related ancillary services, in this contexts, may cover a number of operational services including information technology services, accommodation services resulting from the infrastructure, building-related services such as maintenance and some support services. In some cases, such as certain transport projects, the privately provided services may extend to the delivery of services to end-users.

In the authors' opinion, Ambrose and Tucker [29] resolved that partnerships may involve the private entity taking responsibility for the design and construction of a component of new infrastructure, and/or taking over a long-term lease or concession over existing assets. It may also include the development of a new long-term contract to operate and manage the infrastructure by the private partner [7]. Typical forms of procurement include: design, build, finance and operate/maintain, build-own-operate and transfer or build-own-operate.

A key component of such arrangements is that there is a requirement to pay only for defined assets or services when they are delivered [40].

In Ghana, various procurement systems have been used over the years to some degrees of success because the nature of projects usually dictates the type of management technique suitable for its implementation. Several construction firms utilise the management contracting procurement [41], while Asamoah-Amono indicated that design-build procurement is also practiced by many construction firms [42]. Mensah and Ameyaw in [43] noted that several procurement options in Ghana conform to public-private partnerships. These are guided by laws and policies including the Procurement Law, Act 663 (2003), which factors in more than just the monetary arrangement to include issues of environmental, economic and social sustainability of procurement.

In reference [22, 23] the authors commend partnering as a way to create effective collaboration between the project's actors. However, the procurement option adopted may largely depend on the type of contract, the objectives, budget and the parties involved. Each option is characterised by general and peculiar risk and thus, many require different matching of risks to activities.

### **3. Methods and materials**

This study adopted a quantitative approach. It involved collecting and analysing numerical data to make numerical representation of observations for the purpose of describing and explaining the phenomenon that those observations reflect. Questionnaire was prioritized as the main instrument to solicit primary data. Books, articles, and relevant documents were reviewed as secondary sources of information gathering.

#### ***3.1 Population and Sampling***

A population which was made up of construction companies within the Ashanti Region was considered. The sample size was made up of twenty (20) randomly selected construction companies within the Ashanti Region. Within the twenty (20) selected construction companies, the construction managers, quantity surveyors, site supervisors and site engineers were purposively included in the study. This is because, these individuals are assumed to have the requisite knowledge about procurement procedures in their field of operation and how those processes contribute to or militates against risks. The General Manager of each firm was included in the study for data on the general risk management procedures and how they are linked to procurement. In all, a sample frame of 80 participants was drawn for the study.

#### ***3.2 Sources of Data***

The study employed both primary and secondary data. Primary data on the procurement techniques and the risks of operations were sought from the contract managers, quantity surveyors, purchasing officers and site engineers of the targeted construction firms. Similar respondents were targeted by Osipova; Mensah and Ameyaw, respectively [10, 44]. Secondary data on the construction costs, timing and deadlines, as well as the costs associated with risks were solicited from the targeted managers.

### **3.3 Instrumentation and Data collection Procedure**

In this study, questionnaires were used to solicit data from the general managers, contract managers, quantity surveyors, purchasing officers and site engineers. This is because the study assumes that these groups of people are literate and can therefore read, understand and also answer the items on the questionnaire accordingly. In their study on “Sustainable procurement: the challenges of practice in the Ghanaian construction industry [44]” Mensah and Ameyaw also used questionnaires.

The questionnaire for data collection was tested in one purposely selected construction firm in the Ashanti Region. This was done to serve as the preliminary testing of the research questions to provide insights into ideas not yet considered and problems unanticipated, which could challenge the data analysis. Furthermore, it helped to check and try the planned statistical tests of association between variables. Besides these, the pre-test enabled the researcher to revise the contents of the questionnaire, thereby revising the questionnaire to achieve the reliability and validity standards required in scientific research.

The questionnaire was sent to accessible employees in the firms that gave their consent for the study to be conducted. The employees were encouraged to answer all the items in the questionnaire. The researcher paid subsequent visits to the company after the initial delivery of the questionnaire. During these visits, completed questionnaires were collected while discussions were held to help employees with some difficulties to understand issues raised in the questionnaire. This was repeated until all the answered questionnaire was collected from the participants.

### **3.4. Methods of data analysis**

The data were cleaned and checked for reliability using statistical tools in Statistical Product for Service Solutions (SPSS). The study employed descriptive statistical tools to analyse the demographic characteristics of respondents. The procurement and risk management methods adopted by the contractors were also examined using descriptive statistical tools. Relationships between variables were tested using cross-tabulations and their statistical significance of the associations was tested using the chi-square values and their associated p-values. The relative importance indices of the challenges and risks to the procurement in the construction industry were calculated in support of the discussions. This is in line with the methods adopted by Mensah and Ameyaw [44].

## **4. Results and Discussion**

It is affirmed that, in construction, effective procurement management practice may reduce risks associated with finances, marketing, technology, human resource, or organisational strategy. In some cases, poor procurement management practices have led to the liquidation of construction [12].

### **4.1 Tendering Approaches used by Construction Firms**

Tendering of contracts forms a major part of procurement, and any risks associated with tendering of projects can affect the entire procurement procedure [45].



Given the fact that tendering of projects defines the contractual relations between stakeholders of the project, the risks associated with tendering can permeate through to the project planning, implementation and evaluation [24]. In this study, the risks associated with tendering of the projects and their effects on the projects were analysed, such that Table 1, showed the major tendering approaches used by the construction firms. These tendering approaches are competitive (62.2%), direct (21.6%), as well as development and construct (16.2%).

**Table 1:** Tendering Approaches used by Construction Firms

Tendering approaches	Firm ownership		Total f(%)
	Local f(%)	Foreign f(%)	
Competitive	13(56.5)	10(71.4)	23(62.2)
Direct	6(26.1)	2(14.3)	8(21.6)
Development and construct	4(17.4)	2(14.3)	6(16.2)
<b>Total</b>	<b>23(100.0)</b>	<b>14(100.0)</b>	<b>37(100.0)</b>

Chi-square = 0.923; df = 2; p-value = 0.630

Source: Field survey, 2013

The risks associated with the tendering processes were examined through multiple responses of sampled respondents. This was done to match the tendering processes to their identified risks, as antecedent to making recommendations to lessen those risks. According to Table 2, the risks were related to expected kick-backs (62.2%) excessive bureaucracy (21.6%), and risk of loyalty to a particular bidder (16.2%). In the disaggregated results, it was noted that all the identified tendering risks could be associated with direct and competitive tendering. However, direct tendering was more susceptible to bureaucratic risks (57.1%), while competitive tendering was more aligned to expected kick-backs (41%). The development and construct tendering approach was linked only to bureaucratic risks.

#### **4.2 Risk Management Practice of Construction Firms**

According to McDermott, every decision has some element of risk involved, because decisions are seldom made with complete knowledge of the outcomes [46]. Therefore risk management seeks to narrow the gaps of uncertainty between expected results from decisions and actions, on the one hand, and actual outcomes on the other [47]. This study examined the risk management practices of the construction firms and associated them with the procurement management practice chosen by the firms.

According to the results in Table 3, 54.1% of the respondents indicated that they had an official risk management procedure for risk identification.

In the disaggregated results, it was shown that 64.3% of the respondents from the foreign owned firms expressed that their respective firms had a risk identification process in place. On the other hand a little more than half of the respondents, representing 52.2%, from the locally owned firms indicated that they had no risk identification procedures in place. However, the chi-square statistics (0.949) and the p-value of 0.330 indicate that the differences in the responses were not statistically significant at an alpha of 0.05. Thus, the study concluded with the general indication that generally, the construction firms in the Ashanti Region, irrespective of their ownerships mostly had a risk identification process in place.

**Table 2: Tendering risks in procurement**

Tendering risks	Firm ownership		Total f(%)
	Local f(%)	Foreign f(%)	
Expected kick-backs	8(22.9)	11(45.8)	19(62.2)
Bureaucratic risks	21(60.0)	8(33.3)	29(21.6)
Risk loyalty	6(17.1)	5(20.8)	11(16.2)
<b>Total</b>	<b>35(100.0)</b>	<b>24(100.0)</b>	<b>59(100.0)</b>

Source: Field survey, 2013

**Table 3: Risks Identification Processes of Construction Firms**

Do you have a risk identification process	Firm ownership		Total f(%)
	Local f(%)	Foreign f(%)	
Yes	11(47.8)	9(64.3)	20(54.1)
No	12(52.2)	5(35.7)	17(45.9)
<b>Total</b>	<b>23(100.0)</b>	<b>14(100.0)</b>	<b>37(100.0)</b>

Chi-square = 0.949; df = 1; p-value = 0.330

Source: Field survey, 2013

The study further explored the risk identification practices that were adopted by the construction firms in their procurement management process. This was captured by multiple responses of 20 respondents who indicated that their firms had risk identification processes in place. The results from Table 4 were that 51.6 percent of the responses indicated cost projections as one of the risk identification practices.

Moreover, the geographical evaluation of the soils and construction sites (16.1%) and cross-checking the background of bidders (16.1%) also informed the risk identification processes of the firms. These also confirmed some general practices to risk identification, as noted in the literature [18, 48]. The results further showed that the majority of respondents from local (47.9%) and foreign (41.7%) firms attested to the fact that cost evaluation mostly informed the risk identification processes of the construction firms.

**Table 4:** Risk identification practices by construction firms

Practice	Firm ownership		Total f(%)
	Local f(%)	Foreign f(%)	
Cost evaluation	11(47.8)	5(41.7)	16(51.6)
Geographical evaluation	2(10.5)	3(25.0)	5(16.1)
Cross-checking bidders' background	2(10.5)	3(25.0)	5(16.1)
Climate/weather forecasts	2(10.5)	1(8.3)	3(9.7)
Quality control assessment	2(10.5)	0(0.0)	2(6.5)
<b>Total</b>	<b>19(100.0)</b>	<b>12(100.0)</b>	<b>31*(100.0)</b>

\*Multiple responses; n = 20

Source: Field survey, 2013

In this study the purpose of risk identification was examined as part of risk management in procurement management process during construction of projects. According to the results, multiple decisions are made by the firms, based on the identified risks to the projects. It was found in Table 4 that 20% of the responses indicated that the risk identification results inspired decisions on continuing with the projects. This was confirmed by 23.7% of the responses from the local firms and 15.6% of the responses from the foreign construction firms.

It was further noticed from Table 5, that a higher percentage (23.7%) of the responses from the local firms agreed that the risk identification often informed decisions about the continuity of the project, a higher proportion (18.8%) of the responses from the foreign firms noted that pricing and budgeting decisions of procurement management were mostly informed by the risk identification exercise.

**4.3 Risk Assessment Processes Adopted by the Construction Firms**

The study explored the risk assessment processes adopted by the construction firms through identifying the stakeholders involved in the risk assessment procedures.

The actual risk assessment practices and the response strategy follow risk assessments pattern. The results in Table 6 indicated that in most (50.7%) cases, the management teams of the firms were noted at the major stakeholders in the assessment of risks. This was indicated by 53.8% of the responses from the local firms and 46.7% of the responses from the foreign firms.

In other responses, it was noted that the other stakeholders in the risk assessment of the firms were contractors (24.6%), supervisory staff (14.5%) and private consultants (10.1%).

**Table 5:** Decisions made from risk identification practices

Decisions	Firm ownership		Total f(%)
	Local f(%)	Foreign f(%)	
Continue with the project	9(23.7)	5(15.6)	14(20.0)
Continue tendering	7(18.4)	5(15.6)	12(17.1)
Withdraw from a contract	7(18.4)	5(15.6)	12(17.1)
Procurement methods	5(15.6)	1(3.1)	8(11.4)
Pricing and budgeting	2(5.3)	6(18.8)	8(11.4)
Hiring and remuneration	4(10.5)	4(12.5)	8(11.4)
Health and safety issues	2(5.3)	6(18.8)	8(11.4)
Total	38(100.0)	32(100.0)	70*(100.0)

\*Multiple responses; n = 20

Source: Field survey, 2013

#### 4.4 Risk Response Strategies Adopted for Procurement Approaches

On the other hand, for design and manage procurement, the most effective risk assessment method was noted as the quantification of potential losses and gains. The results from the multiple responses therefore showed that most of the firms were inclined to use qualitative means of assessing risks associated with procurement. This study examined the risk response strategies of the firms, with regards to their procurement management practices.

According to the study, 86.7% of the responses given by the respondents indicated that the major risk response approach in procurement management was risk insurance. The other option for responding to the risks identified was risk absorption (13.3%), or risk retention [49].

This was adopted only for management contracting and design and manages procurement management approaches.

**Table 6:** Stakeholders in risk assessment

Decisions	Firm ownership		Total f(%)
	Local f(%)	Foreign f(%)	
Management team	21(53.8)	14(46.7)	35(50.7)
Contractors	8(20.5)	9(30.0)	17(24.6)
Supervisory staff	6(53.8)	4(13.3)	10(14.5)
Private consultants	4(10.3)	3(10.0)	7(10.1)
<b>Total</b>	<b>39(100.0)</b>	<b>30(100.0)</b>	<b>69*(100.0)</b>

\*Multiple responses; n = 37

Source: Field survey, 2013

**Table 7:** Risk Response Strategies Adopted for Procurement Approaches

Risks	Procurement approach				Total f(%)
	Design and build f(%)	Management contracting f(%)	Design and manage f(%)	Private-public partnership f(%)	
Risk insurance	13(100.0)	28(87.5)	9(69.2)	2(100.0)	52(86.7)
Risk absorption	0(0.0)	4(12.5)	4(30.8)	0(0.0)	8(13.3)
<b>Total</b>	<b>13(100.0)</b>	<b>32(100.0)</b>	<b>13(100.0)</b>	<b>2(100.0)</b>	<b>60*(100.0)</b>

Multiple responses; n = 37

Source: Field survey, 2013

#### 4.5 Risk Monitoring by Construction Firms

The risk monitoring activities of the firms as part of their risk management strategy in procurement management were explored. The results in Table 8 showed that 62.2% of the respondents indicated that their respective firms did not practice the identification and monitoring of residual risks. This was confirmed by 65.2% of the respondents from local firms and 57.1% of the respondents from foreign firms.

Further statistical analysis showed that the distribution of the responses was associated with a chi-square of 0.241 and a p-value of 0.623. This indicated that, with a confidence level of 95%, the differences in the responses were not statistically significant. Thus, generally the majority of the construction firms in the Ashanti Region, irrespective of their origin or ownership did not make efforts to identify and/or monitor any residual risks, as recommended in the literature [50, 51].

**Table 8:** Risk Monitoring by the Construction Firms

	Firm ownership		Total
	Local	Foreign	
Practice of risk monitoring	f(%)	f(%)	f(%)
Practiced	8(34.8)	6(42.9)	14(37.8)
Not practiced	15(65.2)	8(57.1)	23(62.2)
Total	23(100.0)	14(100.0)	37(100.0)

Chi-square = 0.241; df = 1; p-value = 0.623;

Source: Field survey, 2013

**Table 9:** Types of monitoring practices of the construction firms

	Firm ownership		Total
	Local	Foreign	
Monitoring practice	f(%)	f(%)	f(%)
Management team for future costs control	5(31.2)	4(28.6)	9(62.2)
Assigning monitoring personnel	4(25.0)	6(35.7)	9(37.8)
Risk insurance	4(25.0)	3(21.4)	7(23.3)
Specific risk assessment	3(18.8)	2(14.3)	5(16.7)
Total	16(100.0)	14(100.0)	30(100.0)

Chi-square = 0.241; df = 1; p-value = 0.623;

Source: Field survey, 2013

## 5. Conclusions

Given that the study primarily sought to describe how procurement management practices influences risk management in construction firms, the study has established that the procurement management practices, for most of the firms in the Ashanti Region of Ghana, followed a process of risk identification, risk assessment, risk response, and in some few cases there was also a component of risk monitoring.

Mostly, the management teams were responsible for risk identification/assessment procedures. The approach to risk assessment was mostly by quantifying the possible losses over gains, but others also based their assessments on predictions from empirical data and by qualitative judgments based on past experiences. The major risk response strategy was through risk insurance and the main monitoring activities were assigning management team for future cost control and for general risk assessment.

## **6. Recommendations**

The study recommends that employees should engage in effective risk monitoring in order to identify any residual risks that may pertain to the construction projects.

The study can be replicated in other regions within the country, in order to obtain a more comprehensive view of the effects of procurement management practices on risk management in construction firms in Ghana. Further research can also be conducted into the empirical evidence of procurement challenges in Ghanaian construction firms. In relation to this, further research can also be made into methods of consolidating indices for bids and costs, which can help to improve projections and biddings in procurement

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