

FACTORS INFLUENCING THE EFFECTIVENESS OF RISK MANAGEMENT IN HOUSING PROJECTS PROCURED WITH SELECTED METHODS IN AKWA IBOM STATE

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ABSTRACT

Purpose: The awareness and insight of the factors influencing risk management is essential in the effective management of projects delivered with any procurement method. The study aimed at providing insight into how several factors influence the effectiveness of risk management practices of housing projects procured by traditional, direct labour and, labour only methods with a view to enhancing construction projects delivery in Akwa Ibom State.

Design/methodology/approach: A cross-sectional survey approach was used for the study. Ninety-nine (99) copies of questionnaire were retrieved from purposively selected representatives of construction firms operating in the study area. Twenty-five factors were identified from literature and presented for respondents' assessment. Data collected were analysed using relative influence index, while Kruskal Wallis was used to test the hypothesis.

Findings: It has been established that the five most important factors influencing the effectiveness of risks management in traditional, direct labour and labour-only procurement methods are; timing, environmental factors, funds allocation for risk exercise, complexity and top management support. The result also shows that 4.0% of the whole factors has very high influence, 60% have high influence, while 36% of the evaluated factors have moderate influence on the effectiveness of the procurement methods, with all the methods exhibiting similar influence.

Research limitations/implications: The limitations include the use of only the perception of purposively selected representatives of construction firm in Akwa Ibom state and only selected procurement methods. The contribution to knowledge is that this study has established the current level of effectiveness of risk management in some procurement methods in the study area.

Practical implications: It is recommended that that advanced formal and informal training in risk management and prioritization of the control of the factors influencing their effectiveness should be regularly conducted among the stakeholders involved in the delivery of housing projects in the study area

Originality/value: The study revealed the level of influence which the identified risk factors have on the management of risks in of housing projects procured with different methods, as well as the variations among the factors in the procurement methods.

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Keywords: Contractors; housing project; influencing factors; procurement methods; risk management.

1. INTRODUCTION

The Nigerian construction Industry is one active sector of the Nigerian economy which takes the largest part of government spending on capital projects and it's the major source of economic growth and development of the country (Waziri and Bala, 2014). The industry has grown over the years as a result of demands for real estate and housing, the provision of infrastructure to support an increasing population size and the need to open up communities to foster inter-state and inter-regional trade and movement. This opened up the market for construction and services within the industry (NBS, 2015). The provision of these infrastructure is mostly undertaken and financed by the government through different procurement methods of construction in the country (Iboh, Adindu and Oyoh, 2013). According to Babatunde, Opawole and Ujaddughe (2010), procurement method is the management of the total process involved in construction project delivery. The variants of procurements methods available today metamorphosed from the need to improve construction project delivery, that is, project completion within budget and time, and the emphasis of procurement methods is optimizing all parameters involved in project delivery namely, time, cost and quality (Babatunde, Opawole and Ujaddughe, 2010; Alabi, 2018).

According to Chartered Institute of Building (CIOB) (2010), the difficulty and what sets construction industry procurement far apart from anything else, is the complexity of projects. Influences such as ground conditions, topography, logistics, weather, available technologies, finance, labour availability and services all affect the ability of a project to be completed on time, on budget and to a high quality.

There are a number of risks which can be identified in the construction industry and which can be faced in each construction project regardless of its size and scope. Changes in design and scope along with time frames for project completion are the most common risks for the construction sector (Ropel and Gajewska, 2011, Akinkumi, Aghimien and Awodele, 2018).

Risk management is a positive and proactive process intended to reduce the likelihood of unsatisfactory consequences to the project in its different stages, such as design, construction and operation. (Serpella, Ferrada, Rubio and Arauzoa, 2014.) Risk management is a planned form of identifying and evaluating risk and selecting, establishing and applying options for the handling of the risk (Aminu, 2013; Sanda, Anigbogu, Nuhu and Olumide, 2020). Ngundo (2014) opined that the effectiveness of the risk management process can be influenced by several internal and external factors. An understanding of the nature of influence of these factors has overall effect on the performance of a project delivered through any procurement method (Ujene and Adewuyi, 2016). This is consequent upon the fact that the further in the process, changes in scope or design are implemented, the more additional resources, time and cost, those changes require. Project completion ahead of time may be as troublesome as delays in a schedule. Too quick completion may be a result of insufficient planning or design problems which in fact shorten the completion time but on the other hand leads to a low quality of final product and increased overall cost (Ropel and Gajewska, 2011).

The problem of this study therefore concerns the inability of stakeholders to effectively determine and control the factors associated to the management of various

risks associated with different project delivery methods in the study area. Hence this study seeks to evaluate the factors affecting the effectiveness of risk management methods in traditional, direct-labour and labour only procurement in housing projects in Akwa Ibom State. The evaluation of the factors influencing the effectiveness of the risk management practice in the procurement methods will assist the stakeholders (clients, consultants and contractors) of housing projects in the study area to appreciate the impediments to effective risk management methods, and hence prioritize the provision of solutions to check the problems in the various procurement methods.

1.1 Aim and Objectives of the Study

The aim of this study is to provide reasonable insight and awareness of the factors affecting the effectiveness of risk management practice of selected procurement methods of housing projects, with a view to enhancing the delivery of building projects in Akwa Ibom State.

The three objectives of this study are to:

1. Evaluate the factors influencing the effectiveness of the risk management practice in traditional procurement method.
2. Assess the factors influencing the effectiveness of the risk management practice in direct labour procurement method.
3. Evaluate the factors influencing the effectiveness of the risk management practice in labour only procurement method.

One hypothesis was postulated based on the three objectives, which states that there is no significant variation in the influence of factors affecting risk management among the procurement systems.

2. REVIEW OF RELATED LITERATURE

Literature were reviewed in related areas covering, risk management processes, types of procurement methods and factors influencing the effectiveness of risk management.

2.1 The Risk Management Process

Banaitiene and Banaitis (2011) has it that risk management in the construction project management context is a comprehensive and systematic way of identifying, analysing and responding to risks to achieve the project objectives. Ozcan (2008) Considers Project Risk Management as “increasing the probability and impact of positive events, and decreasing the probability and impact of events adverse to the project”.

However, Pereraa, Rameezdeen, Chilesheb and Hosseini (2014) stated that risk management domain should not be confined to mitigating and controlling risks but should target avoiding the identified risk. According to Ropel and Gajewska (2011), risk management cannot be perceived as a tool to predict the future, since that is rather impossible. Instead, it is a tool to facilitate the project in order to make better decisions based on the information from the investment. In this way, decisions based on insufficient information can be avoided, and this will lead to better overall performance. For the purpose of this study, risk management is considered as the whole activities geared toward spotting risky situations, along with developing the strategies to reduce the probability of occurrence

and impacts of risks (Pereraa, Rameezdeen, Chilesheb and Hosseini, 2014). The major processes of Risk Management include risk identification, risk quantification, and risk response, development and control (Ozcan, 2008).

2.2 Methods of Procurement in Construction

Once a project has been found to be feasible and viable, the client's next step is to select the appropriate procurement method he intends to use for the project. This selection of a procurement method by the client is based on experience and or the advice of a construction professional either in-house or from a private practice (Akobi, 2012). A procurement method (or sometimes known as procurement system) "is an organizational system that assigns specific responsibilities and authorities to people and organizations, and defines the various elements in the construction of a project (Ei Agha, 2013). A procurement method can also be described as the process of the management of the design and construction of a building from inception to the completion stage (Kadiri and Ogunkola, 2014). The different procurement systems present have brought changes not only to the process and procedure of project delivery but also the aspects of management and organization (Rashid *et al.*, 2006). Variants of the procurement methods in use in construction projects in Nigeria include Traditional, Design and Build, Project Management, Construction management, Management Contracting, Labour-Only, Direct-Labour, and other Discretionary procurements such as Alliancing, Partnering, and Joint Ventures. Ogunsami (2012), however, came to the conclusion that more often than not, the traditional system of project procurement provides the datum for comparing the other methods. For the purpose of this research, much attention will be paid to traditional, direct labour and labour-only procurement methods.

2.3 Factors Affecting the Effectiveness of Risk Management Practice

Project risk management is an iterative process; the process is effective when it is implemented in a systematic manner throughout the lifecycle of a construction project, from the planning stage to completion. Some of the factors that influence effectiveness of risk management practice include; top management support, competence of project team, project funding and project risk planning.

2.3.1 Top Management Support

As penned by Ngundo (2014), top management support and commitment is a critical success factor in effectiveness of project risk management, the benefit of which is related to improving decision making in order to manage risk, commitment and support from top management plays a key role in influencing the success in almost any initiative within an organization, Critical top management support includes a broad range of activities in an organization. Rao and Mak (2001), outlines a number of key responsibilities for the executive to ensure project success, which include approving the project, confirming it is aligned to the strategic goal of the business, allocating resources such as human, time and financial resources to the implementation effort. Hence, top management should involve itself in resolving conflict by mediating between groups and promoting project acceptance, by building cooperation between various stakeholders and involving users in the project implementation process.

2.3.2 Competence of Project Team

The owners' project team consists of project managers, project executives and functional Members. In order to complete project successfully, it is critical that every project team member has a good understanding of the fundamental project requirements, which include project planning, organizing, motivating, directing and controlling (Cleland and Ireland, 2002) and has positive attitude. The problems of the incompetence of project team have been divided into two categories, individual incompetence and ineffective teamwork. The first issue concerns the ability of each individual in the project team in performing his/her job. Only a few people can perform their duties well with high productivity, on time and with high efficiency. The reasons for this poor performance often come from the lack of knowledge, skills and abilities of project team members (Kerzner, 2003).

In order to cope with the problem of the project team's incompetence, several critical strategies were proposed, namely; training and education, good staffing and effective teamwork (Ngundo, 2014). Ngundo (2014) further observed that formal risk management is rarely used, not only because of a lack of knowledge but also because of doubts in the suitability of risk management techniques for construction activities. From the findings, construction contractors also seldom employ formal risk management in their business practices and it may be because of a lack of knowledge and a lack of exposure to risk management. Although, local organizations sometimes apply risk management, the applied risk management method typically amounts to undocumented practices, which unfortunately fail to achieve the full benefits of formal risk management.

2.3.3 Project Funding

The critical risk factors affecting project time and cost identified in the work of Ngundo (2014), are; increased material cost and inaccurate material estimation were the factors most affecting project cost overrun, difficulty in obtaining monthly payments and material price escalation, change orders, disbursement schedule.

2.3.4 Project Risk planning

The first stage in the risk management process, risk planning, involves planning how to approach and perform risk management to ensure that the level, type and visibility of risk management are commensurate with both the size of the risk and the importance of the project. The project objectives are established and the responsibilities are assigned to the relevant parties in the risk planning stage (PMI, 2004). Here the risk management process is employed in the project risk planning.

2.4 Risks in Procurement

How risks are shared among the actors in a construction project is to a large extent governed by the choice of procurement option and the content of the related contract documents. As different procurement options imply different ranges of responsibilities and liabilities in the project, selecting an appropriate project procurement option is a key issue for project actors (Osipova, 2008). In the traditional procurement system, as the parties share the responsibilities for various phases of a project, the intention is having a balance of risk between parties whereas in design and build because the contractor accepts the responsibility for both design and construction, majority of the risks are placed on the contractor. In direct Labour the client bears all the risk whereas in labour-only the client and the contractor bears the risk in respect of their responsibilities in the project.

In management contracting and construction management procurement systems, the client accepts a considerable amount of risk since the contractor is mostly providing only the management expertise (Davis, Love and Baccarini, 2008). However, the type of the contract chosen for the project under any of the selected procurement systems would also determine the ratio of risk transferred to the involved parties. In fixed price contract since the contractor is responsible for majority of the tasks, the risks are mostly transferred to contractor than the client whereas in the reimbursable contract because the contractor is paid a percentage of the cost of the project, it is possible that contractor tries to maximize the cost of the project in order to earn more profit and therefore the client is dealing with majority of the risks (especially financial risks) in this contract.

In billed rates and also turnkey contracts, since the contractor is responsible for executing the majority of the phases of the project and client is only paying the contractor, responsibility of managing the majority of the risks is also by the contractor. Partnership contracts, however, would have a balance in sharing the risks between the parties based on the details of the contract. Therefore, it can be seen that the level of risk transferred to the parties varies in different procurement systems and contracts. However, no matter which party is responsible for the risks more than others, the risks should be managed systematically. The identification of the factor(s) that will constitute the greatest risk to the projects if they fail to be achieved will assist in the development of a weighted list of priorities and the overall procurement system to be considered. The following risk factors should be considered when evaluating the most appropriate procurement strategy as identified by Davis, Love and Baccarini (2008):

a. External factors – consideration should be given to the potential impact of economic, commercial, technological, political, social and legal factors which influence the client and their business, and the project team during project's lifecycle. For example, potential changes in interest rates, changes in legislation and so on.

b. Client resources – a client's knowledge, the experience of the organisation with procuring building projects and the environment within which it operates will influence the procurement strategy adopted. Client objectives are influenced by the nature and culture of the organisation. The degree of client involvement in the project is a major consideration.

c. Project characteristics – The size, complexity, location and uniqueness of the project should be considered as this will influence time, cost and risk.

d. Ability to make changes – Ideally the needs of the client should be identified in the early stages of the project. This is not always possible. Changes in technology may result in changes being introduced to a project. Changes in scope invariably result in increased costs and time, especially they occur during construction. It is important at the outset of the project to consider the extent to which design can be completed and the possibility of changes occurring.

e. Cost issues – An assessment for the need for price certainty by the client should be undertaken considering that there is a time delay from the initial estimate to when tenders are received. The extent to which design is complete will influence the cost at the time of tender. If price certainty is required, then design must be complete before construction commences and design changes avoided.

f. Timing – Most projects are required within a specific time frame. It is important that an adequate design time is allowed, particularly if design is required to be complete before construction. Assurances from the design team about the resources that are available for the project should be sought. Planning approvals can influence the progress of the project. If early completion is a critical factor, then design and construction activities can be overlapped so that construction can commence earlier on-site. Time and cost trade-offs

should be evaluated. Ogunsanmi, Salako, and Ajayi (2011) also identified 37 risks in design and build procurement which are:

Natural Phenomenon: The sub factors are; weather conditions (exceptional inclement weather) and catastrophes (fire, earthquake, windstorm and others).

Economics/finance: The sub factors are; Inflation, financial failure – any party (lack of payment), exchange rate fluctuation/devaluation and tax rate charge.

Politics/Government/Society: The sub factors are; government acts and regulations, and administrative bureaucracy.

Industrial Characteristics/Contract: The sub factors are; Labour disputes, third party litigation, contract and award method, indemnification and holding harmless.

Construction/Safety and Environment: The sub factors are; different sites conditions (unforeseen site conditions), unidentified utilities, construction defects (inadequate quality of works and need for correction), quality control and assurance, environmental risks, accidents, safety, delayed payment (delay progress payments), owner's experience, designer and builder selection and, charge order (change in scope of work/quality).

Designer/Contractor: The sub factors are; permits and approval, establishment of a project cost, constructability of design, redesign if over budget, errors or omissions, level of design completion, contract and award method, delay in Design, inadequate specifications, warranty of facility performance, contractor's experience and, permits and approval.

Job Site: The sub factors are; soil condition and site access.

3. RESEARCH METHODOLOGY

3.1 Study Area

The research was conducted in Akwa Ibom state. Akwa Ibom State is one of the thirty-six states that make up Nigeria and one of the nine oil and gas producing states of the Niger Delta region in Nigeria. The State is geographically located in the South-South Geo-Political zone of Nigeria with an estimated population of 3,902,051 people and has a total land mass of 6,187km², which represents 0.67% of the total land mass of Nigeria (National Population Commission, 2007). The state which has three major languages of Ibibio, Annang and Oron is located between latitude 4° 3' and 5° 32' North of the equator and longitude 7° 25' and 8° 3' East of the Greenwich meridian (Akpan, 2014).

Politically, the state has three senatorial districts namely; Eket senatorial district, Ikot-Ekpene senatorial district and Uyo senatorial district, with ten federal constituencies and thirty-one Local Government Areas. According to Akpan and Usoro (2011), as at now, some urban areas like Ikot-Ekpene, Abak and especially Uyo capital city, which has other part of Uruan, Ibiono Ibom, Itu, Ibesikpo and Etinan Local Government Areas carved out and added to the former Uyo Township, have witnessed tremendous transformation. Their former natures of rural local government headquarters have metamorphosed into Municipalities with many modern roads which have completely changed the aesthetics of the places (Udoh, 2014). These transformations have also encouraged rural-urban migration and steady influx of people from neighbouring states, which has imposed several housing problems on the populace (James, Akpan, Essien and Ekpo, 2012; Udoh, 2014). This research focused on this area due to the on-going and completed housing project construction in the state, which is, attributed to the drive by the state government and the

private sector to provide accessible and affordable housing accommodation to its increasing population

3.2 Research Methods

The study adopted cross-sectional survey approach to assess the factors influencing the effectiveness of risk management in projects delivered using traditional, direct labour and labour only methods. The perceptions of 99 purposively selected representatives of construction firms practicing in Akwa Ibom were gathered using structured questionnaire. The purposive approach is due to the researchers' desire to reach out to willing and capable respondents who preferred to remain anonymous. Statistical analysis of the data from the questionnaire was done using statistical package for social sciences (SPSS). The tools employed for the data analysis were: relative influence index and Kruskal Wallis test.

The relative influence index (RII) method was used in this study to determine the influence of the Twenty-five selected factors from literature on risk management in the different procurement methods as stated in objectives 1-3. This approach was adopted from Ugwu and Haupt (2007) and Enshassi, Mohamed and Abushaban (2009) as shown in equation 1.

$$RII = \sum W / AxN \dots\dots\dots (1)$$

Where W is the weight given to each variable by the respondents and ranges from 1 to 5; A – The highest weight = 5; N – the total number of respondents.

For ease of explanation the RII were categorised as: 0-0.359 very low influence (VLI); 0.36-0.529 low influence (LI); 0.53-0.679 moderate influence (MI); 0.68-0.839 high influence (HI) and 0.84-1.0 very high influence (VHI) as adopted from Ujene and Adewuyi (2016), since there is no specific range of RII available in the literature for explanation (Alashwal and Al-Sabahi, 2018). Kruskal Wallis test was used for the variations in the perceptions of the factors influencing the effectiveness of risk management in projects procured with the different delivery methods as captured in the hypothesis of the study.

4. DATA ANALYSIS, RESULTS AND DISCUSSION OF FINDINGS

The results and findings arising from the analysis are presented in this section.

4.1 Respondents Characteristics

The characteristics of the respondents that supplied the data used for the study were analysed for an understanding of the effect of risk management using the understudied procurement methods. From the findings 88.9% represents the male while 11.1% represents the female. The highest academic qualification of the respondents are 1% had SSCE, 8% had OND, and 56% had HND OR B.Sc while 35% had M.Sc or P.hD, also 14% of the respondents were consultants, 65% were contractors while 21% were clients. The

professional affiliation of the respondents, 25% were Architects, 30% Builders, 29% Engineers, 10% Quantity Surveyors and 5% Estate Surveyors.

The respondents were requested to indicate their membership status in their professional bodies. The study revealed that corporate members were 21%, graduate members 37%, while associate members were 29%. The results also show that 16% of the respondents have been in practice between 1-5yrs, 42% have practiced between 6-10yrs, 12% between 11-15yrs, 8% between 16-20yrs and 21% have been practicing for over 20yrs.

The respondents were asked to state the client for the housing project they took part in. The result shows that 29% were public housing projects while 70% were private housing projects. The study also reveals that 54% of the respondents were from Uyo senatorial district while Ikot Ekpene and Eket senatorial district had 26% and 20% respectively. The respondents were requested to indicate the size of their firms and- if they are consultants or contractors. The results show that 93% of the respondents are working in a small firm (from 0-50 permanent employees) and 7% in a large firm (from 50-250 permanent employees). The results from the type of firm operated by the respondents shows that 82% operates contracting firms while 18% operates consultancy firm.

4.2 Factors influencing the Effectiveness of the Risk Management Method in the different Procurement Methods

The three objectives of the study were formulated to evaluate the factors affecting the effectiveness of risk management methods in the different procurement methods. To achieve these objective 25 factors were identified from the literature and pilot study and presented to the respondents for subjective assessment as it applies to the three understudied procurement methods. The perception of the respondents was measured on a five point Likert scale as indicated in the methodology of the study. The sum and relative influence indices of the factors affecting effectiveness of the risk management methods were analysed and their corresponding ranks and level of influence were determined.

The result as presented in Table 1 shows that in traditional procurement the most significant factors are Complexity, Top Management Support and Timing. These ranked 1st, 2nd, 3rd with an RII of 0.836, 0.814 and 0.794 respectively. The results also showed that 76% the factors have high influences, while 24% have moderate influence on the effectiveness of risk management methods in traditional procurement.

In Direct-Labour the most significant factors are timing, environmental factors and funds allocation for the risk exercise with an RII of 0.857, 0.808 and 0.806 respectively. The result shows that 4% of the factors have very high influence, 68% have high influence, while 28% have moderate influence on the effectiveness of risk management methods in direct-labour procurement. In Labour-only, timing, funds allocation for the risk exercise and top management support were the most significant factor with RII of 0.869, 0.826 and 0.810 respectively. The result also shows that 4% of the identified factors have very high influence, 64% have high influence, while 32% of the factors have moderate influence on the effectiveness of risk management in the labour-only procurement method.

The study found out that lack of project timeliness affects effectiveness in risk management to a great extent. When a project takes longer to complete than was initially planned for, the delay triggers cost overruns which jeopardizes the success of the project in that these cost overruns were not planned for and the financiers may either not have the extra funding or are not willing to spend more on the project. This finding concurred with the result of the research by Cox, Morris, Rogerson and Jared (1999) that identified that

project time variations affect management of project risks. Environmental factors such as socio cultural, economic conditions affects risk management practice in housing projects in the study area. As each project is situated graphically within a specific environment the external environment has an important influence on the way any project risk is managed (Ghahramanzadeh, 2013). Funds allocation for the risk exercise as indicated by the respondents affects risk management in the understudied procurement methods in the study area. This usually may make the risk management process to stop at identification since analysis of the risk for its likely impact on the project will require funds that were not provided for. The findings correspond with the inference of the study by Ngundo (2014), that lack of commitment and low risk knowledge level makes the management not to allocate sufficient resources to risk management practice.

Table 1: Factors influencing the Effectiveness of the Risk Management in the Procurement Methods

Procurement methods Risk Factors	Traditional method			Direct labour method			Labour-only method		
	RII	Ran k	Rm k	RII	Rank	Rmk	RII	Rank	Rmk
Timing	0.794	3	HI	0.857	1	VHI	0.869	1	VHI
Funds Allocation for the Risk Exercise	0.754	9	HI	0.806	3	HI	0.826	2	HI
Top management support	0.814	2	HI	0.742	11	HI	0.810	3	HI
Environmental factors	0.776	7	HI	0.808	2	HI	0.806	4	HI
Historical data of past projects	0.733	13	HI	0.766	7	HI	0.802	5	HI
Risk Management Policies	0.792	4	HI	0.782	5	HI	0.790	6	HI
project type	0.786	5	HI	0.752	8	HI	0.766	7	HI
Expected outcome of risk exercise	0.768	8	HI	0.669	21	MI	0.760	8	HI
Clients knowledge	0.648	22	MI	0.749	9	MI	0.760	8	HI
Complexity	0.836	1	HI	0.786	4	HI	0.758	10	HI
Project Size	0.782	6	HI	0.766	6	HI	0.741	11	HI
Documentation Reviews	0.737	12	HI	0.737	13	HI	0.741	11	HI
Level of skills of risk assessor	0.745	10	HI	0.703	18	HI	0.723	13	HI
Nature and culture of the organization	0.630	26	MI	0.625	25	MI	0.689	14	HI
Project budget	0.729	14	HI	0.747	10	HI	0.687	15	HI
Change in scope	0.703	18	HI	0.741	12	HI	0.683	16	HI
Level of occurrence of risk	0.705	17	HI	0.616	26	MI	0.681	17	HI
Risk Tolerance	0.717	15	HI	0.706	17	HI	0.673	18	MI
Risk perception	0.717	16	HI	0.640	24	MI	0.671	19	MI
Qualification of risk assessor	0.642	24	MI	0.715	14	HI	0.651	20	MI
Unforeseen site conditions	0.681	19	HI	0.712	15	HI	0.638	21	MI
Project requirement	0.644	23	MI	0.707	16	HI	0.634	22	MI
Incomplete design	0.741	11	HI	0.693	19	HI	0.632	23	MI
Degree of client involvement	0.636	25	MI	0.661	23	MI	0.630	24	MI
Government acts and regulations	0.673	20	MI	0.679	20	MI	0.566	25	MI

RII= Relative Influence Index, Rmks = Remarks

The complexities of projects arising from ambiguous and non-routine activities affects effectiveness of risk management practice as complex projects require more attention to the risk management process. Systems and procedures that are easy to handle are important drivers of more effective risk management, hence, the complexity of the systems makes them difficult to apply in practice (Osipova, 2008).

4.3 Variation in the Influence of Factors Affecting Effectiveness of Risk Management Methods in the different Procurement Methods

For the purpose of evaluating the variation in the influence of factors affecting effectiveness of risk management practice in the different procurement methods, one hypothesis was tested it states that there is no significant variation in the influence of factors affecting effectiveness of risk management methods among the procurement system. . In order to test this hypothesis Kruskal-Wallis test was used at ≤ 0.05 , to provide confidence of views and generalization of opinions of the three procurement methods. The decision rule is that if p-value > 0.050 , the hypothesis is accepted, but if p-value ≤ 0.050 the hypothesis is rejected. In Table 2, the result shows a p-value of $0.918 > 0.050$, this indicates that there is no significant variation in the factors affecting effectiveness of risk management in the study area. This implies that the perception of the respondents on the factors influencing risk management among the procurement methods is the same, which may be attributable to the current general level of awareness of the respondents.

Table 2: Variation in Influence of Factors affecting Effectiveness of Risk Management Methods in the different Procurement Methods

Procurement methods	N	Mean Rank	Chi-square	Df	Asymp. Sig.	Decision
Traditional	25	40.52	0.171	2	0.918	Accept
Direct Labour	25	39.94				
Labour Only	25	38.04				
Total	75					

The result is similar to the finding by Gyamfi, Boadaa and Adu-Fosu (2016), which established from the corroborative evidence of respondents that the risks influencing the various procurement options (Design and build, Management contracting, Design and manage and Private-public partnership) adopted by construction firm in the Ashanti Region of Ghana could be classified mainly into economic risks and technological risks.

4.4 Aggregated Influence of Factors Affecting Effectiveness of Risk Management Methods in all the Procurement Methods

Consequent upon the establishment that there is no significant variation in the factors affecting effectiveness of risk management in the study area, the study attempted to evaluate the aggregated influence of all the methods by computing the average influence of the three procurement methods as presented in Table 3. The result shows that the five most influencing factors are; timing, environmental factors, funds allocation for risk exercise, complexity and top management support. The result also shows that only one factor representing 4.0% of the whole factors has very high influence. Fifteen factors representing 60% have high influence, while nine factors representing 36% have moderate influence on the effectiveness of the procurement methods. The result is similar to the finding by Gyamfi, Boadaa and Adu-Fosu (2016), that several factors classified into economic and technology have influence on the performance of various procurement options.

Table 3: Combined Influence of Factors affecting Effectiveness of Risk Management Methods in all the Procurement Methods

Risk Factors	Procurement Methods												Rmks
	Traditional			Direct Labour			Labour Only			Combined			
	Sum	RII	Rank	Sum	RII	Rank	Sum	RII	Rank	Sum	RII	Rank	
Timing	393	0.794	3	424	0.857	1	430	0.869	1	1247	0.840	1	VHI
Environmental factors	384	0.776	7	400	0.808	2	399	0.806	4	1183	0.797	2	HI
Funds Allocation for Risk Exercise	373	0.754	9	399	0.806	3	409	0.826	2	1181	0.795	3	HI
Complexity	414	0.836	1	389	0.786	4	375	0.758	10	1178	0.793	4	HI
Top management support	403	0.814	2	360	0.742	11	401	0.810	3	1164	0.789	5	HI
Risk Management Policies	392	0.792	4	387	0.782	5	391	0.790	6	1170	0.788	6	HI
project type	389	0.786	5	372	0.752	8	379	0.766	7	1140	0.768	7	HI
Historical data of past projects	363	0.733	13	379	0.766	7	397	0.802	5	1139	0.767	8	HI
Project Size	387	0.782	6	379	0.766	6	367	0.741	11	1133	0.763	9	HI
Documentation Reviews	365	0.737	12	365	0.737	13	367	0.741	12	1097	0.739	10	HI
Expected outcome of risk exercise	380	0.768	8	331	0.669	21	376	0.760	8	1087	0.732	11	HI
Level of skills of risk assessor	369	0.745	10	348	0.703	18	358	0.723	13	1075	0.724	12	HI
Project budget	361	0.729	14	370	0.747	10	340	0.687	15	1071	0.721	13	HI
Clients knowledge	321	0.648	22	371	0.749	9	376	0.760	9	1068	0.719	14	HI
Change in scope	348	0.703	18	367	0.741	12	338	0.683	16	1053	0.709	15	HI
Risk Tolerance	355	0.717	15	346	0.706	17	333	0.673	18	1034	0.699	16	HI
Incomplete design	367	0.741	11	343	0.693	19	313	0.632	24	1023	0.689	17	MI
Unforeseen site conditions	337	0.681	19	349	0.712	15	316	0.638	22	1002	0.677	18	MI
Risk perception	355	0.717	16	317	0.640	24	332	0.671	19	1004	0.676	19	MI
Qualification of risk assessor	318	0.642	24	354	0.715	14	322	0.651	20	994	0.669	20	MI
Level of occurrence of risk	349	0.705	17	305	0.616	26	337	0.681	17	991	0.667	21	MI
Project requirement	319	0.644	23	350	0.707	16	314	0.634	23	983	0.662	22	MI
Nature & culture of the organization	312	0.630	26	303	0.625	25	341	0.689	14	956	0.648	23	MI
Degree of client involvement	315	0.636	25	327	0.661	23	312	0.630	25	954	0.642	24	MI
Government acts and regulations	333	0.673	20	336	0.679	20	280	0.566	26	949	0.639	25	MI

RII= Relative Influence Index, Rmks = Remarks

5. CONCLUSION AND RECOMMENDATIONS

Risk management has become an integral part of construction project management. In spite of the general awareness of the risk management process, implementing risk management systematically in the project is still limited in practice owing to some factors affecting its effective management. It has been established that the five most important factors influencing the effectiveness of risks management in traditional, direct labour and labour-only procurement methods are: timing, environmental factors, funds allocation for risk exercise, complexity and top management support. The result also shows that 4.0% of the whole factors have very high influence, 60% have high influence, while 36% of the evaluated factors have moderate influence on the effectiveness of the procurement methods. It was concluded that these factors impair effective risk management practice in the study

area and if not given adequate consideration, successful delivery of projects will be hindered using any of the procurement methods. It was also concluded that the perception of the respondents on the factors affecting risk management among the procurement system is the same, hence equal and similar risks management consideration can be applied to any adopted procurement method. It is recommended that advanced formal and informal training in risk management and prioritization of the control of the factors influencing their effectiveness should be regularly conducted among the stakeholders involved in the delivery of housing projects in the study area.

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