

Assessing the Impact of Risk Management Techniques on the Cost of Building Projects in South-East Nigeria ¹

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ABSTRACT

The study assesses the impact of risk management techniques on the cost of building projects in South-East Nigeria. It was survey-based research; the study was effected via literature review and a well-structured questionnaire. Likewise, interviews were carried out to substantiate the findings of the questionnaire survey. The study was conducted in South-East Nigeria specifically: Anambra, Imo, Enugu, Abia and Ebonyi states for a period of 6 months. Being a survey research, questionnaires containing information relating to risk management were randomly administered to main players within the built environment, particularly clients, contractors and consultants in the South-East, Nigeria. Accordingly, a total of 322 questionnaires were administered while 284 copies were completed, returned and found useful. This corresponds to a response rate of 88%. The data were analyzed using Relative importance index and ranked appropriately. The study found out that project cost management (3.81), project team can maintain a focus on the critical outcomes (3.79), Contribute to project success by establishing a list of internal and external risks (3.77) are the leading impacts of risk management techniques on the cost of building projects in in South-East Nigeria. The study concluded by recommending that in order to improve the chance of success and reduce potential risks associated with building construction projects in Nigeria, risk management should be an important part of the decision-making process for a construction enterprise.

Keyword: Risk Management, Procurement System, Risk Management index (RMI), Management process (RMP),

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1.0: INTRODUCTION

Dealing with risks and uncertainties is usually a problem for contractors, builders and clients. This problem might end up with substantial financial losses for both parties. The sources of risks and uncertainties in a project are several. And not only is the size of a project the main factor that causes risk, but there are also other factors such as cash flow, underestimation of direct costs, and quality problems (Morgan, 2014). Risks and uncertainty often involve many participants in a project. And each participant uses his own methods of analyzing and managing his scope relevant risk items. For whatever method used, it should objectify and quantify the risks in a project and provide the measurable means of diversifying or sharing the risks among the project participants. The willingness of a participant to accept risks often reflects the professional competence of that participant as well as his tendency to risk. Since usually each participant tries to minimize his own risks, conflict arises between the participants, and sometimes this conflict can be detrimental to the project.

Risk management is an important part of the decision-making process in construction and now widely accepted as a vital tool in the management of projects (Kangari 1995 cited in Wenzhe Tang et al., 2007). Risk management is a complicated process that interrelates with many other processes in the construction industry and on construction projects (Alexander, 1998; Chapman, 1997; Grey, 1995 cited by Holland, 2006). Investigating project risks includes studying potential events that may affect the scope, cost, time, or performance of the project's objectives. Investigating potential risks requires the collaboration of all disciplines contributing to the project. Technical, managerial, financial, and administrative departments of the participating firms need to cooperate to identify and respond to expected risk events. This integrative process needs practical experience to adapt the required environment (Smith, 1999 cited in Nnadi and Ugwu, 2014).

In Nigeria, the construction industry was the dominant contributor to the nation's GDP in the 1980s, accounting for about 70% of the GDP (Planning Committee on the National Construction Policy, 1989). This made the industry very strategic to Nigeria's developmental efforts. Unfortunately, however, the industry has been bedeviled by a combination of low demand and consistent low productivity and poor performance over the years (Edmond, 2015). This has reduced its contribution to the national economy to a mere 8.91% of the GDP in 2013 (Project Management Institute 2008). Over the world, construction activity is regarded as the principle sign of growing economic activity. Risks and uncertainty are inherent in all construction works, no matter the size of the project. Despite the fact that the construction industry in Nigeria is a vital contributor to the process of development, the industry is still characterized by under-performance when compared with other industries worldwide. The general situation observed currently in building construction in developing countries is that the output of a construction company is usually characterized by poor quality work, cost and time overruns including inadequate attention to health and safety.

Risks in public building procurement systems is a variable in the process of construction whose occurrence results in uncertainty as to the final cost, duration and quality of the project (Ogunsanmi, Iyagba and Omirin, 2003). Some of the major causes of risk in public building procurement options include design error, estimating error, competitive tendering risk, financial risk and changes in political and economic climate among others. While these risk factors are not unknown to the Nigerian construction practitioners, their assessment and management are yet to be investigated particularly in the study area. It is against this backdrop that this study tends to assess the impact of risk management techniques on the cost of building projects in in South-East Nigeria view to developing an effective risk management framework for public buildings in the study area.

2.0 LITERATURE REVIEW

2.1 Concept of Risk

Risk is the potential of gaining or losing something of value. Values (such as physical health, social status, emotional well-being, or financial wealth) can be gained or lost when taking risk resulting from a given action or inaction, foreseen or unforeseen (planned or not planned). Risk can also be defined as the intentional interaction with uncertainty (Cline, 2015). Uncertainty is a potential, unpredictable, and uncontrollable outcome; risk is a consequence of action taken in spite of uncertainty (Antunes and Gonzalez, 2015). Risk is an uncertain event or condition that, if it occurs, has an effect on at least one objective. This definition using project terminology is easily made universal by removing references to projects (). It means the probability of something happening multiplied by the resulting cost or benefit of it. This concept is more properly known as the 'Expectation Value' or 'Risk Factor' and is used to compare levels of risk. The probability or threat of quantifiable damage, injury, liability, loss, or any other negative occurrence that is caused by external or internal vulnerabilities, and that may be avoided through pre-emptive action.

Risk is a challenging concept to define, understand and ultimately to manage. This is primarily because risk often means different things to different people. Historically, risk is defined as the possibility that the actual input variable and the outcomes may vary from those originally estimated (Correia, 2009). This implies that the extent of the possible difference between the actualities and expected value reflects the magnitude of the risk. Although the word 'risk' is usually used in the context of a potential hazard or the possibility of an unfortunate outcome resulting from a given action, intrinsically risk may be either positive or negative (Correia, 2009). Risk is the measure of probability and the weight of undesired consequences (Lawrence, 2006). Risk equals the triplet (s_i, p_i, c_i) , where s_i is the set of scenarios, p_i is the likelihood of that scenario, and c_i is the consequence of the scenario, $i = 1, 2, \dots, N$ (Kaplan and Garrick, 2001). Risk equals the product of probability and severity (Wilson and Crouch, 2002). Risk is a combination of five primitives: outcome, likelihood, significance, causal scenario and population affected (Kumamoto and Henley, 2006). Risk is a situation or event where something of human value (including humans themselves) has been put at stake, and where the outcome is uncertain (Rosa, 2008).

2.2 Concept of Management

Management (or managing) is the administration of an organization, whether it be a business, a not-for-profit organization, or government body. Management includes the activities of setting the strategy of an organization and coordinating the efforts of its employees (or of volunteers) to accomplish its objectives through the application of available resources, such as financial, natural, technological, and human resources (Lethon, 2016). The term "management" may also refer to those people who manage an organization. Management is the organizational process that includes strategic planning, setting objectives, managing resources, deploying the human and financial assets needed to achieve objectives, and measuring results (Morris, 2014). Management also involves recording and storing facts and information for later use or for others within the organization. Management functions are not limited to managers and supervisors. Every member of the organization has some management and reporting functions as part of their job" (Terry, 2014).

Management is the art, or science, of achieving goals through people. Since managers also supervise, management can be interpreted to mean literally "looking over" – i.e., making sure people do what they are supposed to do. Managers are, therefore, expected to ensure greater productivity or, using the current jargon, 'continuous improvement' (Ramos, 2014). More broadly, management is the process of designing and maintaining an environment in which individuals, working together in groups, efficiently accomplish selected aims (Koontz and Weihrich, 2009). In its expanded form, this basic definition means several things. First, as managers, people carry out the managerial functions of planning, organizing, staffing, leading, and controlling. Second, management applies to any kind of organization. Third, management refers to managers at all organizational levels. Fourth, the aim of all managers is the same – to create surplus. Finally, managing is concerned with productivity – this implies effectiveness and efficiency. Thus, management refers to the development of bureaucracy that derives its importance from the need for strategic planning, co-ordination, directing and controlling of large and complex decision-making process. Essentially, therefore, management entails the acquisition of managerial competence, and effectiveness in the following key areas: problem solving, administration, human resource management, and organizational leadership (Koontz and Weihrich, 2009).

2.3 Concept of Risk Management

Risk management is an activity which integrates recognition of risk, risk assessment, developing strategies to manage it, and mitigation of risk using managerial resources (Lerad, 2014). Some traditional risk managements are focused on risks stemming from physical or legal causes (e.g. natural disasters or fires, accidents, death). Risk management is a management discipline whose goal is to protect the asset, reputation, and profits an organization by reducing the possible losses or damages before they occur (Bing, Tiong, Fan and Chew, 2009). Risk management is one of the nine knowledge areas (i.e., integration management, scope management, time management, cost

management, quality management, human resource management, communications management, risk management, and procurement management) propagated by the Project Management Institute (PMI, 2008). Zou et al (2007) describes risk management in the construction project management context as a systematic way of identifying, analysing and dealing with risk as associated with a project with an aim to achieve the project objectives. Williams (2005) further describes project risk management as an integrated process which includes activities to identify project uncertainty, estimate their impact, analyse their interactions, control them in the execution stage, and even provide feedback to the maintenance of collective knowledge asset.

Risk management is central part of any organizations' strategic management. It is the process whereby organizations methodically address the risks attaching to their activities with the goal of achieving sustained benefit within each activity and across the portfolio of all activities. The focus of good risk management is the assessment and estimation of these risks. Its objective is to add maximum sustainable value to all the activities of the organization. It must translate the strategy into tactical and operational objectives, assigning responsibility throughout the organization with each manager and employee responsible for the management of risk as part of their job description. It supports accountability, performance, measurement and reward thus. Preparing operational efficiency at all levels. Risk management is a straightforward process in it requires the evaluation of risk and the execution of risk management strategy (Ashworth *et al*, 2007).

2.4 Project Cost and the Effect of Certain Procurement Methods

Cost has been defined as the degree to which the general conditions promote the completion of a project within the estimated budget (Bubashit and Almohawis, 2004). It covers overall costs incurred from project inception to completion. This highlights the importance that has to be attached to every project management activity carried out through every stage of the project development up to completion. Chan and Chan (2014) also argue that cost is not only confined to the tender sum and that it is the overall cost that a project incurs from inception to completion, which includes any cost arising from variations, modifications during construction period. These cost variables give indication of certain additional practices that when engaged in during the project management process would have both direct and indirect implications for the project cost performance. The number and manner in which variation orders are issued by consultants during construction is an important practice to look at. Clients who often engage in the habit of agitating for numerous design changes before practical completion also play great role in the influences on project cost.

The way contractors respond to variation orders may also have implications for the project performance. In predicting the performance of design-build and design-bid-build projects, Ling, Chan, Chong, and Ee (2014) identified certain variables that affect cost performance. These include: the number of repetitive elements contained in a project, the extent of design completion when bids are invited, and the level of paid-up capital of contractors engaged. These variables bring to bear certain related practices that may affect the performance of project cost. For instance,

the kind of procurement method usually adopted by clients; traditional procurement or design and build will determine the extent of completion of designs to be used for bidding. Moreover, the kind of project consultants selected by clients for design of a particular kind of project will also have influence on the way the design will be made (i.e. whether repetitive elements will be brought into the design or not).

The attitude of client towards the project cost will also determine whether he or she will adhere to the advice given by designers concerning the cost advantage of having repetitive elements in designs. How contractors are usually selected (i.e. always selecting through competitive tendering or negotiated tendering) will also determine the kind of contractors that are employed to execute the projects. The presence of certain features within a particular contract also goes a long way to determine the kind of contractors that would tender for the job and eventually win. For instance, the availability of certain facilities (such as payment of advance mobilization by client) within a given building contract may attract contractors who have low level of paid up capital or low level of ability to pre-finance a project. The level of financial capability of the winning contractor would have bearing on project performance.

3.0 METHODOLOGY

The research approach adopted in this study comprises of quantitative research defined as an inquiry into a social or human problem, based on answering certain questions. This research involves a cross-sectional survey approach from which statistical data were collected to answer questions in respect of the main subject of study. Questionnaires are the main instruments used.

The population for the study comprises of a total of one thousand six hundred and fifty-three (1553) main players within the built environment, comprising of three hundred and thirty-three (333) Clients, eight hundred and ninety-four (894) Contractors and four hundred and twenty-six (426) Consultants involved in public project in the study area. This was obtained from the ministry of works of each of the five southeast states under study. The population was sampled using stratified random sampling and purposive sampling technique. This resulted in a total sample size of 322. Out of 322 questionnaires distributed, 284 of them were completed, returned and considered useable (See Table 1). Primary data was collected through questionnaires whilst secondary data was extracted from journals, textbooks, seminar papers, lecture notes and occasional publications. The data were processed and analyzed using SPSS statistical analysis software. Descriptive statistics, using mainly simple percentages (%) were applied to collect data where applicable, from variables in the study. This helped in clarifying results.

4.0 RESULTS AND DISCUSSION

Table 1: Return Rate of Questionnaire

Questionnaire	Frequency	Percentage (%)
Total number of questionnaire administered to respondents	322	100
No of questionnaire received	284	88.20
No of questionnaire not received	38	11.80
Total		100

Source: Researcher’s field survey (2018)

Table 2: The impact of risk management technique on the cost of projects.

No	Impact	Strongly Agree (5)	Agree (4)	Strongly Disagree (3)	Disagree (2)	Undecided (1)	Mean Score	Ranking	Remark
1	Maximizes Results and Meet Deadlines.	61	74	43	29	37	3.38	13	Agree
2	Effective Evaluation of the Entire Project	59	78	51	36	20	3.49	12	Agree
3	Proactive Decision making	43	94	71	28	8	3.06	18	Agree
4	Contribute to project success by establishing a list of internal and external risks.	77	81	49	26	11	3.77	3	Agree
5	Project cost management	44	72	58	49	21	3.28	16	Agree
6	Project human resource management.	47	71	62	47	17	3.34	15	Agree
7	Project communications management	51	62	59	44	28	3.26	17	Agree
8	Project speed management.	79	82	39	34	10	3.76	4	Agree
9	Project procurement management.	45	78	61	44	16	3.38	13	Agree
10	Risk monitoring and control	54	69	48	52	21	3.34	15	Agree

11	Ensuring about the control over all risky items and their proper management	52	71	54	47	20	3.36	14	Agree
11	Determining probable residual items for execution	78	69	49	34	14	3.67	6	Agree
12	Adequate Procurement policy	72	75	39	51	7	3.63	9	Agree
12	Determining items related to changes in design and planning	21	34	90	71	28	2.79	22	Disagree
13	Reviewing costs estimation by the end of the project	24	18	101	72	29	2.74	23	Disagree
14	Reviewing the time of concluding the project in execution step.	74	68	53	31	18	3.61	10	Agree
15	Escalations are clearer and easier	18	37	91	74	24	2.80	21	Disagree
16	Project team can maintain a focus on the critical outcomes.	81	75	49	33	6	3.79	2	Agree
17	Labour force effectiveness	19	24	102	85	14	2.79	22	Disagree
18	Budgets rely less on guesswork	73	66	48	37	20	3.55	11	Agree
19	Good risk management elevates the conversation of project team.	19	27	104	86	8	2.85	20	Disagree
20	There's better quality data for decision making.	22	31	106	72	13	2.91	19	Disagree
21	Fewer or Lesser surprises	68	84	48	36	8	3.69	5	Agree
22	easier to spot projects in trouble.	69	78	44	48	5	3.65	7	Agree
23	The expectation of success is set	72	70	50	45	7	3.64	8	Agree
24	Project cost management	84	73	48	35	4	3.81	1	Agree

Source: Researcher's field survey (2018)

Table 2 revealed that the respondents agree that Project cost management is one of the impacts of risk management techniques on project cost and ranked highest with mean score of 3.81. This shows that Project cost management is one of the most important impacts of risk management techniques on project cost. They also agree that; project team maintenance of focus on the critical outcomes is one of the impacts of risk management techniques on cost of project and ranked second with mean score of 3.79. They contribute to project success by establishing a list of internal and external risks as one of the impacts of risk management techniques on cost of project and ranked third with mean score of 3.77. Project speed management is one of the impacts of risk management

techniques on cost of project and ranked fourth with mean score of 3.76. Fewer or Lesser surprises is one of the impacts of risk management techniques on cost of project and ranked fifth with mean score of 3.69. Determining probable residual items for execution, Adequate Procurement policy, Maximizes Results and Meet Deadlines, Effective Evaluation of the Entire Project, Project cost management, Project human resource management, Project communications management, Project procurement management, Risk monitoring and control, Ensuring about the control over all risky items and their proper management, Reviewing costs estimation by the end of the project, Budgets rely less on guesswork and Proactive Decision making and ranked sixth to eighteen with mean scores ranging from 3.67 to 3.06.

Table 2 uncovered that the respondents disagree that better quality data for decision making is one of the impacts of risk management techniques on cost of project and ranked nineteenth with mean score of 2.91. They also disagree that good risk management elevates the conversation of project team, Escalations are clearer and easier, determining items related to changes in design and planning and Reviewing costs estimation by the end of the project are some other impacts of risk management techniques on cost of projects and ranked twentieth to twenty-third with mean scores ranging from 2.85 to 2.74.

This indicates that risk management techniques have a great impact on project cost majorly in the area of Project cost management and project team maintenance with focus on the critical outcomes.

CONCLUSION AND RECOMMENDATION

Evidence from literature showed that Risk is a complex phenomenon that has physical, monetary, cultural and social dimensions. Risk in construction is a variable in the construction process whose variation results in uncertainty as to the final cost, duration and quality of the project. Project risks are uncertain events or conditions that may have an impact on one or several project objectives. Project risk management is an integrated process which includes activities to identify project uncertainty, estimate their impact, analyze their interactions, control them in the execution stage, and even provide feedback to the maintenance of collective knowledge asset.

Conclusively, in order to improve the chance of success and reduce potential risks associated with building construction projects in Nigeria, risk management should be an important part of the decision-making process for a construction enterprise.

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