An Evaluation of Risk Factors Affecting Performance of Construction Projects in Southwestern Nigeria

Taiwo Arowojolu-Alagwe
and
Bolanle Felicia Adegoke

Department of Quantity Surveying
Federal Polytechnic, Ede, Osun State, Nigeria.

ABSTRACT

In virtually all construction projects there is risk of one form or the other. Too often, the inability to accurately predict these risks and deal with them leads to challenges for the project team and stakeholders. The objectives of the research are to assess the level of awareness of the stakeholders of the associated risks in construction project; identify and examine the risk factors associated with construction project; examine the impact of risk factors on performance of a project in terms of cost, time, and quality; and to determine the relative of each factors identified. The self-administered questionnaire to obtain relevant data was adopted. Sixty-two (62) professionals in the construction industry were sampled in the study area. Data were analysed with the use of non-parametric and parametric statistics. The study revealed that approximately half of the stakeholders are aware of the inherent risk factors. It was discovered that there is a relationship between attention given to risk factors and performance of projects.

Key words: Risk, Uncertainties, Nigeria, Construction Projects

1. INTRODUCTION

Technically, risk is the probability that a harmful events arising from exposure to a biological, chemical or physical agent, which may occur under specified condition and is a universal phenomenon that poses a problem to individuals in nearly all walks of life (Richardson, 1992; Odeyinka, 1993; and Onyeador and Ukwuoma, 2006). Construction works are not exemption, in fact, the distinguished characteristics of construction projects make it a unique one. Miller and Lessard (2001), observed that construction projects are characterised as very complex project, where uncertainty come from various sources, even though, there are diverse objectives of the participants in the industry. To a person acquainted with the workings of the construction contracts the problem posed by risk, resulting in cost and time over could be understood (Odeyinka, 1993). Risk is said to emanate from changes in requirement of clients, poor estimates, design errors, omission, and misunderstanding, poorly defined or understood roles and responsibilities and insufficient skilled staff.

This study is based on the assumption that by identifying the factors both internal and external factors, determining which risk are likely to affect the project, documenting the characteristics of each will enable the participants to better handle risk factors. This will consequently affect the performance of the project by maximizing the result of positive events and minimizing the consequence of the adverse effect.

1.1 Statement of The Problem

Construction projects are full of risk, which consequently required good knowledge of risk management more than purely common sense and instinct (Ashworth, 2000). Successful completion of any project is most time assessed on the basis of three parameters which constitute risks, namely: time, cost and performance (Oyetoran, 1994). Byrine (1996) asserts that, the time schedule is important risk factors because of the time value of money as any delays in schedules completion may erode planned profit expectancy.

The significance of risk stems from the fact that the future is based with uncertainties both in terms of human behaviour and the characteristics of certain element. Poor cost performance of construction project has been a major concern for both contractors and clients, despite the large number of reported cases, it seems that construction project ranging from the simplest to more complex have increasingly faced cost overrun (Oyetoran, 1994). Berkeley *et al* (1991), Raftery (1994) and Tah (1993) highlighted that construction project have traditionally had a bad reputation for excessive time and cost overruns. Kamming *et al* (1997) also studied factors influencing time and cost performance on high-rise project in Indonesia and concluded that cost and time overruns were very frequent. Major studies with similar results were conducted in various developing countries (Elinwa and Buba, 1993; Mansfield *et al*, 1994 and Assaf *et al,* 1995). However, to lay man, foul play would be suspected as regard any cost overruns in the execution of a construction project whenever is due to genuine causes. There is therefore a need to establish and evaluate the risk factors affecting performance of construction projects in South Western Nigeria.

1.2 Aim and Objective

The study aimed at examining the risk factors affecting performance of construction project in South Western Nigeria.

The specific objectives of the research to achieve the aim are:

- Assess the level of awareness of the stakeholders of the associated risk factors in construction projects,
- Identify and examine the risk factors associated with construction project,

- Examine the impacts of risks factors on performance of a project in the terms of cost, time and quality, and

- Determine the relative importance of each factor identified

1.3 Scope of the Study

In the course of this study, evaluation of risk factors affecting construction projects in Nigeria was considered by grouping the risk factors under the following category: Organisation specific, Global and Acts of God. Risks are very comprehensive and wide, generally the risk factors were considered as it affects construction industry as a whole. However, for a detailed and more comprehensive study, Oyo, Osun and Ondo States (out of Six States in the zone) were considered under the South-west Geopolitical Zone as the study area.

2. LITERATURE REVIEW

Projects do not exist in isolation. They are initiated to fulfil a need and exploit opportunities that exist before the project, they are products of the world at large. Projects are therefore heavily influenced by factors external to them. Baloi and Price (2001) submitted that, construction organisations operate within an environment and not a vacuum. They are inevitably influenced by and constantly with their environment. In this context, an organisation or a project environment is a set of factors and their preparation both inside and outside the organisation or project that have the potential to impact on its operations and progress.

According to Smith (1999), publicly funded projects, the government or local authorities have taken many of the risks in the past; this has also been true of private sections projects. Recently however, private companies and consortia have sought to transfer, more of the risk for the design and construction of the projects to the consultant and contractors. Nevertheless, in such arrangements the owner would retain the risk of the viability of the project and the risk of the operating and maintenance cost.

The structure of the environment of an organisation or a project can be subdivided as follows: inner layer or internal environment, operational environment and outer layer of general environment. Both general and operational environment are external environment. The general environment is broad in scope and comprises five basic domains namely technological, social, physical, economic and political. Both general and operational environment of the construction organisation have significant impacts on performance of project (Walker, 1996).

2.1 Risk Factors Affecting Performance of a Construction Project

2.1.1 Construction Project Risk or Project Uncertainty

Although risk is widely studied, it still lacks a clear and shared concept definition. Risk is often only perceived as an uninvited, unfavourable consequence, such a definition embodies two misleading concepts. Firstly, among professional there is an established consensus that risk need to be viewed as having both negative and positive consequences. Secondly, risk is not only related to events, i.e. single points of action, but risk related to future project conditional, which may turn out to be favourable or unfavourable. The point is that future project conditions are hard to predict in the early stages of the project life cycle.

Risks are seldom on-off types meaning that risks do either happen or not-happen. The impact of the risk varies greatly, depending on the conditions at the time of the possible occurrence (Ward and Chapman, 2003). Turner (1999) asserts that variability and the level of predictability (uncertainty) of the future sceneries determine the quality of risk analysis done today. Skitmore (1989) defines risk as the chance of an event occurring that has financial consequences for the contractor, while uncertainty on the other hand is the inherent inability of bidding techniques to forecast events and therefore represents the errors which cannot be avoided. Dickson (1978) also tried to make distinction that with risk, the distribution of the outcome in a group of instances is known either through calculation (a priori) or from statistics of past experience, while in the case of uncertainty, this is not true. Greene (1973) and Deneberg *et al* (1974) submitted that there is risk could either be pure or speculative. In pure risk, there is uncertainty as to whether the destruction of an object will occur. Pure risk can only produce profit or loss such as business ventures of gambling transaction. While speculative risks are frequently desirable.

In view of these arguments about the use of risk and uncertainty, therefore, many researchers have suggested that the terms risk should be replaced with a more neutral term that could embody a larger scope than risk traditionally denotes. The term uncertainty is suggested to replace risk because it can easily embody the variability and ambiguity of risk (Ward and Chapman, 2003).

2.1.2 Categorisation of Typical Construction Risk Factors

Risks arise from uncertainty and are generally interpreted as factors which have an adverse effect on the achievement of the project objectives. Risks in construction project arise from a variety of sources and are of several types: Environmental/Political, Hazard/Safety, Market, Innovation, Technical functional. Risks specific to a project are interactive and sometimes cumulative, they all affect costs and benefits (Baloi and Price, 2003; Chapman, 2001; and Cohen and Palmer, 2004).

In Nworuh and Nwachukwu (2004) risk identification was broken down into the following risk areas: Physical, Environmental, Design, Logistic, Financial, Legal, Political, Construction risk. Also, Baloi and Price (2003) believe that there are several approaches to categorizing risks permeating construction projects. In view of this they grouped risks affecting the performance of construction projects into main categories namely: Organisation-specific, Global (general and operational) and Acts of God.

Organisation-specific Risks are internal risk related to the resources of an organisation as well as management which include factors considered under contractor's control for example risk related to labour skills and availability, materials delivery and quality equipment reliability and availability and management efficiency (Smith *et al*, 1999 and Baloi and Price, 2003).

Global Risk factors refer to risk factors that are not directly present in cost estimates yet they may lead to significant financial impact. It is called global risks because it transcends the boundaries and control of the organisation but can have significant impact. Contractors have less control over these risk factors and contract should provide fair and sensible allocations between parties. In practice contractors in developing countries have to bear most of the risks (see fig. 2.1)

Figure 2.1 Groups of Global Risk Factor

Risk	
Design Related	Vagueness in scope, design complexity, project size and type.
Construction Related	Geological conditions, unexpected site conditions, weather, accessibility, client-generated, sub-contractor generated
Fraudulent Practice Related	Corrupt practices, theft
Economic Related	Market conditions, price fluctuations, inflation, exchange rate.
Competition Related	Policies of the contractor need for job, market conditions, number of bidders.
Political Related	Political system, nature of the firm's operation, strikes, regional and external factors, influence of power groups, project desirability, labour restrictions, changes in labour costs, civil disorder losses, taxation on imported materials, supply of local materials, taxation changes, foreign exchange rate, government relations.

Source: Authors (2011)

Miller and Lessard (2001) studied large engineering projects (e.g. construction of a new factor) and categories risks according to their sources into three, that is Market (mainly caused by demand uncertainty), Completion (as tactical risks during and after the completion of a project) and Instructional risks (this related to the political uncertain tied in a specification).

Conclusively, Cohen and Palmer (2004) identified risk trends in construction projects. They found that typically, risks are determined at the very early phases of the project

(feasibility and planning) while the impacts are not experienced until the construction and production startup phase. Their list of typical sources of risk in construction projects are: Changes in project scope and requirement, Design errors and omissions, inadequate skill staff, Subcontractors and Inadequate contractor experience.

3. METHODOLOGY

This research covers stakeholders in construction project, and primarily Contractors/Builders, Quantity Surveyors and Architects in Southwest Nigeria. The study specifically collected information from the above mentioned professionals and contractors relating to their years of experience, the likely numbers of projects they have handled with their experiences on the performance of such projects. Other data collected include information about their awareness of risk factors and its impacts on the performance of the projects. The simple random sampling method was chosen so as to give equal chances to all the listed professionals and contractors in study areas. A well-structured close-ended questionnaire was designed for this study and directed to the selected targets. An in-depth self-administered questionnaire was the method data collection used for this study. The questionnaire was divided into two sections. The first section (Section A) dealt with the background and issues relating to the characteristics of respondents, while questions in Section B (the second section) focused the identified risk factors and their level of importance on the performance of construction projects.

Hence, a total of thirty (30) questionnaires were directed to each of the three (3) selected States. Ten (10) of the questionnaires to each of the selected stakeholders aforementioned. That is, a total of ninety (90) were administered to the professionals and contractors who held positions of seniority within their organisations and saddled with wealth of experience in construction projects and had expected adequate information of a sensitive nature. Thus out of the ninety (90) questionnaires that were sent out to the selected respondents, sixty-two (62) questionnaires were completed and used for the analysis. This represents 69% response rate.

3.1 Method of Data Analysis

The data collected was analyzed using descriptive and inferential statistical techniques. Relative importance index (RII), was used to analyse for better results so as to obtain a comprehensive and accurate analysis in both the descriptive statistics and inferential statistics as applicable.

4. RESULTS AND DISCUSSIONS

Below are the analysis and the results of data collected from the field survey as extracted from the data collection instrument on the details of the relative importance of each factor as it affects the performance of construction projects.

As background information necessary to be given on data collected, it is important to state that questionnaires were distributed and administered. In administering the questionnaires, the researchers did not only give consideration to the earlier stratification of respondents in terms of location and the stakeholders chosen, but also ensured that the same percentages were allocated to each location.

Table 4.1 revealed that the highest percentage of responses was recorded from Oyo State which is 80%, this is so based on the fact that Oyo State is the largest of all the three locations chosen for the study and moreover, the number of professionals in the state was more pronounced than the other two locations. The next to that of Oyo State is Osun State where 76.67% of responses were recorded while Ondo State had the least percentage.

Table 4.1 Responses from Distributed Questionnaire

Location	Category of the Respondents							
	Quantity Surveyor		Architecture		Contractor/Builder		Total	
	No. of Questionnaire Distributed	Response Frequency	No. of Questionnaire Distributed	Response Frequency	No. of Questionnaire Distributed	Response Frequency	No. of Questionnaire Distributed	No. of Responses
Osun	10	9 (90)	10	6 (60)	10	8 (80)	30	23 (76.8)
Oyo	10	10 (100)	10	8 (80)	10	6 (60)	30	24 (80)
Ondo	10	7 (70)	10	0 (0)	10	8 (80)	30	15 (50)
	30	26 (86.67)	30	14 (46.67)	30	22 (73.33)	90	62 (68.89)

Source: (Author, 2011)

4.1 Impact of Risk Factors on Performance of Projects

The summary of the analysis shown in Table 4.2 depicted the mean of 2.53 for the year of post academic qualification, 3.6o as mean of number of project handled so far, 1.55 at time overrun, as abandonment, 1.56 as cost overrun and mean of 1.47 as successful completion.

Table 4.2 Mean of the Years of Post Academic Qualification, Number of Projects Handled and their Performance

	Years of Post Academic Qualification	No of Project Handled	Time Overrun	Abandonment	Cost Overrun	Successful Completion
N	62	62	62	62	62	62
Mean	2.53	3.60	1.55	0.56	1.56	1.47
Sum	157	223	96	35	97	91

Source: (Author, 2011)

4.3 Awareness of Inherent Risk Factors by the Stakeholders

As a starting point in establishing the awareness of the three stakeholders chosen for this research, the respondents were asked to state the level of their awareness of inherent risk factors to the construction project ranging from Very Much Aware, Casual Awareness and No Awareness.

The result obtained from Osun State shows that the majority of the respondents are very much aware with (56.5%), while Awareness had (8.7%), Casual Awareness with (26.1%) and No Awareness with 8.7%. Hence, one can deduce that the respondents are all very much aware. Therefore, the expectation is that there should be better project performance. Meanwhile, the result from Ondo State, which is almost in agreement with Osun State having the highest percentage of (46.7%) of the respondents that are Very much aware of the inherent risk factors. From Oyo State, nevertheless, the level of awareness is the same.

However, the results from the three study locations reveal that (62.9%) are Very Much Aware of the inherent risk factors, while (12.9%) are Aware, (21%) with Casual awareness, and (3.2%) with No awareness. Therefore, majority of the respondents are Very much aware of the inherent risk factors.

4.4 Relationship between Risk Factors and Performance of Project

Having established the level of awareness of the inherent risk factors in construction projects, it is pertinent to know further if there is any relationship between the risk factors and performance of project. It was cleared enough from the findings that performance of a project as regards its experiences of cost over range time overruns, abandonment, successful completion is as a result of adequacy or inadequacy considerations given to the risk factors. This is backed up from the result obtained from the respondents indicated that 27 (43.5%) strongly agreed to the statement, while 29 (46.8%) was agreed, while only 6 (9.7%) were indifferent and nobody disagree to the statement.

4.5 Relative Importance of Risk Factors of the Three Study Locations

The risk factors were ranked in terms of most important, important, moderate important, less important and not important depending on respondents' assessment of the importance of the factors to their own decisions. The ranking were then assigned scores of 1, 2, 3, 4 and 5 for most important, important, moderate important, less important and not important respectively.

The mean of the RII really indicated that distinction clearly by showing organisation specific group of factors as the most relevant risk factor having mean of RII of 0.278 and ranked first position (1st), followed by Economy related group of factor with the mean of

RII of 0.282 and ranked second position (2nd). The little variance with that of result in Table 4.4 is where fraudulent practices group of factor ranked 3rd position whereas it ranked 4th position, estimator related factor having 4th position when the means of the RII was calculated whereas it ranked 5th.

4.6 Comparison of Results of Respondents from Oyo, Ondo and Osun State

To further prove the reliability of the data collected and to compare the level at which the risk factors influencing the performance of a project at one state at one over the other states. From the findings there are similarities from the results obtained from the three to some extent. Even though, there is little variance this could not be avoided as a result of peculiarity of one State to another. This is also showing genuiety of the data collected. Table 4.3 showed that Organisation specific group of factors was rated highly significant to the performance of a project in the three States. Having fell within the mean of 1.50 – 2.45, and rated as important and ranked first (1st) in position in the three States, which means the level at which organisation specific group of factor affect the performance of project was the same throughout the study locations. The factors that ranked second position is economy related factor and it also fall within mean that carries important weight.

The variances can be seen in Table 4.3, where fraudulent practice was ranked 3rd in Oyo State. It took 4th position in Osun State and 5th in Ondo State. Even though the different is seen in the position they were ranked, but the mean from the three locations falls within the mean of 1.50 – 2.45 which is rated as important for the three location. Also, construction related factor ranked 4th, 6th and 3rd position respectively; project related ranked 5th, 3rd and 4th position.

Competition related factor ranked 8th, 7th and 8th from Oyo, Osun and Ondo State respectively. The three study locations came to agreement again with the position of factor that is ranked last (9th in position) with is Acts of God group of factors with the means that fall within 2.50 – 3.45 and carrying moderate important.

Conclusively, it can be seen that there is an agreement from the result obtained from each of the study locations with that of overall result obtained in table 4.4

Table 4.3 Mean of the Means of the Group Factors for each of the Study Areas

Group of the Risk Factors	Oyo			Ondo			Osun		
	Mean	Level of Importance	Rank	Mean	Level of Importance	Rank	Mean	Level of Importance	Rank
Act of God	2.76	M.I	9th	3.07	I	9th	3.19	M.I	9th
Organisation specific	2.33	I	1st	1.64	I	1st	1.67	I	1st
Estimator related	2.33	I	5th	2.40	I	7th	2.26	I	5th

Project related	2.50	I	5th	2.02	I	4th	2.10	I	3rd
Competition related	2.09	M.I	8th	2.42	I	8th	2.43	I	7th
Fraudulent practices	2.21	I	3rd	2.04	I	5th	2.22	I	4th
Construction related	2	I	4th	1.88	I	3rd	2.27	I	6th
Economy related	.04	I	2nd	1.66	I	2nd	2.02	I	2nd
Political related	2.38	I	7th	2.33	I	6th	2.49	I	8th

Source: Author, 2011

Table 4.4 Ranking of the Mean of the Means of Group Factors for the Three States

	Group of the risk factors	Mean of RII	Overall Mean	Rank	Remark
i.	Act of God	0.469	2.99	8th	Moderate
ii.	Organisation specific	0.278	1.73	1st	Important
iii.	Estimator related factor	0.287	2.19	5th	Important
iv.	Project related factor	0.294	2.21	6th	Important
v.	Competition related factor	0.305	2.40	7th	Important
vi.	Fraudulent practices	0.285	2.12	4th	Important
vii.	Construction related factor	0.292	1.95	3rd	Important
viii.	Economy related factor	0.282	1.93	2nd	important
ix.	Political related factor	0.305	2.40	7th	Important

Source: Author, 2011

5. CONCLUSION

This research has found out the level of awareness of stakeholders in construction industry about risk factors that affect the performance of project to be average. Also, there were strong indications that there is relationship between proper handling of risk factors and performance of project. It was established that organisation specific group of factors, economy factor and construction related group of factors have more important to the performance of project in that order. This research has also identified quality and reliability of materials and equipment, management efficiency, availability and delivery of materials and equipment, price fluctuation and design omission and error in that order are risk factors that are more significant to the performance of projects. While act of God group of factors have least impact out of which heavy flood ranked highest among the three under this group.

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About the Authors

Taiwo Arowojolu-Alagwe

Ede, Osun State
Nigeria

Taiwo Arowojolu-Alagwe is an alumnus of Federal University of Technology, Minna, Nigeria and a diplomate of Tower College of Technology, London, UK. He is currently an LLM student of Robert Gordon University, Aberdeen, Scotland. He is an AACEi, Morgantown, USA Certified Cost Engineer and Incorporate Builder (ICIOB) of Chartered Institute of Building (CIOB) UK. He has more than a decade post-graduation experience working with client organisation, contracting, academic and consulting establishments. He has worked in Africa and Arabian Gulf Region. He can be contacted at tairoghojolu@yahoo.com.

Bolanle Felicia Adegoke

Ede, Osun State
Nigeria

Bolanle Felicia Adegoke is a quantity surveyor who rose to the pinnacle of the profession through the dint of hard work. She is an Alumnus of Enugu State University of Technology, Enugu, Nigeria; Federal University of Technology, Akure, Nigeria and The Polytechnic, Ibadan. The author and lecturer of repute is happily married to Adegoke Oluseyi PhD of Obafemi Awolowo University, Ile-Ife, Nigeria.