ASSESSMENT OF RISK RESPONSE TECHNIQUES FOR CONSTRUCTION PROJECTS UNDER DESIGN BID BUILD AND DESIGN & BUILD PROCUREMENT METHODS IN ABUJA

ABSTRACT

The non-implementation of risk management techniques constitutes a lot to most of the project failures encountered nowadays. This leads to variations, incessant claims due to time loss by the contractor and loss of significant stakeholder's value. This study assessed risk response techniques for construction projects under Design Bid Build and Design & Build (DBB and DB) procurement methods in Abuja, with a view to enhancing the level of understanding and implementation of risk management in DBB and DB procurement methods. Data were collected from 150 respondents who are professionals working under companies registered with Federation of Construction Industry (FOCI). Tools used for data analysis were Relative Importance Index (RII) and Mean Item Score (MIS). Findings from the study revealed six (6) major risk response techniques that are often practiced on construction projects with average RII of 0.71. The most effective risk response techniques in construction projects are "Risk mitigation/Reduction" and "Risk Acceptance" (MIS = 3.94 and 3.60 respectively). "Insurance" is the most effective risk sharing technique for DBB procurement method (RII = 0.81). On the average, the risk sharing techniques for DBB procurement method are effective in construction projects procurement (average RII = 0.70). The most effective risk sharing technique under the DB procurement method is "Warranty" (RII = 0.71). On the average, the risk sharing techniques under the DB Procurement method are effective in construction projects procurement (average RII = 0.61). It was concluded that the risk sharing and response techniques under the Design Bid Build (DBB) and Design and Build (DB) procurement methods are effective. However, the techniques for the sharing and responding to risks in construction projects under the DBB procurement method are more effective than the risk sharing and response techniques under the DB procurement method in Abuja, Nigeria. It was therefore recommended that stakeholders should consider the use of DBB procurement method for procuring projects in order to respond to risks in construction projects more effectively.

CHAPTER ONE

1.0

INTRODUCTION

1.1 Study Background

Construction projects have been described to be highly complex and executed under circumstances of fluctuating degrees of risks (Oladokun *et al.*, 2016). The sector of which can stand as an industry on its own with different sub-sectors, example of which is the building sector, a loosely coupled system which displays characteristics of intricacy. This means that any changes to the core areas of support for the building product and process will have a significant effect on all parties participating in the strategic preparation, architecture, sourcing, delivery, service and maintenance phases. (Kordas, 2015). The construction firm is undergoing restructuring, especially in the procurement system, as a result of ever-increasing and evolving client demands, as well as the need to minimize project costs, time, and risks (Oyelami, 2015).

According to Ogunsanmi (2013), expense, time, efficiency, project characteristics, and external environmental factors significantly impact on project success when used as parameters for choosing procurement methods. In view of this, the final decision would be based on risk retention attitudes, prior experience, and understanding of the alternatives. In summary, choosing the right procurement strategy will make or break the progress of projects. Any organisation experiences complexity in a variety of settings, each with its own set of characteristics and consequences. The company can face serious or less severe sanctions as a result of this confusion (Aven, 2011). The study of Basheka and Tumutegyereize (2012) inferred that it is a construction venture principle that project is good when the product is completed on schedule, at the appropriate price, required standards, providing clients with the satisfaction they want. If performance is critical, the study found that risk distribution and avoidance are the most relevant issues to address. Complexity is a major challenge that must

be solved when our environment is alive and difficult. The concept "risk" has been the subject of extensive studies by various scholars in various zones. Hillson (2013) described risk as the assurance of knowing the magnitude of a risk, while uncertainty is a risk that cannot be determined. Risk cannot be completely avoided in a building project because of the terrain and environmental intrusion. However, risk cannot be completely ignored but it may be mitigated, dealt with, exchanged, embraced, or relocated (Bahamid & Doh, 2017).

Several researchers and works of expertise have recommended various versions of the risk assessment process in the literature (Goh *et al.*, 2013).Assessment of risk is carried out with the purpose of detecting, evaluating, and monitoring of risks with the use of strategies that reduce risks to a manageable level while ensuring project completion(Rohaninejad & Bagherpour, 2013).There are numerous risk response articles available in hard copies, books and magazines, and on the internet which focus on the influence of the contract procurement process on risk response implementation is limited in practice (Bahamid & Doh, 2017).

Procurement is described as the combination of different methods of acquiring construction for design, responsibility for management, and amount of subcontracting in the integration of various variables such as source of financing, price base, partner selection process, responsibility for design and management, and amount of subcontracting (Murdoch & Hughes, 2008). The client's procurement option may influence risk management (Love *et al.*, 1998; Eriksson & Westerberg, 2011; Osipova & Eriksson, 2011). Project execution mechanisms, payment methods and the utilization of supplemental cooperation or collaborating interventions are all factors to include.

In general, the client/owner bears responsibility for design, while the contractor bears responsibility for design in design-build contracts.Since design is regarded as a significant source of risk, accountability for design can influence actors' risk management attitudes

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(Akintoye & Macleod, 1998). As a result of the above evidence, it is clear that a study to determine the situation is needed.

1.2 Statement of Research Problem

In the building industry as a whole, the acquisition route/methods for purchasing construction contracts play an important role in achieving the project's goals. The overall success or failure of any project is determined in part by the contracting processes employed and in part by the effectiveness of risk response approaches used in project management. Contractors follow informal risk response approaches around the globe, abandoning the traditional way of risk response, according to Allan *et al.* (2007), resulting in project delays, call for variations, incessant claims, and a lack of major shareholder equity, as well as the rare collapse of contractors. These issues or complexities, among others, increase project risk and necessitate careful monitoring if progress is to be achieved. Traditional Design Bid Build, Project Management, Design and Build, and Public Private Partnership are some of the approaches used to procure building contracts. Nigerian contractors are most concerned about financial, political, and physical threats (Dada, 2010).

However, there is dearth of literature on the method(s) of procuring construction projects to check or minimize the impact of risk on the effective attainment of project, in spite of the various levels of risk. Bahamid and Doh (2017) researched on rethinking the erection risk management method and bridging the gap between building risk theory and practice in developing countries. The study, however, did not go so far as to use procurement practices as a way of handling or reducing risk in construction projects. The failure to apply risk response methods, as documented in publications and academic studies, from theory to reality, contributes significantly to the majority of project delays today. As a result of the contractor's time loss and the loss of significance, there are constant arguments. This study therefore

addressed the main problems of risk response techniques in management and successful delivery of construction projects under Design and Build &Design Bid Build procurement methods(DB and DBB) in Abuja.

1.3 Research Questions

To address the research problem, the research provided answers to the following questions:

- i. What are the risk factors with higher possibility of occurring during construction process?
- ii. What are the main risk response techniques practiced in managing risks in construction projects?
- iii. How effective are the risk response techniques used in managing risk in construction projects?
- iv. What is the level of level of effectiveness of risk sharing techniques between DBB and DB procurement methods?
- v. What are the strategies for enhancing the level of understanding of risk response under DBB and DB procurement methods?

1.4 Aim and Objectives of the Study

1.4.1 Aim of the Study

The study aimed at evaluating risk response strategies for building projects under the Design Bid Build and Design &Build procurement system (DBB and DB) in Abuja, Nigeria, with the goal of improving risk response knowledge and application in DBB and DB procurement methods in Abuja.

1.4.2 Objectives of the Study

The objectives of the study are:

- i. Identify and examine risk factors with higher possibility of occurring during construction process.
- Identify and examine main risk response techniques in practice used in managing risks in construction projects.
- iii. To examine the level of effectiveness of risk techniques techniques.
- iv. Tocompare the level of effectiveness of risk sharing techniques betweenDBB and DB procurement methods.
- v. To propose strategies forenhancing the level of understanding of risk response under DBB and DB procurement methods.

1.5 Need for the Study

Building firms have been battling with the challenges of risk response for such a long time. In the light of this, the need for a risk control structure that can be implemented to mitigate risks inunindustrialized economies such as the Nigerian construction firms has become a pressing concern (Oladokun *et al.*, 2016). Past studies have worked on risk assessment techniques/processes used by builders in the context of building projects all over the world. These studies, including those by Oladokun *et al.* (2010), Okenwa (2011), and Fabi and Awo1esi (2013), identified significant threats faced by Nigerian construction firms. These studies have found that the threats have caused construction contractors to lose their corporate image as a result of poorly delivered projects that resulted in cost overruns, delays, and low efficiency, as previously reported, and a greater percentage of all construction projects face interruptions. Furthermore, incessant design flaws, constructability problems, inadequate plans, and inadequate planning are all issues that plague the Nigerian construction industry, even at the design level. Aliyu (2013) suggested that the attitude of approving the lowest bid be changed to promote better work. Because the lowest bids are not always the best, particularly when it comes to risk response, some other criteria should be included in the selection process.As a result of the above, it is recommended that further research be conducted in order to conclude the extent of successful risk response technique application and improve strategies for improving risk response technique awareness for construction projects using the DBB and DB procurement approaches.

1.6 Scope of the Study

The thesis focused on evaluating risk control strategies in Abuja using DBB and DBprocurement approaches. The study focused on finished building projects that used DBB and DB procurement processes from January 2014 to December 2018. The construction firms chosen for this study were those registered with the Federation of Construction Industry in Nigeria (FOCI), based in Abuja, with a contract value of at least #50,000,000.00.

CHAPTER TWO

2.0 **REVIEW OF LITERATURE**

2.1 The Construction Industry

The construction industry plays critical role in the development of any nation's economy, especially in developing countries like Nigeria (Ibironke, 2003).Multiple discrete business organizations such as experts, suppliers, trade agencies, municipal bodies, trade unions, specialists, and others may effectively coordinate multiple discrete business entities in this sector with dynamic and complex systems (Keane & Caletka, 2008). Many surveys have highlighted the building industry's important contribution to the development of the global economy, as Myers (2013) demonstrates. As a consequence, it's critical to note that the construction industry is an investment in the economy of a nation.

Due to the design of building projects, there are many opportunities for many environmental, socio-political, and other issues to arise at the execution and management periods (pre-bid, contract, and post-contract), resulting in project completion delay issues, cost overruns or financial plan overruns, and low quality finish (Akintoye & Macloed, 1997). The urban environment in Nigeria is a vital component of the country's economy. It propels the economy by adding to the country's GDP and providing various infrastructures needed for economic growth (Moses *et al.*,2019)

2.2 **Procurement of Construction Projects**

The procurement team's preparation, which involves the following, frequently comes before the decision-making for products or outsourcing services:

i. For each class of procured product or outsourced operation, the relevant contract methods and relationships will be chosen. (2019, Webb)

- ii. Evaluating collaboration prospects and planning RFQs and RFPs (RFPs)
- iii. Forming Partnerships and Evaluating RFQs and RFPs
- iv. Contract signing and award, quality product and timely delivery
 - vi. Dealing with contract modifications
 - vii. Contract closure Management

2.2.1 Methods of procurement of construction projects

The procurement process must be done in a well-organized and analytical mode within the outline of the client's overall project priorities, since the scope of sourcing methods is so diverse, and projects are getting more complex (Love *et al.*, 1998: Ibrahim, 2012; Oyelami, 2015). A slew of procurement tactics have sprung up in response to the need to expedite building project completion, i.e. finishing the project on schedule and on budget (Babatunde *et al.*, 2010). Selecting an appropriate selection process, according to Moriro and Wood (2010), is a critical factor that leads to project success and customer satisfaction.

Basheka and Tumutegyereize (2012) inferred from their research that it is a construction venture maxim that a project is successful if it is completed on time, at the right price, and with acceptable quality, giving clients their desired satisfaction, which leads to efficient risk management. The procurement method, also known as the delivery mechanism, is a hierarchical structure that gives specific roles and authorities to individuals and organisations, as well as specifying the different functions of such roles and authorities. the fundamentals of project development (Love *et al.*, 1998; Oyelami, 2015). Procurement processes was categorised as separated, mixed, or rational, according to Love *et al.* (2008) and Oyelami (2015). See Table 2.1.

S/No	Procurement Method	Classification
Ι	Lump Sum	Separated
Ii	Design and Build	Integrated
Iii	Design and Build (Novated)	Integrated
Iv	Public Private partnership	Relational
V	Traditional Design Bid Build	Separated
Vi	Design and construct by contractor	Integrated
Vii	Detailed Design and construct	Integrated
Viii	PPP services	Relational
Ix	PPP with maintenance only	Relational
Х	Design and build viaboard of builders	Integrated
Xi	Novated design & build	Integrated

Table 2.1: Classification of procurement methods

Source: Extracted from Love et al. (2008)

Procurement strategies range from the traditional to some "fast-track" approaches such as design install, management outsourcing, construction management, and public-private partnerships, as seen above (Ojo, 2010: Oyelami, 2015).

2.2.2 Risks Associated with themethods of procurement

It's pointless to approach all construction projects the same way because they're all different. Based on the goals of the owner, different project response methods can be needed.Technical, Construction, Physical, Organizational, Financial, Socio-political and Environmental Risks are among the building-related hazards described in the study. Contractual partnerships, consultant experience, and engagement methods are among the corporate risks involved with procurement processes. When the project is over,The owner receives bids from builders to finish the building after receiving the design papers from the builder.

Since the manufacturer and the contractor have not entered into a joint contract, the owner bears sole responsibility for providing complete design documents to the contractors (and have no duty to one another).

Any of the possible risks associated with Design-Bid-Build include: Before having a solid price on the final building process, the owner spends a significant amount of project funds on planning. Change orders, delays, and extra costs initiated by the contractor could put the owner at risk.

- i. The building project should not begin until all of the design drawings have been completed.
- ii. This will lengthen the project's total completion period.
- iii. The general contractor is unable to provide input during the planning phase since they are not usually brought on board early in the process.
- iv. Payment disagreements
 - vi. Communication stumbling block (Webb, 2019)

2.3 The Concept of Risk Response Techniques in Construction Projects

Risk is a concept that has been explored extensively in a variety of fields. Danger, according to Hillson (2013), is the uncertainty that can be calculated, while unmeasurable danger is called uncertainty. Risk management is a constructive and optimistic mechanism that aims to reduce the likelihood of unfavorable outcomes in the project's various phases, including planning, fabrication, and activity (Mills, 2001; Rohaninejad & Bagherpour, 2013).

According to Olsson (2007), confusion exists in daily life, in organisations, and in ventures, posing a direct challenge to the market. Danger, according to Hillson (2011), is a big chance that must be taken. Danger may also reflect benefits, but since the popular risks have negative outcomes, people focused on the negative aspects of risk (Baloi & Price, 2003; Hillson 2011). The primary goal of project risk response is to identify, assess, and monitor the risks that could jeopardize the project's movement (Lee *et al.*, 2009). According to Forbes *et al.* (2008), risk control processes include: risk planning, identification, assessment, analysis, monitoring and assessment process documentation.

2.3.1 Risk factors most likely to occur during construction process

Any building project's progress hinges on its ability to manage risk. Identification of risk factors is critical in risk management (Karim *et al.*, 2011). Twenty-five (25) risk factors were defined and grouped into five categories by the researcher using a compressed format. The classification of known risk factors is seen in Table 2.2.

Risk Category	Risk Factors
Construction	Land acquisition Equipment scarcityMaterial scarcityLate material Supply Poor workmanshipSafety on site Bankruptcy of subcontractor Insufficient planning Weather condition Bankruptcy of supplier
Political and contractual provision	Modification in Law and policy; Delay in receiving project approval and obtaining a permit; Inconsistency in official decisions; There is an excessive amount of deal variation; Bureaucracy with no oversight; and Observance of federal regulations
Finance	Delayed claims; Cash flow difficulties; andLack of financial resources
Design	Improper design and Change of scope
Environmental	Pollution, ecological disruption, adherence to environmental laws and regulations

Table 2.2: Classification of risk factors according to category

Source: Risk factor attribute from previous studies (Karim et al., 2011)

2.3.2 Techniques for responding to risk in construction projects

Rather than just moving risks over to another entity, risk response entails minimizing, monitoring, and distributing them (Iqbal *et al.*, 2015). Risk assessment is an important aspect

of project management, because when done correctly, it will lead to a profitable building project.

The structured method of assessing, recognizing, and reacting to project risk is known as risk response. In order to fulfill the project goals, it entails exploiting the likelihood and effect of helpful events while decreasing probability and effect of adverse events (Tipili & Ibrahim, 2015). Risk response, according to Goh and Abdul-Rahman (2013), is a decision-making mechanism that involves getting a complete understanding of a famous risk and extract the requisite steps to minimize both impact and likelihood occurrence, so as to reduce uncertainties and improve the probability of success. According to Wang and Chou (2004) and Zayed *et al.*(2008), there are three phases in the control of danger in the building industry:

Stage 1: Identifying and assessing risks

Stage 2: Risk assessment and appraisal

Stage 3: Reaction to the threat

The method of identifying and recording related threats is known as risk analysis. Risk evaluation, on the other hand, entails objectively examining known threats, defining the risk's , and estimating the risk's likelihood and impact on the project. In construction projects, there are four major strategies for detecting risk (Iqbal *et al.*, 2015). See Table 2.3.

S/No	Method of risk identification	Description
1	Checklists	Pinpoints possibleopinions that has failed in
		preceding projects and very useful in risk
		identification.
2	Interviews	Examination of past similar projects and
		observe similar past or present projects
3	Past experience	Data from previous programs of a related nature
		is only applicable under a certain circumstances.
		brainstorming can be adopted due to new risk
4	Brainstorming	inherent in this new innovations and idea.

 Table 2.3: Methods of risk Identification

Source:(Iqbal et al., 2015)

The sole purpose of the second stage of risk assessment is to separate the unnecessary events,

the risks of an unexpected occurrence, and the magnitude of those events (Karimi-Azari et al.,

2011). See Table 2.4.

Technique	Description	Author
AHP	Risk events are ranked on the basis of	Zayed et al., (2008);
	double comparisons, restricted to a few	
	number of double comparisons	
Fuzzy logic assessment	Usefulwhere probabilistic data are	Naderi (2008)
	lacking.	
Risk matrix		
	Classification is limited to a number of	Mahamid (2013)
	categories	
Monte Carlo simulation		
	Combined the collective effects	Choudhry et
Export opinion	resulted from mexact parameters.	<i>ai.</i> ,(2014)
Expert opinion	Read on export advice, the failure rate	
	and chances of completion of the total	
	project is calculated	El Savagh (2014)
Analysis of Exported	project is calculated	EI-Sayegii (2014)
Monotory Voluo	This is based on a bonefit matrix which	
wonetary value	looks at the probability component of	El Savagh (2014)
	the function states	EI-Sayegii (2014)
	the function states.	
FMEA	Determine when a pritical risk insident	
	Determine when a crucal fisk incident	Amadi (2016)
	occurs.Just one result can be quantified	Alliadi (2010)
Source: Author's Compilation	at a given moment. (2019)	

Table	2.4:	Methods	of risk	Analysis
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Source: Author's Compilation (2019)

The risk approach relates to the project's assessment, selection, review, and implementation

(Zhang & Fan, 2014).

Table 2.5 gives a description of Risk Response Strategies for construction projects.

S/No	Strategy	Description
A	Acceptance/Retention	The party responsible for the risk agrees to address it when it occurs.
В	Transfer	The responsibility of the risk will be transferred to another party through contracts and third party guarantees
C	Mitigation/Control	Reducing the likelihood of occurrence and/or impact of the risk Exploitation Taking on risks that may have a positive impact
D	Enhancement	Increasing the probability of occurrence and/or impact of risks with an expected positive outcome
Е	Avoidance	Changing scope of work and specifications, to avoid the source of the risk
F	Sharing	Obtained through a contractual mechanism in order to foster a sense of shared obligation among project stakeholders.

Table 2.5: Description of Risk Response Strategies

Source:(Smith *et al.*, 2009; Goh & Abdul – Raman, 2013; PMI, 2013)

2.3.3 Level of effectiveness of the risk response techniques

The Project Management Institute promotes nine knowledge areas, including risk management. (i.e., scope, integration, expense, time, inventory, human resource, acquisition, and risk managements) (PMI, 2000).According to Ojo (2010), who conducted research on a topiccontract differences and claims in a variety of construction projects, the existence of threats that were not analysed by parties is the primary cause of variations and differences in construction projects. As a result, risk response procedures seem to be more analytical than realistic.

2.4 Techniques for Sharing Risks in Construction Projects

Risk sharing is a method of dealing with risk, whereas risk transfer is a technique in which the risk is transferred to the group with the ability and expertise to handle it(Oke 2016). For construction sites, there are many different types of risk sharing. Subcontracting, insurance, subletting, bond, surety, and joint venture warranty are among the items listed, (Olatunji*et al.*, 2016).Risks that exist infrequently (such as those linked to politics, labor unions, and natural hazards) should be avoided.According to Kordas (2015), parties involved in construction projects must form a risk-sharing relationship in order to obtain the highest risk-sharing ratios. Risk sharing takes several types, each of which is determined by the individual risk sharing type stakeholders involved in a building construction project. Mudzookowa (2017) listed them in the following order: Insurance; Bond; Warranty; Surety; Joint Venture; Subcontracting; Subletting; Partnership; Alliancing; and Relational Contracting.

2.5 Strategies for Enhancing Level of Understanding of Risk Response

According Egan (1998), development of a project team integration, focus on quality and a commitment to people, customer focus strategy, and committed leadership, are the major drivers that determine the modification and execution of substitute procurement forms. In order to produce and implement another method of work, dedicated building owers must come up with a model for the project. To improve the degree of awareness and reduce the impact of risk on the project priorities, the following recommendations were made by (Miller *et al.* 2009 & World Bank 2016)Revising the variouseform of contract thoroughly, selecting the rightagreementtype, and the applied conditions.

i. Taking into account the market's expertise, the Borrower's capability, and the operating context in which execution will occur.

- ii. Understanding required worth and costing tool at the time of the contract and contract type selected.
- iii. Collaboration between private party and government in order to have a common concern in reducingall project risks and lessen the outcome, irrespective of the formal risk bearer.
- iv. Evaluation methods deals with the process of supplier bidding and proposals are assessed to determine the supplier that offers best Value for Money and willdeliver the right result.
- v. Management and Economic capital allocation necessitates the estimation of related costs and benefits, as well as risk assessment.
- vii Taking into consideration the method of analising procurement risk used earlier, and assess methods of procurement which addresses the identified riskrespectively.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Research Design

This study adopted quantitative research approach. Data collection was undertaken with the use of structured questionnaire. Analysis of data was carried out using descriptive analytical techniques. In this research, general focus is on the overallideas of risk management. Identification of risk identification was done with the study of literature. The Questionnaire was developed after the identified factors affecting risk in relation to the type of procurement methods used. Qualitative and quantitative analysis was used in assessing risk. Risk response would be based on the outcome of the study. All the above were done under the umbrella of procurement method adopted for the project, which was used as supporting tool in risk control.

The objectives of this study wereachieved by using a research design that involved a critical review of extant literature onrisk and risk management in construction project. It also review deeply on the procurement methods adopted in the procurement of construction project in Nigeria. This is by examining leading academic and technical journals, technical reports, text books, conference proceedings, and case studies. Also, the research used a survey approach to achieve the objectives. Data were collected by decisively sampling construction professionals with required construction experience in Nigeria through the use of questionnaire administered to them both online and manually. The survey was carried out on a sample of respondents haphazardly selected from the population of construction firms registered with FOCI, where primary data was collected. Tables and charts were used in the presentation of data. The analysis was done using the descriptive analysis.

3.2 Research Population

For the purpose of this research work, the target population constitutes the proffessionals working with construction firms registered with FOCI in Nigeria with Abuja's business address. The reasons for the choice of these contractors are based on the fact that they are found to have used most of the procurement methods and practice risk management in the cause of delivering projects. These firms are also found to be full members of FOCI which have executed construction project of not less than #50,000,000.00 in the last five years.

3.3 Sample Size

The survey sample was drawn from the list of registered construction firms with FOCI and are based in Abuja. FOCI has 85 members as at the time of this research (2019), with 74 full members, 5 associate members, 5 information members and 1 ordinary member. To ensure adequate representation of information, all the 25 members which are resident in Abuja were selected. All the professionals (Architects, Quantity Surveyors, Builders, Electrical, Mechanical and Civil Engineers, project managers and Estate surveyor and Valuers) in the construction industry were involved from the sampled firms because all of them have roles to play in the successful management of risk in construction projects.

3.4 Method of Data Collection

This sectionenlightenson how data were collected from relevant and reliable sources to guarantee quality and also speed up the progress of this research work. Data for this research were sourced primarily and this was achieved using questionnaire. The questionnaire was administered to sampled professionals includingArchitects, Quantity surveyors, Civil Engineers and Builders from selected construction firms.

3.5 Instruments for Data Collection

For this study, well-structured questionnaire was the instrument for collecting primary data. Raw data collected from literature assessment was used to develop the questionnaire. Data collection processinvolves a field survey to collect primary data from a population of construction contractors registered with FOCI, based on the fact that they have used both Design Bid Build and Design &Build procurement methods and very vibrant using risk management techniques during the procurement phase, construction phase and after the construction period. The questionnaire was designed in a way that it mightprompt necessary information required to realise the objectives of this study. Respondents to the questionnaire emanated from different field in the construction industry, including clients, management organisations, contractors, engineers and consutants in the different disciplines of construction, such as Architect, Civil engineers, Quantity surveying, Construction Management, Mechanical and Electrical Engineering among others. There are to main part in the questionnaire fix; the background information of the respondents; risk managementfacts and procurement options.

3.6 Methods of Data Analysis

The analysis was done using descriptive method of analysis. This was carried out using Mean Item Score (MIS) and Relative Importance Index (RII). The risk factors which occurs most during construction process were identified from literature review. These factors were ranked in order of occurrence with the use of MIS. The major risk management techniques were identified through literature review and itemised for ranking in order of frequency of usage with the use of RII. The effectiveness of each risk management techniques identified were analysed using MIS.This was done to determine the most effective risk management technique(s). Methods of risk sharing wereidentified under DBB and DB procurement methods and were analysed in accordance with the level of effectiveness using RII. Strategies for enhancing the level of understanding of risk management under DBB and D&B procurement methods were identified and ranked according to their level of effectiveness using MIS. Table 3.1 summarises the methods of analysis adopted for this study.

I dole et	i i i i i i i i i i i i i i i i i i i	
S/No	Objectives	Methods of data analysis
Ι	Identify and examine the risk factors with higher possibility of occurring during construction process.	MIS
Ii	Identify and examine the main risk management techniques employed in managing construction risks.	RII
Iii	Examine the level of effectiveness of risk management techniques.	MIS
Iv	Compare the level of effectiveness of risk sharing techniques between DBB and DB procurement methods.	RII
V	Propose strategies for enhancing the level of understanding of risk management under DBB and DB procurement methods.	MIS

Table 3.1: Methods of Data Analysis

Source: Researcher's Field Survey (2019)

Decision rules for data analysis in this study are stated below. The formula for calculating RII and MIS for data analysis is expressed in equation 3.1 and 3.2as follows:

i. Relative Importance Index

Relative Importance Index is being graded from 0.00 to 1.00 and all have their decision rule as shown in Table 3.2.Relative Importance Index (RII) is formulated as follows:

$$\operatorname{RII} = \frac{\Sigma W}{A X N} (3.1)$$

Where: Σ = Summation, W = the weightings of every factors given by respondents, in the range of (1 - 5), (A=5) the Highest weighting (i.e. Highest factor) and finally N refers to the Totalof number respondents.

ii. Mean Item Score

Mean Item Score is graded from 1.00 to 5.00 and they all have their decision rule as shown in table 3.2. Mean item score (MIS) is is formulated as follows:

$$MIS = \frac{\Sigma W}{N} (3.2)$$

Where: Σ = Summation, W = Weight, and N = Total

Decision rule embraced for RII and MIS are summarized in Table 3.2.

SCALE	Cut-Off Point		Interpretation				
	RII	MIS	Frequency of Occurrence	Level of Importance	Level of Significance	Level of Effectiveness	
5	0.81 - 1.00	4.51 - 5.00	Very Often	Very Important	Very Significant	Very Effective	
4	0.61 - 0.80	3.51 - 4.50	Often	Important	Significant	Effective	
3	0.41 - 0.60	2.51 - 3.50	Fairly Often	Fairly Important	Fairly Significant	Fairly Effective	
2	0.21 - 0.40	1.51 - 2.50	Less Often	Less Important	Less Significant	Less Effective	
1	0.00 - 0.20	1.00 - 1.50	Rarely	Least Important	Least Significant	Least Effective	

Table 3.2: Decision Ru1e for Data Ana1ysis

Source: Shittu et al. (2015)

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Chapter Synopsis

The chapter demonstrates data utilizes for analysis and discussion of the results gotten from the analysis. The analysis of data and the result discussions were premised on the data obtained from primary source through questionnaire.

4.2 Response Rate

This section gives the rate of response to the administered questionnaire as presented in Table

Questionnaires Sent	Received Questionnaires	Percentage
150	125	83.33%

Table 4.1: Response Rate of Questionnaires

Source: Researcher's Field Survey (2019)

From Table 4.1, One hundred and Fifty (150) questionnaires were distributed. One hundred and twenty-five (125) questionnaires were returnedshowing an effective response of 83.33%.

4.3 Respondents' Profile statistic

This section shows the demographic features of respondents that contributed to the research. Highlights of the respondents' demographics are given in Figures 4.1 - 4.6. Figure 4.1 presents information on the Profession of Respondents.



Figure 4.1: Respondents' Profile

Source: Researcher's Data Analysis (2019)

From Figure 4.1, the largest contributors to this research were the Quantity Surveyors with 30%, followed by Architects with 18%, Next are builders with 14%, Electrical Engineer 12%, the Civil Engineers with 10%, Mechanical Engineer 7%, Land Surveyor 5% and Finally Estste Surveyor with4%. The above information shows that the Quantity Surveyors are more active in the practice risk management, from inception through to completion stage of construction projects. Figure 4.2 presents information on the Professional Registration Status of Respondents.



Figure 4.2: Professional Registration Status of Respondents Source: Researcher's Data Analysis (2019)

Figure 4.2 shows that there are more registered professionals with 62% registered with their

professional body and 38% are yet to register professionally. This implies that there are more

professional contribution to the research.

Figure 4.3 Showsrespondents' age group



Figure 4.3: Respondents' Age Group Source: Researcher's Data Analysis (2019)

Figure 4.3 shows the age of respondents. Age group 31 - 40 contributed the most to the study with 66%, followed by age group 21 - 30 with 17%, next age group is 41 - 50 with 11% and 51 and above contributed the least with 5. This give the clear picture of professional who are willingly contributing to this research are vibrant young professionals who are active in the field.



Figure 4.4 shows the respondents' academic qualification.



Figure 4.4 shows respondents academic qualification, respondents with HND got the highest rate of response with 34%, Next was BSc, MSc, and PhD with 26%, 19%, 14% and 7% respectively. The attitude of respondents shows that professionals with higher qualifications are reluctant or very occupied to contribute to kind of study like this. An encouraging attitude, new method of approach that will suit the busy schedule of the professionals should be employed in research.



Figure 4.5 presents the respondents' years of experience.

Figure 4.5: Respondents' Years of Experience Source: Researcher's Data Analysis (2019)

Figure 4.5 represent respondents years of experience, respondents below 10 years of experience got the highest rate of response with 36%, Next was 10 - 15,20 - 25, 15 - 20, 25 - 30 and 30 years and above with 19%, 16%, 15%, 9% and 5% respectively. This reveals that upcoming professional are taking risk management serious compare to the levity handling risk management has experienced.



Figure 4.6 presents the respondents' level of involvement in risk management.

Figure 4.6: Respondents' Level of Involvement in risk management Source: Researcher's Data Analysis (2019)

Figure 4.6 Respondents' Level of Involvement in risk management, respondents who are moderately involved rate of response with 34%, next was Highly involved, Involved, Least involved and Less involved 32%, 20%, 8%, and 6% respectively. This result shows that the level of involvement was moderate and for risk management to be effective professional need to be highly involved due to the effect of risk on construction project.

4.4 Discussions Of Results

Results and discussion of data analised was carried out in this section. RII and MIS was employed for the analysis of data. Results are presented in Tables and thereafter discussed.

4.4.1 Risk Factors with Higher Possibility of Occurring During Construction Projects

The MIS results of the risk factors with higher possibility of occurring during construction projects is presented in Table 4.2.

S/NO	RISK FACTORS	MIS	RANK	DECISION
1	Change in law and regulation	4.18	1 st	Often
2	Insolvency of suppliers	3.82	2^{nd}	Often
3	Lack of financial resources	3.75	3 rd	Often
4	Delay in payment of claims	3.69	4 th	Often
5	Compliance with government	3.65	5^{th}	Often
6	Bureaucracy	3.63	5^{th}	Often
7	Pollution	3.63	5^{th}	Often
8	Ecological damage	3.62	8^{th}	Often
9	Inadequate planning	3.58	8^{th}	Often
10	Improper design	3.58	8^{th}	Often
11	Change of scope	3.46	11^{th}	Fairly Often
12	Poor supervision	3.42	12^{th}	Fairly Often
13	Delay in project approvaland permit	3.33	13 th	Fairly Often
14	Inconsistency government policies	3.28	14^{th}	Fairly Often
15	Too much contract variation	3.22	15^{th}	Fairly Often
16	Land acquisition	2.91	16^{th}	Fairly Often
17	Compliance with law and regulation for environmental issues	2.71	17^{th}	Fairly Often
18	Weather condition	2.38	18th	Less Often
19	Shortage of materials	2.28	18th	Less Often
20	Poor quality of workmanship	2.26	20th	Less Often
21	Cash flow difficuties	2.10	21st	Less Often
22	Shortage of Equipment	2.08	22nd	Less Often
23	Insolvency of contractor	2.08	22nd	Less Often
24	Late deliveries of materials	1.81	24th	Less Often
25	Site safety	1.46	25th	Rarely
	Average	3.04		Fairly Often

Table 4.2: Frequency in Occurrence of Risk Factors during Construction Projects

Source: Researcher's Analysis of Data (2019)

It is shown in Table 4.2 that out of the 25 Risk Factors identified, ten (10) occurs often. These range between "Change in law and regulation" and "Improper design" (MIS = 3.58 - 4.18). Seven (7) other risk factors fairly often occurs. These range from "Change of scope" to "Comp1iance with law and regulation for environmental issues" (MIS = 2.71 - 3.46). Another 7 factors occurs less often. These spans between "Weather condition" and "Late deliveries of materials" (MIS = 1.81 - 2.38). The last factor which is "Site safety" with MIS of 1.46 rarely occurs. On the average the identified risk factors during construction projects occur fairly often (average MIS = 3.04).

The finding of this study agrees with findings from past studies.For instance Karimi *et al.*(2012) identified these factors and grouped them in categories of Construction risk, Political risk, Financial risk, Design and Environmental risk respectively. Bahamid & Doh, (2017) also submitted that risk due to environmental intrusion total risk evasioncannot be guaranteed. But can be lessened, coped with, pooled, or moved. Therefore this study clearly reveal that most of the risk factor occur fairly often.

4.4.2 Major Risk Response Techniques Practiced in Construction Projects

The RII analysis results for the frequency of occurrence of the major risk response techniques practiced in construction projects is presented in Table 4.3.

S/NO	RISK RESPONSE TECHNIQUES	RII	RANK	DECISION
1	Risk exploit/Control	0.81	1^{st}	Very Often
2	Risk mitigation/Reduction	0.78	2^{nd}	Often
3	Risk Enhancement/	0.70	3^{rd}	Often
4	Risk Sharing	0.69	4^{th}	Often
5	Contingency plan	0.66	5^{th}	Often
6	Risk Avoidance	0.65	6 th	Often
	Average	0.71		Often

 Table 4.3: Major Risk Response Techniques Practiced on Construction Projects

Source: Researcher's Analysis of Data (2019)

Table 4.3 reveals seven (7) identified major riskresponse techniques practiced on construction projects. These techniques range between "Risk exploit/Control" and "Risk avoidance" (RII = 0.65 - 0.81). "Risk exploit/Control" is the technique which is practiced very often (RII = 0.81) while others are also often practiced. On the average, the identified major risk management techniques on construction projects are often practiced (average RII = 0.71).

Findings from previous research also corroborate with findings of this study, Bahamid & Doh, 2017 concluded their study that risk management application is insufficient, especially when it is based on the impact of the procurement method for the contract. This shows that findings from previous studies agree that these risk response techniques exist but the implementation was not methodically, and risk mitigation/ control is used in most cases of risk.

4.4.3 Effectiveness of the Risk Response Techniques

Results for level of effectiveness of Risk Response Techniques analysed with MIS are presented in Table 4.4.

S/NO	RISK RESPONSE TECHNIQUES	MIS	RANK	DECISION
1	Risk mitigation /Reduction	3.94	1 st	Effective
2	Risk Acceptance	3.60	2^{nd}	Effective
3	Risk exploit/Control	3.50	3 rd	Effective
4	Risk Enhancement/	3.38	4 th	Fairly Effective
5	Risk Sharing	3.26	5^{th}	Fairly Effective
6	Contingency plan	3.10	6 th	Fairly Effective
7	Risk Avoidance	2.30	7 th	Less Effective
	Average	3.30		Fairly Effective

 Table 4.4:
 Level of Effectiveness of the Risk Response Techniques

Source: Researcher's Analysis of Data (2019)

It is shown from Table 4.4 that "Risk mitigation /Reduction, Risk acceptance and "Risk Control" (MIS = 3.94, 3.60 and 3.50 respectively) are the effective Risk Response Techniques in

construction projects. Four (4) other techniques ranging from "Risk exploit/Control" (MIS = 3.50) and "Contingency plan" (MIS = 3.10) are fairly effective. The least effective technique is "Risk Avoidance" (MIS = 2.30). Averagely, the identified Risk Response Techniques in construction projects are fairly effective (average MIS = 3.30).

The findings of this study agrees with findings of the past study, Previous research show that risk response is been practiced on construction project but in an informal approach, which make risk management seam rarely used. Ojo (2010) on a study, postulated that the event of risks occurrence that were not analysed by parties involves is the chief cause of claims and disputes in the construction projects. It is therefore clear from this reseach work that the application of risk response on a fairly effective mode, because most risk that occur were not properly manage fron inception and risk mitigation /reduction, risk acceptance and risk exploit are practiced effectively more than other methods.

4.4.4 Comparison of Effectiveness of Risk Sharing Techniques between DBB and DB Procurement Methods

RII analysis was carried out in order to rank the level of effectiveness of the identified risk sharing techniques under each of the two (DBB and DB) procurement methods. Thereafter, comparison of the average RII was made in order to show which of the two methods of procurement was more effective. The results of the RII analyses are summarised in Tables 4.5 and 4.6 while the comparison of the average RII for the DBB and DB procurement methods is presented in Figure 4.7.

S/NO	RISK SHARING METHODS (DBB)	RII	RANK	DECISION
1	Insurance	0.82	1 st	Very Effective
2	Warranty	0.77	2^{nd}	Very Effective
3	Sub-contracting	0.77	2^{nd}	Very Effective
4	Bond	0.74	4^{th}	Very Effective
5	Surety	0.71	5 th	Very Effective
6	Joint Venture	0.71	5 th	Very Effective
7	Sub-letting	0.69	$7^{\rm th}$	Very Effective
8	Partnership	0.64	8 th	Very Effective
9	Alliancing	0.64	8 th	Very Effective
10	Relational Contracting	0.47	10^{th}	Fairly Effective
	Average	0.70		Effective

Table 4.5: Risk Sharing Techniques for DBB Procurement Method

Source: Researcher's Analysis of Data (2019)

It is revealed from Table 4.5 that "Insurance" is the most effective risk sharing technique for DBB procurement method with RII of 0.81. Eight (8) other risk sharing techniques for DBB procurement method are also effective (RII = 0.77 - 0.64). "Relational Contracting" is shown to be the least effective risk sharing technique under the DBB procurement method with RII of 0.47. On the average, the identified risk sharing techniques for DBB procurement method are effective in construction projects procurement (average RII = 0.70).

S/NO	RISK SHARING METHODS (DB)	RII	RANK	DECISION
1	Warranty	0.71	1^{st}	Effective
2	Bond	0.66	2^{nd}	Effective
3	Surety	0.66	2^{nd}	Effective
4	Sub-letting	0.66	2^{nd}	Effective
5	Insurance	0.64	5^{th}	Effective
6	Joint Venture	0.64	5^{th}	Effective
7	Sub-contracting	0.63	7^{th}	Effective
8	Partnership	0.61	8 th	Effective
9	Alliancing	0.48	9^{th}	Fairly Effective
10	Relational Contracting	0.45	10^{th}	Fairly Effective
	Average	0.61		Effective

Table 4.6: Risk Sharing Techniques for DB Procurement Method

Source: Researcher's Analysis of Data (2019)

Table 4.6 shows that the most effective risk sharing technique under the DB procurement method is "Warranty" with RII of 0.71. Seven (7) of the ten (10) identified risk sharing techniques for DB procurement method are also effective. These range between "Bond" and

"Partnership" (RII = 0.66 and 0.61 respectively). "Alliancing" and "Relational Contracting", on the other hand, are fairly effective with RII of 0.48 and 0.45 respectively. On the average, the identified risk sharing techniques under the DB procurement method are effective in construction projects procurement (average RII = 0.61).

Figure 4.7 shows that the risk sharing techniques under both the DBB and DB procurement methods are effective. The average RII for the level of effectiveness of the risk sharing techniques under the DBB procurement method is 0.70 which is higher than the average RII value of 0.61 for the level of effectiveness of the risk sharing techniques under the DB procurement method. The risk management techniques for the DBB procurement method is therefore more effective than that of DB procurement method.

Singh and Goel (2006) advised that risks that occurred least often (like those related to politics, labour union and natural hazards) which rarely occur and are outside the control of project manager can be transferred to other parties through insurance policies.



Figure 4.7 Comparison of Effectiveness of Risk Sharing Techniques between DBB & DB Procurement methods

4.4.5 Strategies for Enhancing the Level of Understanding of Risk Response

The MIS results on the Strategies for Enhancing the Level of Understanding of Risk Response

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is presented in Table 4.7.

S/NO	STRATEGIES	MIS	RANK	DECISION
1	Critically revising the contract type and selection of the appropriate contract form, and terms and conditions.	4.11	1st	Effective
2	Collaboration between private party and government in order to have a common concern in reducing all project risks and lessen the outcome, irrespective of the formal risk bearer.	3.77	2nd	Effective
3	Understanding the required worth and costing tool at the time of the contract and contract type selected. The determinant of risk allocation between the Procurement Risk Analysis, and the StrategicAssessment of Operating Background and Borrower Capacity.	3.37	3rd	Fairly Effective
4	Evaluation methods deals with the process of supplier bidding and proposals are assessed to determine the supplier that offers best Value for Money and will deliver the right result.	3.25	4th	Fairly Effective
5	Management and Economic capital allocation necessitates the estimation of related costs and benefits, as well as risk assessment.	2.84	5th	Fairly Effective
6	Taking into consideration the method of analising procurement risk used earlier, and assess methods of procurement which addresses the identified risk respectively.	2.62	6th	Fairly Effective
	Avarage	3.32		Effective

Source: Researcher's Analysis of Data (2019)

Table 4.7 revealed six (6) strategies for enhancing the level of understanding of risk Response Only two (2) of the strategies are effective. These are "Understanding the required price and costing tool at the time and the Contract type and selected" and "Collaboration between private party and government in order to have a common concern in reducing all project risks and lessen the outcome, irrespective of the legal risk bearer." (MIS = 4.11 and 3.77 respectively). The other four strategies are fairly effective with MIS ranging from 2.62 - 3.37. Averagely all the strategies are fairly effective (average MIS = 3.32). This study also agree with previous studies Miller *et al.* (2009) and The World Bank (2016) also recommended "Critically revising the contract type and selection of the appropriate contract form, and terms and conditions" and "A collaborative approach to the relationship may be appropriate where, some or all of the following, are present. Collaboration between private party and government in order to have a common concern in reducing all project risks and lessen the outcome, irrespective of the legal risk bearer." and ranked it first and second in the list of strategies for enhancing the level of understanding of risk management.

4.5 Summary of Findings

The analyses of data carried out for this research led to the following main findings:

- i. Of the 25 risk factors identified, ten (10) occurs often. These range between "Change in law and regulation" and "Improper design" (MIS = 3.58 - 4.18). Seven (7) other risk factors fairly often occurs. On the average the identified risk factors during construction projects occur fairly often (average MIS = 3.04).
- ii. The technique which is practiced most very often in construction projects is "Risk exploit/Control" (RII = 0.81). Averagely, the identified major risk response techniques on construction projects are often practiced (average RII = 0.71).
- iii. The most effective risk response techniques in construction projects are "Risk mitigation/Reduction" and "Risk Acceptance" (MIS = 3.94 and 3.60 respectively). Averagely, the identified risk response techniques in construction projects are fairly effective (average MIS = 3.30).
- iv. "Insurance" is the most effective risk sharing technique for DBB procurement method with RII of 0.81. On the average the identified risk sharing techniques for DBB procurement method are effective in construction projects procurement (average RII = 0.70).

- v. The most effective risk sharing technique under the DB procurement method is "Warranty" with RII of 0.71. On the average, the identified risk sharing techniques under the DB Procurement method are effective in construction projects procurement (average RII = 0.61).
- vi. The average RII for the level of effectiveness of the risk sharing techniques under the DBB procurement method is higher than the average RII value for the level of effectiveness of the risk sharing techniques under the DB procurement method. The risk sharing techniques for the DBB procurement method is therefore more effective than that of DB procurement method.
- vii. The most effective strategies for enhancing the level of understanding of risk management in construction projects are "Understanding the required price and costing tool at the time and the Contract form and selected" and "Collaboration between private party and government in order to have a common concern in reducing all project risks and lessen the outcome, irrespective of the legal risk bearer." (MIS = 4.11 and 3.77 respectively). Averagely all the strategies are fairly effective (average MIS = 3.32).

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

Quantitative research approach was used in this work. Questionnaire was used for Data collection was carried out using questionnaire. Descriptive methods of analysis was employed in this study. Findings from the analysis carried out led to the following conclusions of this research.

Ten (10) of the 25 risk factors identified, ranging between "Change in law and regulation" and "Improper design", occurs often. On the average, all the identified risk factors during construction projects occur fairly often. The risk management technique which is practiced most very often in construction projects is "Risk exploit/Control. Averagely, all the identified risk response techniques on construction projects are often practiced.

responsetechniques in construction projects The most effective risk are "Risk mitigation/Reduction" Acceptance". and "Risk Averagely, the identified risk responsetechniques in construction projects are fairly effective. "Insurance" is the most effective risk sharing technique under the DBB procurement method. The most effective risk sharing technique under the DB procurement method is "Warranty". On the average, the identified risk sharing techniques under the DB Procurement method are effective in construction projects procurement. The risk sharing techniques for the DBB procurement method is therefore more effective than that of DB procurement method.

The most effective strategies for enhancing the level of understanding of risk management in construction projects are "Understanding the required price and costing too1 at the time and the Contract type selected" and "Collaboration between private party and government in order to have a common concern in reducing all project risks and lessen the outcome, irrespective of

the legal risk bearer.". Averagely, all the strategies for enhancing the level of understanding of risk response in construction projects are fairly effective.

It can therefore be concluded that therisk sharing and response techniques under the Design Bid Build (DBB) and Design & Build (DB) procurement methods are effective. However, techniques for the sharing and management of risks in construction projects under the DBB procurement methodare more effective than the risk sharing and management techniques under the DB procurement method in Abuja, Nigeria.

5.2 Recommendations

The results and conclusions led to the following recommendations:

- Project stakeholders should pay more attention risks associated with "Change in law and regulation" and "Improper design" in order to effectively manage construction project risks for enhanced project performance.
- The use of "Change in law and regulation" and "Improper design" should be most often used as risk management techniques in construction projects for improved project success rate.
- Stakeholders especially clients and consultants should consider the use of DBB procurement method for procuring projects in order to more effective manage risks in construction projects.
- iv. In order to better enhance the level of understanding of risk response in construction projects, stakeholders should use the strategies of "Understanding the required price and costing tool at the time and the Contract type, selected" and "Collaboration between private party and government in order to have a common concern in reducing all project risks and lessen the outcome, irrespective of the legal risk bearer."

5.3 Contribution to Knowledge

The following important points are the major contributions of this study to the body of knowledge:

- i. The most important risk factors in construction projects are range between "Change in law and regulation" and "Improper design" (MIS = 3.58 4.18).
- ii. The most effective risk management techniques in construction projects are "Risk mitigation /Reduction" and "Risk Acceptance" (MIS = 3.94 and 3.60 respectively).
- iii. The most effective technique in the management and sharing of risks in construction projects is "Insurance" and it is recommended for the DBB procurement method (RII = 0.81).

5.4 Areas for Further Research

The listed areas below are suggested for additional studies in order to expand the scope of this study:

- Assessment of risk response techniques under DBB and DB procurement methods for Road Construction projects in Nigeria.
- ii. Assessment of risk response techniques under DBB and DB procurement methods in North – Central Nigeria.
- iii. Assessment of risk response techniques under multiple for heavy engineering projects procurement methods in Nigeria.

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APPENDIX A

RESEARCH QUESTIONNAIRE

ASSESSMENT OF RISK MANAGEMENT TECHNIQUES FOR CONSTRUCTION PROJECTS UNDER PROCUREMENTMETHODS IN ABUJA, NIGERIA.

Department of Quantity Surveying, School of Environmental Technology Federal University of Technology Minna Niger State 12th August 2019

Dear Respondent,

This questionnaire is part of an ongoing M. Tech research work in partial fulfilment of the requirement for the award of Master of Technology (M. Tech) in Quantity Surveying. It is aimed at assessing the risk management techniques for construction projects under Design Bid Build and Design and Build procurement methods in Nigeria. It is hoped that the outcome of the study in which your contributions is very important will provide suitable criteria for the best risk management techniques for each procurement methods in Nigeria.

While appreciating your busy schedule, I humbly solicit that you spare time to help respond to the attached questionnaire which is crucial to the success of the ongoing research work titled above.

Your response will be treated with strict confidentiality and used for the purpose of this research work only

Thank you for your anticipated cooperation

Yours Faithfully

Oyelami Cecilia Feyishayo MTECH/SET/2017/7294 Mobile No: 08059094939; 08091767112 Email: <u>feyishayo1980@gmail.com; foyelamicecilia@yahoo.com</u>

SECTION A

PERSONAL DATA

1. Name of respondent's organisation

2.	Profession of respondent (<i>Please tick as appropriate</i>)
(a) Eng	gineer (e) Electrical Engineer (f) Mechanical Engineer (g) Estate
Sui	rveyor (h) Land Surveyor
3.	Are you a registered member of your profession (Please tick as appropriate) (a) Yes (b) N
4.	Highest Academic qualification (a) HND (b) B. 3. Tech (c) PGD (d) M.Sc.) PhD
5.	Age Group of respondent (a) 21-30 (b) 31-40 (c) 41-50 (d) 51 and above
6.	Years of service in the Nigerian construction industry
	(a) Below 10 Years (b) 10 - 15 Years (c) 15-20 Years (d) 20 - 25Years (e) 25 - 30 Years (f) 30 years and above (
7.	Please rate your level of involvement in risk management processes of any
	(a) Highly involved (b) Moderately involved (c) Involved
	(d) Less involved (e) not involved

SECTION B

PART 1: Risk Factors with Higher Possibility of Occurrence During Construction Project

8. Kindly rate from the list below, how often the identified risk factors occur in construction project.

S/No	Risk factors that occurs often/frequently	Very	Often	Fairly	Rarely	Less
	in construction projects	often	(4)	often	often	often
		(5)		(3)	(2)	(1)
1	Land acquisition					
2	Shortage of Equipment					
3	Shortage of materials					
4	Late deliveries of materials					
5	Poor quality of workmanship					
6	Site safety					
7	Insolvency of contractor					
8	Inadequate planning					
9	Weather condition					
10	Insolvency of suppliers					
11	Change in law and regulation					
12	Delay in project approval and permit					
13	Inconsistency in government policies					
14	Excessive contract variation					
15	Poor supervision					
16	Bureaucracy					
17	Compliance with government					
18	Delay in payment of claims					
19	Cash flow difficulties					
20	Lack of financial resources					
21	Improper design					
22	Change of scope					
23	Pollution					
24	Ecological damage					
25	Compliance with law and regulation for					
	environmental issues					

PART 2:Major Risk Management Techniques Practiced in Construction Projects

9. Kindly rate from the list below, how often the identified risk management techniques practiced in the construction industry are used.

S/No	The major risk management techniques practiced in the construction industry	Very often (5)	Often (4)	Fairly often (3)	Rarely often (2)	Less often (1)
1	Risk mitigation/Reduction					
2	Risk exploit/Control					
3	Risk Avoidance					
4	Risk Enhancement/					
5	Risk Acceptance					
6	Risk Sharing					
7	Contingency plan					

PART 3: Effectiveness of the Risk Management Techniques

10. Kindly rate the effectiveness of the listed risk management techniques.

S/No	The effectiveness of the risk management techniques	Very effective	Effective (4)	Fairly Effective	Less Effective	Least Effective
		(3)		(3)	(2)	(1)
1	Risk mitigation /Reduction					
2	Risk exploit/Control					
3	Risk Avoidance					
4	Risk Enhancement/					
5	Risk Acceptance					
6	Risk Sharing					
7	Contingency plan					
8						

PART 4: Forms of Risk Sharing and Management Under DBB and DB Procurement Options

11. Kindly identify and rate from the list below, the forms of risk sharing used under DBB and DB procurement options in construction project.

Key: M-Mostly Used, MU – Moderately Used, F – Fairly Used, L- Least Used & N–Not Used

	The forms of risk sharing and		DBB			DB					
	management under DBB and DB procurement options	Μ	MU	F	L	N	Μ	MU	F	L	Ν
1	Insurance										
2	Bond										
3	Warranty										
4	Surety										
5	Joint Venture										
6	Sub-contracting										
7	Sub-letting										
8	Partnership										
9	Alliancing										
10	Relational Contracting										

PART 5: Strategies for Enhancing the Level of Understanding of Risk Management

12. Kindly rate from the list below, the level of effectiveness of the strategies for enhancing the level of understanding of risk management.

S/No	Strategies for Enhancing the Level	Very	Effective	Fairly	Less	Least
	of Understanding of Risk	Effecti	(4)	Effective	Effective	Effective
	Management	ve (5)		(3)	(2)	(1)
1	Critically studying the contract type and selection of the appropriate contract form, and terms & conditions.					
2	Considering the market's capability, the Borrower's capacity, and the operational environment in which delivery will be taking place.					
3	Understanding the required price and costing mechanism at the time and the Contract type and selected.					
4	Collaboration between private party and government in order to have a common interest in minimizing overall					

	project risks and contribute to that outcome, regardless of which party formally bears a particular risk.			
5	Establishing the process by which supplier bids and proposals are assessed to determine the supplier that offers the best Value for Money and will therefore deliver the right result through evaluation methods.			
6	The effective, efficient, and economic use of resources, which requires the evaluation of relevant costs and benefits, along with an assessment of risks, and non-price attributes and/or life cycle costs, as appropriate. Because price alone may not necessarily represent Value for Money.			
7	Looking at the procurement risk analysis undertaken earlier and evaluate how each procurement option addresses the risks identified.			