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Studies on Exploring the Project Execution Risks in the Real Estate Business in Ghana

by

Kennedy Osei Poku (BSc. Civil Engineering)

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MASTER OF SCIENCE

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DECLARATION

I hereby declare that this research is a product of my own genuine work towards the award of an MSc and that this thesis do not contain any material which has been accepted for the award of any other degree at this university or elsewhere, except where due acknowledgement has been made in the work.

KENNEDY OSEI POKU (PG 1153817)

Student's name & ID

.....

Signature

.....

Date

Certified by:

DR. ERNEST KISSI

Supervisor's name

.....

Signature

.....

Date

Certified by:

PROFESSOR B. K. BAIDEN

Head of department's name

.....

Signature

.....

Date

ABSTRACT

Ghana is one of the developing countries that has embraced the real estate industry as a means to improve its housing sector of the economy. Over the years, the real estate industry has been faced with a myriad of risks during project execution. Hence, the aim of the research study was to explore the project execution risks in the real estate industry in order to efficiently outline measures to mitigate them. Through an in-depth literature review, the concept of project execution risks, the causes of these risks, the adverse impact of these project execution risks and efficient mitigative measures were ascertained. The model was tested vis-à-vis data obtained from a field research when a total of 60 questionnaires were administered to professionals; site supervisors, site engineers, project managers, project sponsors, architects and subcontractors in the real estate industry. A total number of 50 responses were obtained representing a response rate of 83.33%. Some of the results obtained from the analysis of stakeholders responses agreed with the qualitative research made. The research work was limited in scope such that, only a handful of real estate firms in Accra were sampled using purposive and snowballing sampling techniques. This renders it inappropriate to generalize the results for the entire real estate industry in Ghana coupled with the fact that, it was hectic getting subcontractors and professionals off their working hours to respond to the questionnaire which may also affect the results. However, recommendations were made for future study to the effect that, research should be made on implementation of risk management and its impact on project success in the real estate industry in Ghana.

Keywords: Real estate industry, Project execution risk, impact, implementation, Risk management.

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DEDICATION

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CHAPTER ONE

GENERAL INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Since Ghana gained independence, the housing sector has been faced with several problems and this has constantly caught the attention of successive leadership and policy makers. While little information is available, the seriousness of the challenge is acknowledged worldwide. Over the past years, the challenge has been spotted to be aggravating. The rural-urban migration has escalated the pressure on urban housing facilities. Provisions have scarcely been made to meet this demand resulting to the creation of slums and communities that are composed of kiosks and containers with poor drainage system.

According to BusinessWorld (2012), the population of people living in slums stood at approximately 4.9 million. At the close of 2010, the total number of people in slums had risen to 5.8 million, almost a quarter of the nation's population. Where even available, the houses are overcrowded with an average number of 8.7 people sharing a house. The housing deficit is still very contentious with the most popular view of about one million though some dispute it. According to the 2007 statement produced on housing by Bank of Ghana, a total of 665,920 units of houses ought to be put up in order to make up for the deficit (Timofeeva, Ulrikh and Tsvetkun, 2017).

To a large extent, successive administrations have sought to intervene and salvage the situation. This led to the execution of the Dansoman Estate project by the Acheampong led administration,

J.J Rawlings' SSNIT flats project, Kuffour's affordable housing project and other governmental interventions all prove the weight of the housing situation. Nonetheless, these interventions have not been able to do away with the problem. There emerged the private sector to fight a common goal by the provision of housing units through real estate construction industry. The Real estate firms have been keen trying to fix the housing deficit. Presently, the private sector produces the chunk of the real estate all in an attempt to resolve the housing problem. Regarding the deficit at hand, however, there still require a lot of housing units to match up with the problem. On records, the private sector reportedly produces less than 10,000 housing units a year (BusinessWorld, 2012).

In spite of the fact that the Real Estate industry has contributed immensely to the improvement of the housing challenges in Ghana, the industry is plagued with myriad of risks which has made it unattractive for investors to invest their resources in it any longer. This is gradually deteriorating the industry and few years to come, the industry might collapse entirely.

1.2 PROBLEM STATEMENT

The real estate industry in Ghana is one of the sectors that has contributed immensely to the growth of the housing sectors in the nation over the years. Provision of safe and conducive accommodation and litigation-free lands for classes of people from low to high income, company staffs among others have been their main focus.

Recently, the real estate industry is faced with a lot of risks during their project execution which have adversely affected the successful delivery of their projects. As a results of these, many investors and sponsors are withdrawing from the industry which is detrimental to the growth of the housing sector of Ghana and this will eventually pose accommodation problems in the nation. This makes this research study no imminent than now. But of interest in this study is to discover

all the project execution risks the real estate industry is faced with, identify their causes, determine the adverse impact on projects and outline mitigation measures to efficiently deal with them.

1.3 AIM OF RESEARCH WORK

The aim of this research was to explore the project execution risks in the real estate industry in order to efficiently outline measures to mitigate them.

1.4 OBJECTIVES

The following objectives were formulated to achieve the stated aim as follows:

- To identify the Project execution risks and their causes in the real estate industry.
- To identify the adverse effects of project execution risks in the real estate industry.

1.5 RESEARCH QUESTIONS

With regards to the study, the following research questions were proposed;

- What is Project execution risk in real estate industry?
- What are the various categories and causes of Project execution risk?
- What are the adverse impacts of these Project execution risks on the real estate industry?
- What are the requisite measures to efficiently mitigate and manage these risks?

1.6 SIGNIFICANCE OF STUDY

The real estate industry has proven over time to be one of the industries that has contributed immensely to the economic growth and development of Ghana in its quest to resolve housing problems in the nation. Nonetheless, the industry is faced with project execution risks during their operations. It is the ardent expectation of this study to bring to light risks confronting the industry during project execution stage and provide risk management measures to neutralize these risks leading to the improvement and sustainability of the real estate industry and successful delivery of projects.

1.7 SCOPE OF THE STUDY

The attention of this research work was tuned to exploring the risks faced during project execution stage by the real estate industry in Ghana. It placed the industry into perspective and investigated the execution phase of their project to uncover the inherent risks. With the execution risks in view, requisite management measures were applied to mitigate them and for enhancing growth and development of the industry.

1.8 RESEARCH METHODOLOGY

The methodology employed for this research work includes; both experimental and exploratory methods. This was as a results of the nature of research questions raised in this study.

The exploratory method allowed background study to be made by delving into the general overview of the subject matter under consideration in the study. Reliable secondary data were collected and perused from the internet sources, journals, books and other literature that have bearing on the area of study.

Qualitative and Quantitative techniques were also used for the experimental session of this research work. This helped to determine the project execution risks, their causes and impact on the projects. Data compiled were analyzed making use of appropriate statistical methods. Data collected also made use of Purposive sampling method. Structured questionnaires were administered to Project sponsors/Clients, Project supervisors, Project managers, Site engineers, Architects, Quantity surveyor and subcontractors in the real estate industry in Ghana. These were done as a results of the differences in educational background of the stakeholders involved in order to solicit for the required and necessary information.

Data were appropriately presented in graphs, chart, tables and words description.

1.9 ORGANISATION OF THE STUDY

This research work is composed of some knowledge areas categorized under five chapters namely; Introduction, Literature review, Research method, Results and analysis and Conclusion and recommendation.

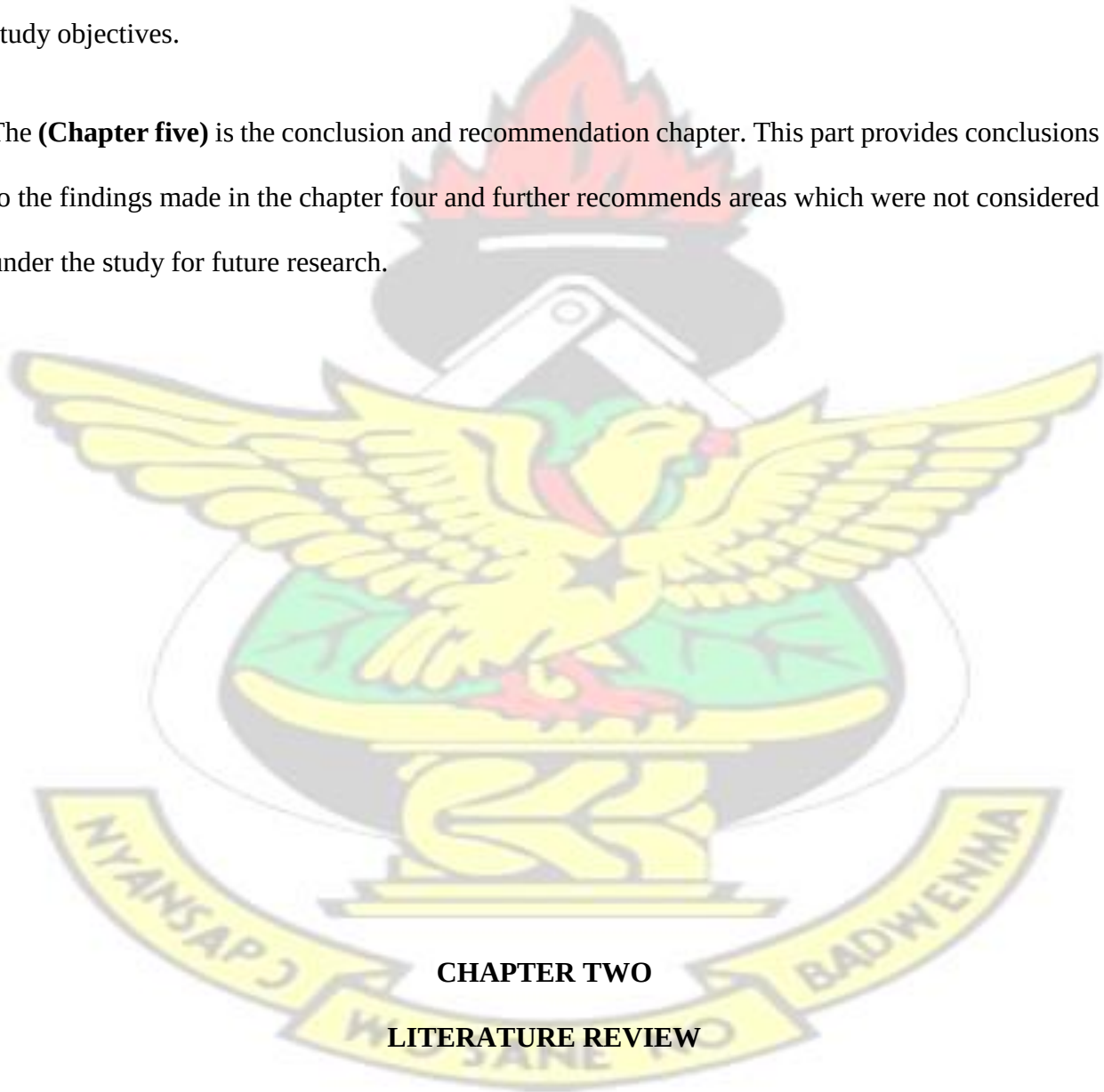
The **(Chapter one)** which is basically an introduction to the study presents a brief background information to the research work. It zooms into the study by stating the problem statement, the aim and objectives, the scope and significance of the research work and concludes with the research method employed in this study as well as the structure of the work.

The **(Chapter two)** contains the Literature review session. This part delves into the various research studies conducted by academicians, institutions and scholars around the globe which correlate to the topic under study. It encapsulates a brief overview of what project execution risks are, identifies the project execution risks in the Ghanaian real estate industry and outlines mitigative and efficient management measures to these risks.

The **(Chapter three)** is the Research methodology of this thesis. It sheds light on the type of method employed in conducting the study, the research design and the sampling and data collection techniques.

The **(Chapter four)** analyses the findings from the data compiled from the field to ensure constructive discussions. The discussions aim at answering the research questions to arrive at the study objectives.

The **(Chapter five)** is the conclusion and recommendation chapter. This part provides conclusions to the findings made in the chapter four and further recommends areas which were not considered under the study for future research.



CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter elucidates the concept of Project execution risk. It opens with definition of key terms; Project, Risk and Project execution risk. It identifies various Project execution risks and elaborates on the causes of such risks and their adverse effects on the Project. Causes of these risks are delved into and mitigative and efficient management measures are outlined to deal with them.

2.2 DEFINITION OF A PROJECT

According to Project Management Institute (PMI), (2017) Project is defined as a temporary endeavor undertaken to create a unique product, service, or result.

A project possess distinctive attributes, which makes it different from an ongoing work or a business operation (Wu, 2017). Projects are temporary or time bound in nature. They are not an everyday activity or process and have a defined beginning dates and end dates. This feature is important because a greater strength is devoted to make sure project is finished at appointed duration. To accomplish this feat, calendars are designed indicating the time tasks must begin and finish. Projects may however elapse in any time (Wall *et al.*, no date).

Project Management Institute (2017) also noted that, projects have the following features;

- *Unique product, service or result: Projects are executed to meet objectives by producing deliverables. The end products of projects are not the same. This emphasizes the uniqueness feature of projects.*
- *Temporary: Projects exhibit temporary nature in the sense that they have definite beginning and end. The end is reached when the objectives of the project have been achieved or when the project is terminated due to the fact that its objectives will not or cannot be achieved, or when the needs for the project is no more in existence.*

- *Purposeful: Every project is aimed at achieving a specific purpose. Projects are means through which organizations achieve their strategic goals.*
- *Progressively elaborated: The distinguishing features of projects are well defined in details in the course of time during the project lifecycle.*

2.2.1 DEFINITION OF PROJECT EXECUTION RISK

Risk is generally viewed as an exposure to a condition that results to unfavorable outcome, meanwhile a project risk is an occurrence that can either be positive or negative (Anantatmula and Fan, 2013). By definition, a project is a new venture and risks are related with projects due to the fact that there are uncertainties and unknowns available, for example, developing a new product or an electronic infrastructure (Wu, 2017).

Project risk is defined as an occurrence that is uncertain or condition that, if it takes place, affects a project's objectives either positively or adversely (Sayed *et al.*, 2017).

Project execution risk can therefore be defined as an uncertain occurrence or condition that if it takes place during the execution phase of a project and has an adverse or positive implication on the objectives of the project. Constituents of risk are occurrences that may or may not happen, the likelihood of the happening of that condition and the degree of impact of that condition's occurrence.

There exists many sources of uncertainty in construction projects, which includes the performance of construction parties, availability of resources, environmental conditions, other parties inclusion, contractual relations, etc. As a results of these sources, construction projects may be faced with problems that result in delay(s) in the project's completion time (Sayed *et al.*, 2017).

Risk identification prior to and during the project life cycle can be responsible for the success or failure of project risk management to a high extent. Factors that results into risks can be outlined

in diverse classifications. Zhou et al. (2008) suggested five risk groups along the path of the project life cycle, while Wysocki (2007) grouped them according to risk takers. Factors that are responsible for risk may overlap one another because the impact of one risk can spark some other risks to emerge (Anantatmula, 2013). Hence, efficiently uncovering risk factors can be very hectic but it is a very paramount task for project success.

Previously, time, cost and quality were used as parameters to quantify success or failure of any project (De Bakker et al., 2010).

2.3 GENERAL OVERVIEW OF PROJECT RISK MANAGEMENT

There are enormous research work on managing risk and their implications. Like what was done by Edwards and Bowen (1998), when they compiled dominant construction and risk management study categorized as follows;

- (1) formation of independent likelihood of occurrence;
- (2) investigation of heuristics and preferences; and
- (3) examinations of risk management practices in the construction field.

The work again grouped project and construction risk as normal and human (Chileshe, 2014). Other studies have given attention to risk exploration in community-centered projects (Manelele and Muya, 2008); Research within the Sub-Saharan setting has observed the risk effect on how well a project thrives (Dada and Jagboro, 2007; Hassanein and Afify, 2007; Aje et al., 2009).

Construction risks are normally in close association with delays and cost overrun. Mustafa and Al-Bahar (1991) asserted that, risk factors can be categorized into six groups in construction projects: *acts of god risks, physical risks, financial and commercial risks, political and ecological risks, design risks, and job sited-related risks*. However, most of these studies have centered on a single

or reduced amount of risk factors and their effects on a single area, like cost performance and returns (Wu, 2017).

According to Baloi and Price (2003), there exist a direct relationship between effective risk management and the achievement of project success factors or parameters, especially since risks are assessed or checked by their prospective impact on project objectives. Conspicuously, risk management does not mean totally eradicating uncertainty but rather minimizing the adverse effect posed by risks (Maylor, 2010).

Moreover, Nicholas and Steyn (2008) even proposed that “project management is risk management” to emphasize the importance of risk management. Risk management is regarded as the process of uncovering, sequencing prospective risk factors and establishing with corresponding strategies which can effectively mitigate risk consequences (Project Management Institute (PMI), 2017). Buerter et al. (2012) condenses the tools and techniques that researchers commonly used into two groups. Qualitative risk management techniques is composed of risk probability and impact assessment, probability and impact matrix, and risk data quality assessment. Quantitative risk management includes tools such as sensitivity analysis, decision tree analysis, fuzzy set theory, artificial neural networks, and others. In a recent study, data compiled between the year 2002 and 2012 on 82 federal technology projects across 519 quarterly period of time revealed that early stage complexity risk and later stage execution risk have an appreciable negative impact on a composite measure of schedule-cost performance, while the negative impact of the procurement-related contracting and subcontracting risk on schedule-cost performance is much weaker (Mishra et al., 2016).

Risk definition assumed is that of the unplanned negative occurrence dependent on the conditions (Mills, 2001, p. 246) and is expressed as:

$$RI = N \times T$$

Where:

RI – degree of risk.

N – chance of risk incidence.

T – the result or presumed effect on project.

Odeyinka et al. (2008) used the equal equation in defining the risk factors impacting the cash flow projecting in construction. Ten compound risk factors involved within the research documentations are: financial; resources; technical; economic; ecological, operational; government and political; relationship; security; and legal.

Financial risks

Financial risks catalogued by Edwards and Bowen (1998) include interest rates, credit ratings, capital supply, cash flows, and rentals. Dada and Jagboro (2007) in their research work on the effects of risk on project performance spotted finance as one of the major risk factors; however the focus of that research study was on building procurement.

Hassanein and Afify (2007) also realised financial risks as one of most important to construction contracts within Egyptian context. Within the context of Ghana, a study by Agyakwa-Baah (2007), regarding stakeholders' perception on delays on construction projects also found that the delay in payment as the main cause of delays encountered on construction projects. Two financial risks are used in this very study, namely financial failure, and delay in payments.

Resource risks

Risk is a risk factor that can have damning impact on the advancement of a project. Substandard materials come about as a result when there exist appreciable level of incompetence on the supply chain management of contractors. Risk parameters like the scarcity of labour, materials and plants can come about depriving the participants from accomplishing their project purposes. For Ghana, getting workers on a project is not quite daunting, however plants and equipment stand as main challenge in the case of a lot of construction firms particularly cases of indigenous subcontractors. Three resource risks being emphasized, they are “output of workforce and plant”, “obtainability of workforce and plant”, and “substandard resources and resource scarcity”.

Technical risks

Technical risks catalogued in Edwards and Bowen (1998) research work involves design collapse, tools and systems collapse, valuation mistakes and accidents.

Muya (2008) research work in the context of Africa (Zambia) again uncovered inadequate mechanical and directional counsel being an initial risk on projects. In the research, parameters involving technical risk factors listed “alterations in design” and “construction procedures”. It should be noted that Santoso et al. (2003) technical risk categorizations were partitioned as; resources, tools, skill, construction procedure, construction site, and environmental situations.

Environmental risks

Three factors under consideration were grouped as; “weather conditions”, “ground condition and pollutants” and “site conditions”. Wang et al. (2004) research study which sought to ascertain and assess risks and their mitigation measures discovered 28 critical risks and environmental security was ranked as the least crucial risk that can impact on Chinese construction projects. According to

Tchankova (2002), the influence from the environment on the people and influence of the people too on the environment are very paramount aspects regarding the source of environmental risk.

Operational risks

Managerial risks grouped by Edwards and Bowen (1998) involves productivity, quality assurance, cost control, and human resource management. This study also asserts that projects rely on clients, contractors, consultants amongst other stakeholders. Aje et al. (2009) in their research of the effect of contractors in the construction field upon how well a project performs realized management competence to possess appreciable effect. In like manner, (Hassanein and Afify, 2007) which targeted to determine the main important risks germane in view of construction agreements realized reduced exposure level of contractors in Egypt in terms of project management to be the key barriers to the risk determination. The model again comprised of foreign contractors who managed by determining importance of risks compared to colleagues from Egypt. Due to relevance of this research, the administrative risks determined in this research work are predesignated as “executional risks” but involves these risks: “proficiency of consultants and subcontractors”, and “superiority or performance control”.

Legal risks

Legal risks grouped by Edwards and Bowen (1998) comprises of contract clauses, regulations and codes. In a study performed by Tchankova (2002), he realized that the legal system generates risk by differences of new laws to the environment. Two legal risks are captured in this study, which are; “contract flaws” and “local laws”.

2.4 IDENTIFICATION OF PROJECT EXECUTION RISK

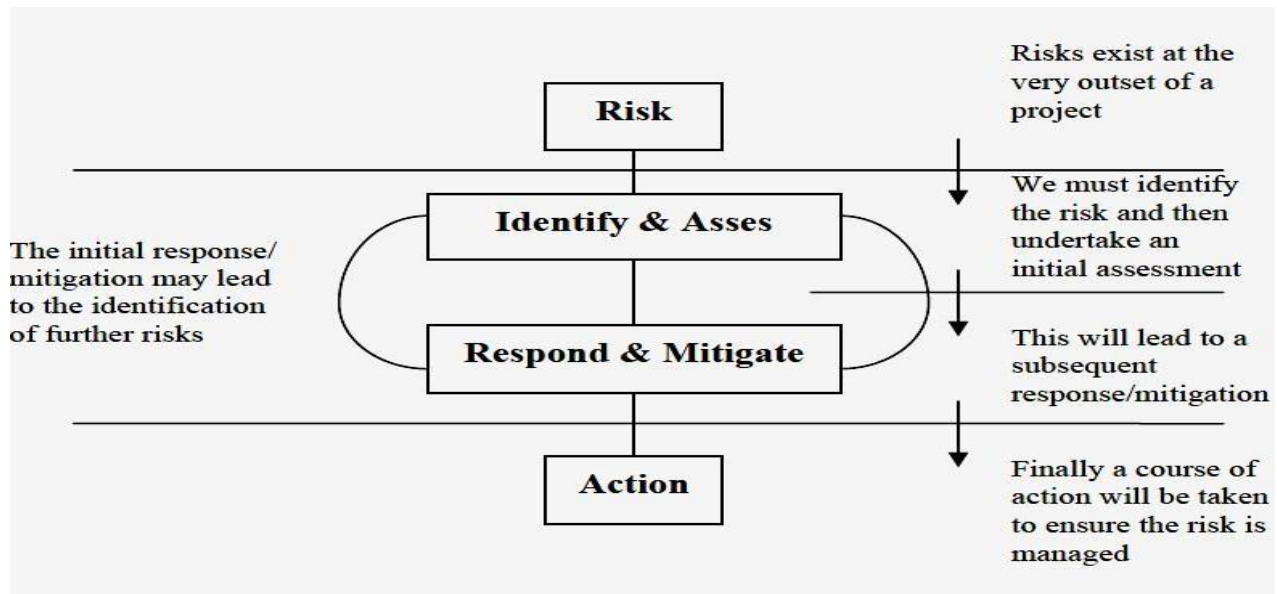
Risk management is a repetitive process. Though projects executed are different and distinctive in nature, the risk management process is normally the same (Powell, 1996).

There are three main basic steps in a risk management process namely:

- Risk Identification and Initial Assessment
- Response and Mitigation
- Risk Analysis

The discovery above on risk management is tackled as three stage process and is supported by other authors as involving identification, analysis, and response Perry and Hayes (1985), Clark et al (1990) and Bannister and Bawcutt (1981). Al-Bahar and Crandall (1991), added another stage which is a fourth stage, known as system administration. The addition of this stage points to the iterative nature of risk management as it includes the monitoring of the risk management process and this buttresses the assertion by (Powell, 1996). With regards to responses to some risks, the effect of others can be altered or new risks generated or discovered (Berny and Townsend, 1993).

Figure 2.1: The risk management process



Source: Powell,C. (1996).” Laxton's Guide to Risk Analysis & Management”

2.4.1 Risk Identification and Initial Assessment

This level of risk management is suggested by many people as the most important, as the subsequent stages can only work on the discovered risks (Al-Bahar and Crandall, 1991). Clark, Pledger and Needler, 1990, posit that "an identified risk is not anymore risk, it becomes a management problem." Risk identification is defined by (Al-Bahar and Crandall, 1991) as "the process of systematically identifying, categorising, and assessing the initial significance of risks related to construction project." Although the initial assessment of importance of risks could be regarded as an analysis stage, it is so placed because of the need to reduce the number of risks discovered (Perry and Hayes, 1985, Berny and Townsend, 1993). Risks could either be controllable or uncontrollable. Controllable risks are the risks that falls within the control of the project or can be controlled by the project team members. Uncontrollable risks on the other hand are the risks that fall outside the control of the project

team members. At times they are termed as "Acts of God". With this, pre-analysis can assist to remove insignificant risks from the in-depth analysis stage.

2.4.1.1 Techniques

The process of risk identification rests heavily on the knowledge, judgement, and experience of the people involved in the execution of the project. In order to help these people, and to involve a scientific base to the process, techniques and strategies have been established. These techniques assist to control the bias, coming from the subjective nature of this exercise and personal objectives. The techniques can be separated into two categories namely; the ones designed to help in the identification of risks and opportunities, and the ones developed to help in the determination of the initial importance of those sources. The following given list, though not complete, indicates the available examples of techniques to help in the identification stage.

- 1) Checklists 2) Brainstorming 3) Cause-event-effect 4) Prototype activities

The pre- analysis stage involves the following techniques namely;

- 1) Qualification 2) Quantification 3) Risk Mapping 4) Classification
- One method of identifying risks and opportunities is checklist. Checklists are the efficient and effective means of comparing past experience to present situations. The checklist will usually include a list of the risks which happens frequently on projects. This technique will not specifically identify the risks involved in the venture under consideration, but they make sure that risks recognized on other ventures are considered (Al-Bahar and Crandall, 1990).

Brainstorming; it is the aim of this technique is to solicit for information specific to the venture being considered. The process deals with a group of people who are involved in the

venture, especially the ones with different expertise and perspectives, in order to ensure that the list of risk and opportunities identified fairly represent all aspects of the venture. Involving a number of people in the process helps to control personal bias though this also brings about the problems of an increased time and has a riskier stance tendency (Harrison, 1995).

Cause-Event-Effect technique tackles the problem from a different way by tracking the implication back to reveal the possible causes (Jardine Ins Brokers, 1987, Al-Bahar and Crandall, 1991, Flanagan and Norman, 1993). This method acknowledges that a single risk (the effect) can possess a number of causes, each one adding to the probability of occurrence. Table 2.1 below displays example of risk categories and typical risk.

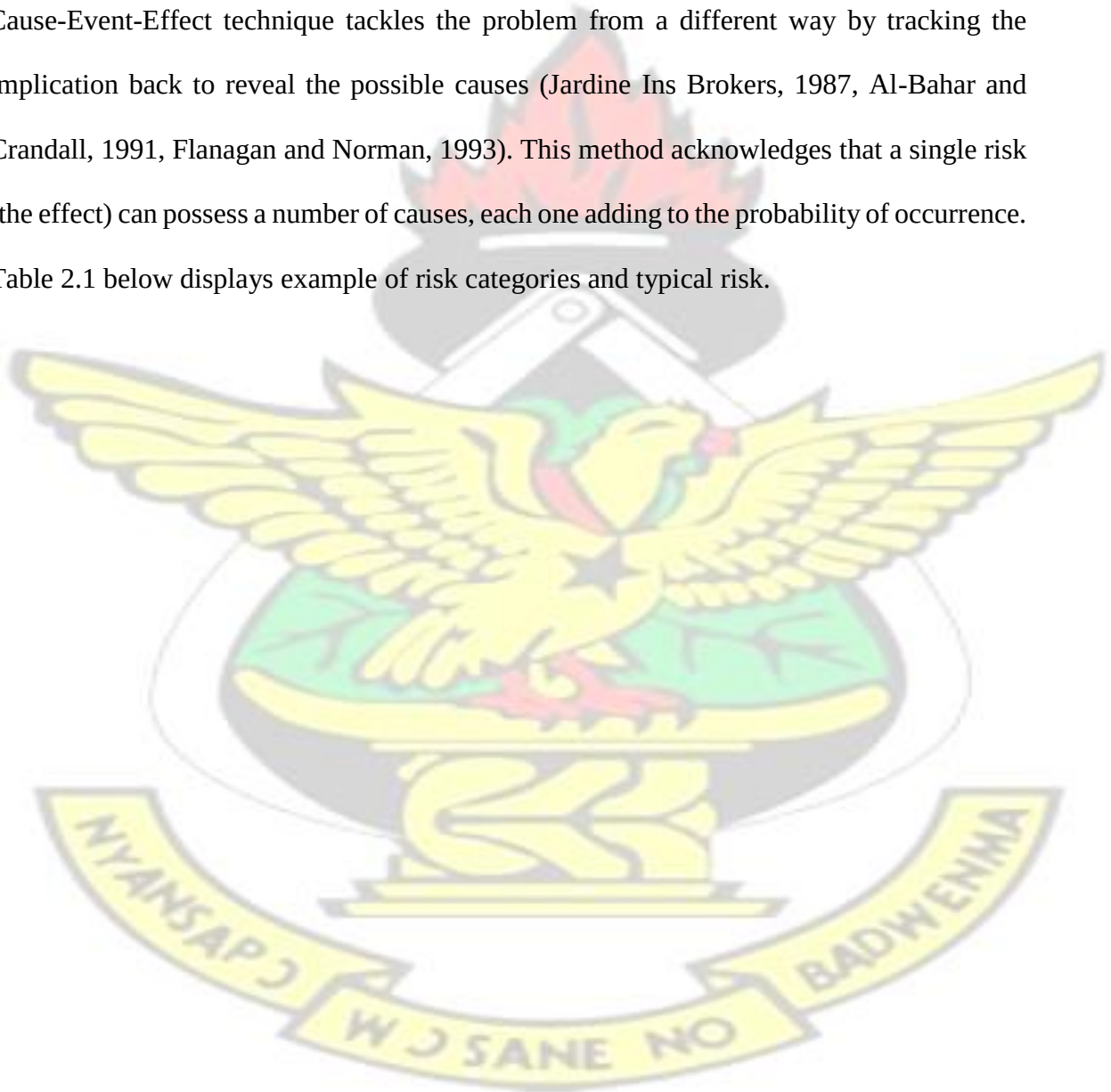


Table 2.1: Example of risk categories and typical risks

Risk Category	Typical Risks
Acts of God	Flood, earthquake, landslide, fire, wind, lightning
Physical	Damage to structure, damage to equipment, labour injuries, material and equipment fire or theft
Financial and economic	Inflation, availability of funds from client, exchange rate fluctuation, financial default of subcontractor, non-convertibility
Political and environmental	Changes in laws and regulations, war and civil disorder, requirements for permits and their approval, pollution and safety rules, expropriation, embargoes
Design	Incomplete design scope, defective design, errors and omissions, inadequate specifications, different site conditions
Construction related	Weather delays, labour disputes and strikes, labour productivity, different site conditions, defective work, design changes, equipment failures

Source: Al-Bahar, J. F., and Crandall, K. C.(1990). Systematic Risk Management Approach for Construction Projects

Prototype activities; this strategy by (Chapman, 1997) recommended for use on construction projects needs a prototype activity to be expressed. The risks are then discovered as variations from that prototype. The strategy was produced to minimize the reliability on the use of network of activities and permit the risk component of the project to be targeted. One of the important feature of the prototype activity is that it contains uncertainty, but at an allowable limit. Rather than identifying the source of every single uncertainty, only the ones with beyond normal uncertainty are given attention. This strengthens the notion that the motive is to ascertain an allowable limit rather than to reduce risk. At the pre-analysis stage, the first stage is risk measurement, whereby the possible impacts of the identified risks and their probability of occurrence are assigned.

Two methods are required in accomplishing this; qualification and quantification (Franke, 1987).

Qualification is deployed when the two parameters are expressed using words. For instance, the impact might be expressed as low, moderate, or high, and its likelihood described as probable, unlikely, etc. It requires words for description because of the difficulty in determining the actual values. Such classifications are easy to assign to some extent but their usefulness is limited.

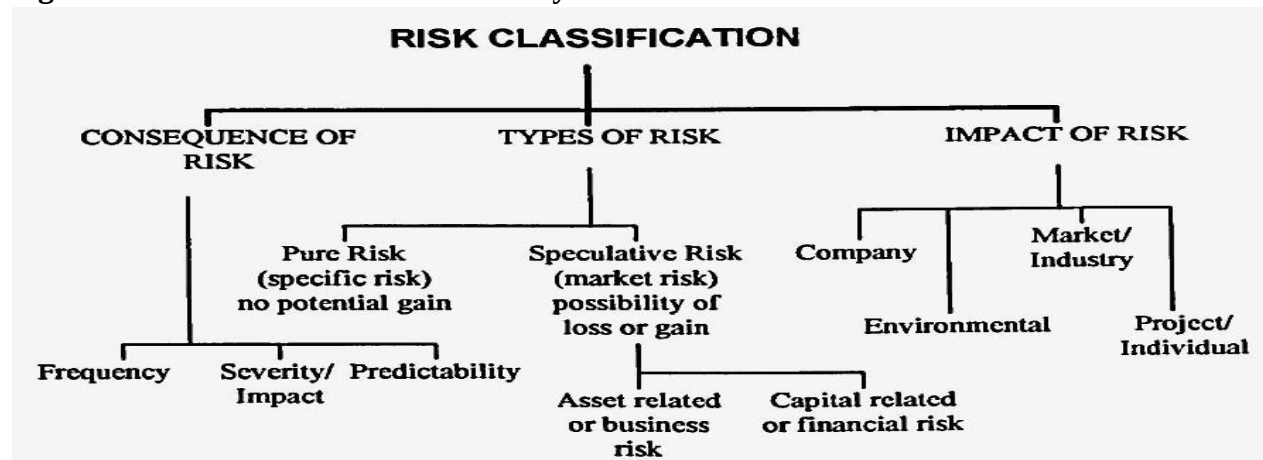
In Risk Quantification, it is possible to assess the effect of a risk with regards to cost or time, as these parameters have common units. Quantities like quality cannot easily be quantified because of the lack of appropriate units. In cases like that, it is suggested that the impact is converted to its cost equivalent (Franke, 1987). Nonetheless, in certain cases this is not feasible (Drucker, 1974).

The quantification of the likelihood of the risk occurring is mostly subjective task than that of its effect. Ideally, the likelihood would be deduced statistically from available historical data. Unfortunately, historical data is hard to come by or not available or is too sparse such that making a confident statistical prediction is error prone. In certain cases, a subjective assessment is made depending on the present historical data and the experience and judgement of stakeholders involved. The following includes examples of the strategies employed for this work. Risk Mapping and Risk Classification.

Risk Mapping; this is probably the most common of all the techniques. A risk map is a two dimensional graph; one axis being the risk potential impact, and the other representing the likelihood of occurrence. The graph is changed to a map by assigning of contours (or isorisk curves); the contours moving away from the origin expresses high risk.

Risk classification has been established to express the nature of a risk, in terms of its origin, consequence or impact, etc. The risk classification is used to determine the possible techniques to control each risk.

Figure 2.2 - Hierarchical classification system



Source: Flanagan, R and Norman, G.(1993). *Risk Management and Construction*.

Risk identification and initial assessment must be conducted at the initial stages of the project's life, because certain decisions made in early enough in the feasibility and design stages of a project have a great toll on the project (Hendrickson and Au, 1989). Construction project like any other projects are unique. This makes the information during this stage most probably inaccurate.

2.4.1.2 Risk Analysis

Before one develops appropriate risk responses and mitigation techniques, it is very important to conduct an in-depth risk analysis for the discovered risks which have been categorized under the risk classification taxonomy. This process of risk analysis is very

important to determine the (severity or otherwise) and their probability of occurrence at the delivery stage of the project.

This section seeks to explain several strategies developed to discover the combined risk, usually in a project, and the sensitivity of the project to the individual risks. The advantages of risk analysis is asserted by Al-Bahar and Crandall, 1991, by describing it as "the pivotal link between systematic identification and rational management of appreciable [risks]." In all the stages of risk management processes, the risk analysis stage contains the great majority of the strategies available. The techniques expressed here are:

- Expected Outcome Analysis
- Project Evaluation Review Technique (PERT)
- Monte Carlo Simulation

2.4.1.2.1 Expected Outcome Analysis

This is the simplest form of technique used and depends on the standard quantification technique of defining the likelihood of occurrence and impact. Multiplication of these two parameters give the expected results for every uncertainty, and the sum of these parameters give the expected results for the project. The figure below displays the average results of the uncertainties which, if included to the price of the project, would represent the average price of the project.

Though this strategy is quantifying the risk, giving some sum of money which can be included to the price, does not define the balance between the risks and its opportunities. To

demonstrate this, consider a list of items whose expected results was zero. The outcome gives no direction of how the risk and opportunity are distributed around the balancing point (of zero), or the probability and potential impact of the individual risks and opportunities. This unveils another problem in that, this strategy treats a risk with a high likelihood of occurrence and moderate effect at same low probability but damning impacts.

2.4.1.2.2 Pert

The Program Evaluation Review Technique, PERT, (Malcolm, Roseboon and Clark, 1959) is the first risk analysis strategy, dating as far back as 1950's. The technique is depended upon the network of the project's activities in which the duration of activities are considered to be variable, rather than being fixed as they are in a critical path analysis.

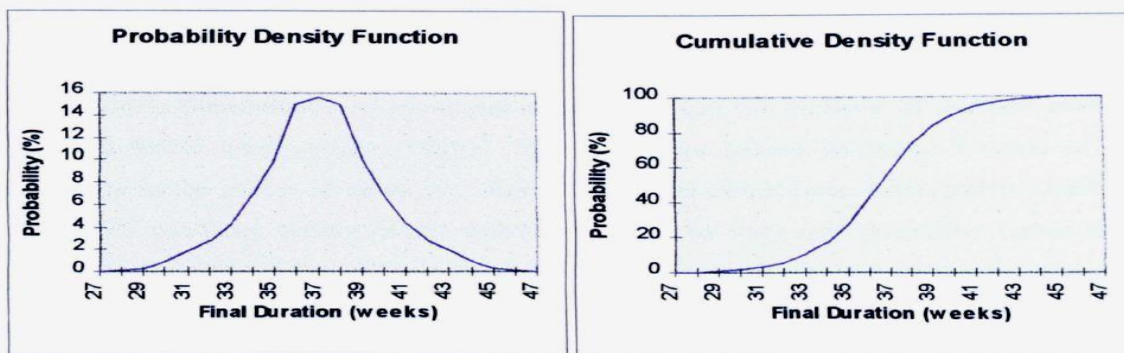
The motive of the strategy is to find out the likelihood of finishing the project by its predefined timelines. The range of possible durations for every activity is determined making use of a three point approximation dependent on the beta distribution. The three parameters that are referred to are; optimistic, most likely, and pessimistic durations.

The mean and variance of duration of every activity is determined making use of the properties of beta distribution using the three parameters given. The analysis starts with the determining the critical path making use of the most likely durations. The mean total duration becomes the total of the mean duration of each activity which is in the critical path.

Using the Central Limit Theorem, the variance of the duration becomes the sum of variances of the each duration of activities which is on the critical path. The resultant distribution has the features of the normal distribution. Figure 2.3, displays an example of

this.

Figure 2.3: Example of output of PERT.



Source: Dawson, P. J. (1997). Hierarchical Approach to the Management of Construction Project Risk.

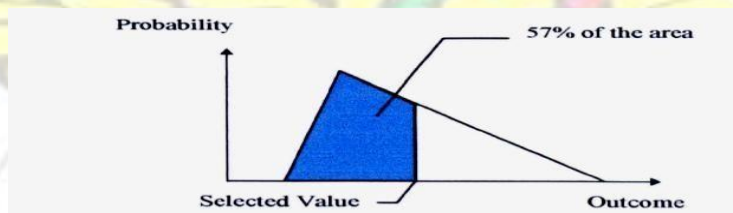
Frequency distributions, like the ones shown in Figure 2.3, are a common result of quantitative risk analysis techniques. The distribution on the vertical axis is a probability density function (pdf) whereby the height of the graph stands for the relative probability of that results. The peak of the graph demonstrates the most likely outcome and is very easily identified. An alternative means of showing the distribution is the cumulative density function, displayed on the right hand side. The height of the graph stands for the probability of finishing prior to the date rather than on the date. PERT is still applied and a very essential techniques, especially in finding out the distribution of costs, as this contains in only one path (Aquino, 1992).

2.4.1.2.3 Monte Carlo Simulation

Monte Carlo Simulation was established as a solution to the challenge of multiple critical paths in PERT (Van Slyke, 1963). The strategy gained its name due to its similarity to the chance game in Monte Carlo. The technique, described in terms of the PERT problem,

permits each activity duration to change and estimates, rather than determining the distribution of the duration of the project. It establishes this by simulating the project a couple of times, each time assigning durations for every activity in the network from the distributions established. A random number is changed to a duration by establishing the duration for which the probability of each duration not being overweighed but equals the random number. To demonstrate this, consider the distribution in Figure 2.4 displayed below, whereby a value is chosen from a triangular distribution making use of a random number of 57. The distribution of total amount of duration is given by compiling the outcome generated for every simulation.

Figure 2.4 - Conversion of a random number to a value



Source: Dawson, P. J. (1997). *Hierarchical Approach to the Management of Construction Project Risk*.

One part of Monte Carlo simulation which needs examination is the production of the random numbers which is used in the analysis. Since Monte Carlo simulation is used on computers, there are two means by which the numbers can be established; a table of random numbers can be saved on the computer or the computer can create the numbers internally. The computer creates the numbers by assessing a function which, cannot truly produce any random numbers.

2.5 NEGATIVE EFFECTS OF PROJECT EXECUTION RISKS

According to Project Management Body of Knowledge (PMBOK, 2017), Project Execution risks can either be positive or negative. Positive risks can be;

- Exploited: Positive risk opportunity can be exploited and made sure its value is realized on the project.
- Enhanced: Likelihood of occurrence of a positive risk and its impact can be enhanced on a project.
- Shared: Positive risks on a project can be allocated to a 3rd party who can increase the likelihood of occurrence of the opportunity.

Project Management Institute (PMI, 2017) acknowledged however that, negative risks have dire consequences on project objectives. Such adverse impacts are;

- Project cost overrun: Negative risks have the tendency to increase the total cost of the project. Substandard project materials when procured for a project would have to be replaced and this would increase project cost unnecessarily.
- Delay in project completion time: Negative risks are capable of extending project completion time. Increase in duration would eventually increase project cost. When project budgets are exceeded as a result, sponsors may not be able to finance such a project anymore and this can cause project failure.
- Stakeholders dissatisfaction of project: Customer satisfaction is key to the success of every project. Negative risks when they occur on a project may diminish the satisfaction of Stakeholders on the project.
- Project failure: Negative risks may cause eventual project failure. When a negative risk occurs on a project it can cause project objectives to exist no longer. Project may fail when its objectives cease to exist.

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CHAPTER THREE RESEARCH METHODOLOGY

3.1 INTRODUCTION

The term methodology refers to the overall approaches and perspectives to the research process as a whole and centers on with the following main issues:

- *Why you collected certain data*
- *What data you collected*
- *Where you collected it*
- *How you collected it*
- *How you analysed it*

(Collis & Hussey, 2003, p.55).

Methodology is viewed as the way in which we discover how to embark upon a task of finding out what we believe to be real (Christou *et al.*, 2008).

Chapter three highlights on how the research was conducted in order to arrive at the aims and objectives of the study.

It also encapsulates the philosophical point of the research, study framework, research design, study population, sample size, data collection and data analysis.

3.2 RESEARCH DESIGN

The research methodology involves establishing the type of data to be collected, the techniques for collecting the data and the tools for data analysis in order to meet the study objectives.

3.3 TYPE OF RESEARCH

While the research has been both exploratory and experimental, the researcher made use of both qualitative and quantitative techniques for the experimental session to uncover and establish the project execution risks involved in the real estate and construction industry in Ghana.

3.4 SAMPLING PROCEDURE

Purposive sampling technique was used for this study. Purposive sampling (also known as Judgement) is a non-probability sampling technique in which the selection of members from a population for a study is based on the judgement of the researcher considering the purpose of the study (Black, 2010). In line with the purpose of this study, Real Estate companies and professionals with enormous exposure and experience in the construction industry were selected for the study. Availability and accessibility were the key factors of consideration for choosing the sampled respondents for the study.

3.5 SAMPLING FRAME

3.5.1 Study Area

As indicated earlier in chapter 1, a structured questionnaires were administered to Project sponsors/Clients, Project supervisors, Project managers, Site engineers, Architects, Quantity surveyor and subcontractors in four Real Estate Companies in Accra namely; Construction Planners Ltd, Clifton Homes, Redrow Estates Ltd and Fridoug Construction Ltd. These were done based on the experience and exposure level of the stakeholders involved in order to solicit for the required and necessary information. This research work spanned one week in administering of questionnaires and receiving of responses from 50 stakeholders drawn from real estate companies in Accra, Ghana.

The following categories of people were administered with questionnaires;

3.5.2 The Sponsor/Client

Clients/Sponsors are the owners of a project. They authorize the start of a project, provide financial resources for the project and set key milestones and project deliverable dates. In the case of this research work they were the Real estate developers or firm owners.

3.5.3 The Subcontractor's setup

Project Managers – they are individuals responsible for managing the whole project, maintaining control over the project and ensuring project deliverables meet specifications. They are also in charge of managing the risk components of the project.

Site Engineers – they are in charge of interpreting both architectural and structural designs and details on site. They also propose alternative solutions to engineering challenges with the approval of Project manager and ensure compliance to specifications of design.

Site Supervisors – Artisans work under the strict supervision and oversight of site supervisors. They ensure artisans carry out works in accordance with best practices and drawing specifications on Project Site.

Procurement Managers – they are individuals in charge of purchasing and supplying approved materials to the Project Site. They ensure these materials are supplied in accordance with schedules of the Project in order not to cause delay.

Foremen – These individuals are in charge of the day to day activities or work on site monitoring and taking total oversight of work done by various artisans engaged on the project. They ensure work is done to specifications as directed by the Site Supervisors.

3.6 STUDY POPULATION AND SAMPLE SIZE

Considering a total population of 150 from the afore mentioned Real Estate companies, a total of sixty (60) stakeholders were sampled using published tables with a precision level of +/-10% and were administered the questionnaires. Fifty (50) of these stakeholders representing 83.33% responded to the questionnaires and submitted them. This formed the sample size used for the analysis and discussions.

3.7 DATA COLLECTION

3.7.1 Procedure for collecting data

Five (5) supervisors, three (3) engineers and two (2) architects were selected for piloting of the questionnaires. Their concerns raised were adopted and the nature of the questions were revised. After this, sixty (60) respondents were administered the questionnaires and given three (3) days duration to complete and submit the questionnaires. Respondents who failed to return their questionnaires after the three day period were contacted on phone.

3.7.2 Sources of data

As set forth in the chapter one, the research work made use of data collected from both primary and secondary data source.

3.7.2.1 Primary data

The researcher relied greatly on primary data solicited from Project Managers, Site Supervisors, Engineers, Architects, Subcontractors and Clients/sponsors from the project sites and offices. This ensured that original information were ascertained based on experiences and exposure coming from numerous years of practice, eye witness accounts and personal observations when site visits were made to meet these stakeholders and to administer questionnaires.

3.7.2.2 Secondary data

Primary data was supplemented by secondary data from journals, written books, magazines, and the internet coming from reliable knowledge repositories and libraries compiled by high subject matter professionals, academicians and world recognized researchers. Information from these

secondary sources that were germane to the Project Execution Risks were adopted and compiled in this research study.

3.7.3 Instruments for Data Collection

3.7.3.1 Questionnaire Structure

The structured questionnaire has been attached as appendix 1. The questionnaire was designed with the aim of making it easy to be understood in order to collect information concerning Project Execution Risks, their causes, adverse effects and mitigative measures in the Real Estate Industry. The questionnaire was piloted with a fraction of professionals in the real estate industry to ascertain its lucidity, ergonomic abilities and the quality of information that can be gathered with it. Five (5) supervisors, three (3) engineers and two (2) architects were the professionals selected for piloting exercise. Their concerns raised were adopted and the nature of the questions were revised. After this, sixty (60) respondents were administered the questionnaires and given three (3) days duration to complete and submit the questionnaires. Respondents who failed to return their questionnaires after the three day period were contacted on phone.

It is composed of five main parts; Section A, B, C, D and E.

- Section A – gathers information on the Personal details of the respondent
- Section B, C, D, and E – compile information on Project Execution risks, causes of these risks, negative impacts of these risks and efficient measures to mitigate them respectively.

3.8 DATA ANALYSIS

Microsoft excel 2016 application is a software adopted for presenting the results obtained from the study displayed in frequency distribution tables. This will enable easy comparisons to be made on the risk parameters involved and trend of results to be assessed for proper discussions and necessary conclusions to be reached.

A five point Likert scale was used as a means to rank the Project execution risk, the factor causing these risks, the adverse effects of the risks and the effective measures for mitigating these risks.

Data collected for the research study were analysed using Mean Score Analysis. This method was used to score the various risk parameters with the highest coming top in a descending order of magnitude.



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CHAPTER FOUR

ANALYSIS AND DISCUSSIONS

4.1 INTRODUCTION

Having discussed the introduction, reviewed relevant literature and methodology employed for this study in previous chapters, this chapter seeks to provide details of the results obtained from the field study as a results of collecting data from stakeholders in the real estate industry in Ghana. This chapter will hold analysis and discussions in the light of the three objectives set forth for the research work. The chapter is broken down into four (4) sections corresponding to the number of objectives. These are;

- ❖ Project Execution Risks in the real estate industry in Ghana
- ❖ Causes of Project Execution Risks in the real estate industry in Ghana
- ❖ Adverse effects of Project Execution risks in the real estate industry in Ghana
- ❖ Efficient measures to mitigate Project Execution risks

Both qualitative and quantitative mode for the analysis of the data obtained from the research study. Sixty (60) stakeholders were administered the questionnaires but fifty (50) of them responded representing 83.33% of the total sampled Professionals and Subcontractors in the real estate industry.

4.2 DATA PRESENTATION ON DEMOGRAPHY

4.2.1 Presentation of responses for Q1 (What is your professional specialization?) **Table 4.1: Professional specialization of stakeholders**

Profession	Frequency	% Distribution
Site Supervisor	14	28%
Project Manager	3	6%
Civil Engineer	12	24%
Quantity Surveyor	10	20%
Architect	6	12%
Total	45 (N = 50)	90%

From Table 4.1 above, 28% of respondents are site supervisors, 24% are civil engineers and the remaining 48% are shared between Quantity Surveyors, Architects and Project managers. Site supervisors are in charge of the day to day oversight of all activities that goes on the site so they encounter these risk directly on site. Therefore information giving out by them to this research work is a fair representation of the risk encountered on site. It is evident that, the number of project managers within the real estate industry is low and this is a contributing factor to the overwhelming risks encountered in the real estate industry since Project managers are the ones to plan the roadmap for the entire project.

4.2.2 Presentation of responses for Q2 (Which age range do you fall within?) Table 4.2 Age range of respondents

Age range	Frequency	% Distribution
25 – 35 years	25	50%
36 – 45 years	19	38%
46 – 55 years	6	12%
Above 56 years	0	0%
Total	50	100%

From Table 4.2 shown above, it is known that a large number of respondents (88%) fall within the youthful age range (25-45yrs). It provides the clue that, the real estate industry is interested in hiring youth for their various roles. This is a good sign since youths have the exuberance or energy and fresh ideas to contribute to the development of the industry.

4.2.3 Presentation of responses for Q3 (What is your educational level?) Table

4.3: Educational level of respondent

Educational level	Frequency	% Distribution
Higher National Diploma	20	40%
Professional Diploma	17	34%
Bachelor's Degree	10	20%
Master's Degree	3	6%
Doctorate Degree	0	0%
Total	50	100%

From Figure 4.3, the percentage distribution of respondent who hold Doctorate degree, Masters degree and Bachelors degree are very few representing 26%. But the number of respondents with Professional diploma and Higher national diploma represent 74%. It is therefore exceedingly clear that higher education is lagging behind in the real estate industry. The professionals are failing to advance their knowledge in the field and this is one of the major reasons contributing to the enormous risks confronting the industry. Most of the risks encountered in the industry could be mitigated by best practices and new methods of doing things. Higher education provides these exposures and knowledge.

4.2.4 Presentation of responses for Q4 (What is the name of your organization?) Table 4.4: Organization of stakeholders

Name of Organization	Frequency	% Distribution
Construction Planners Ltd	20	40%
Fridoug Construction Ltd	8	16%
Redrow Estates Ltd	9	18%
Clifton Homes	13	26%
Total	50	100%

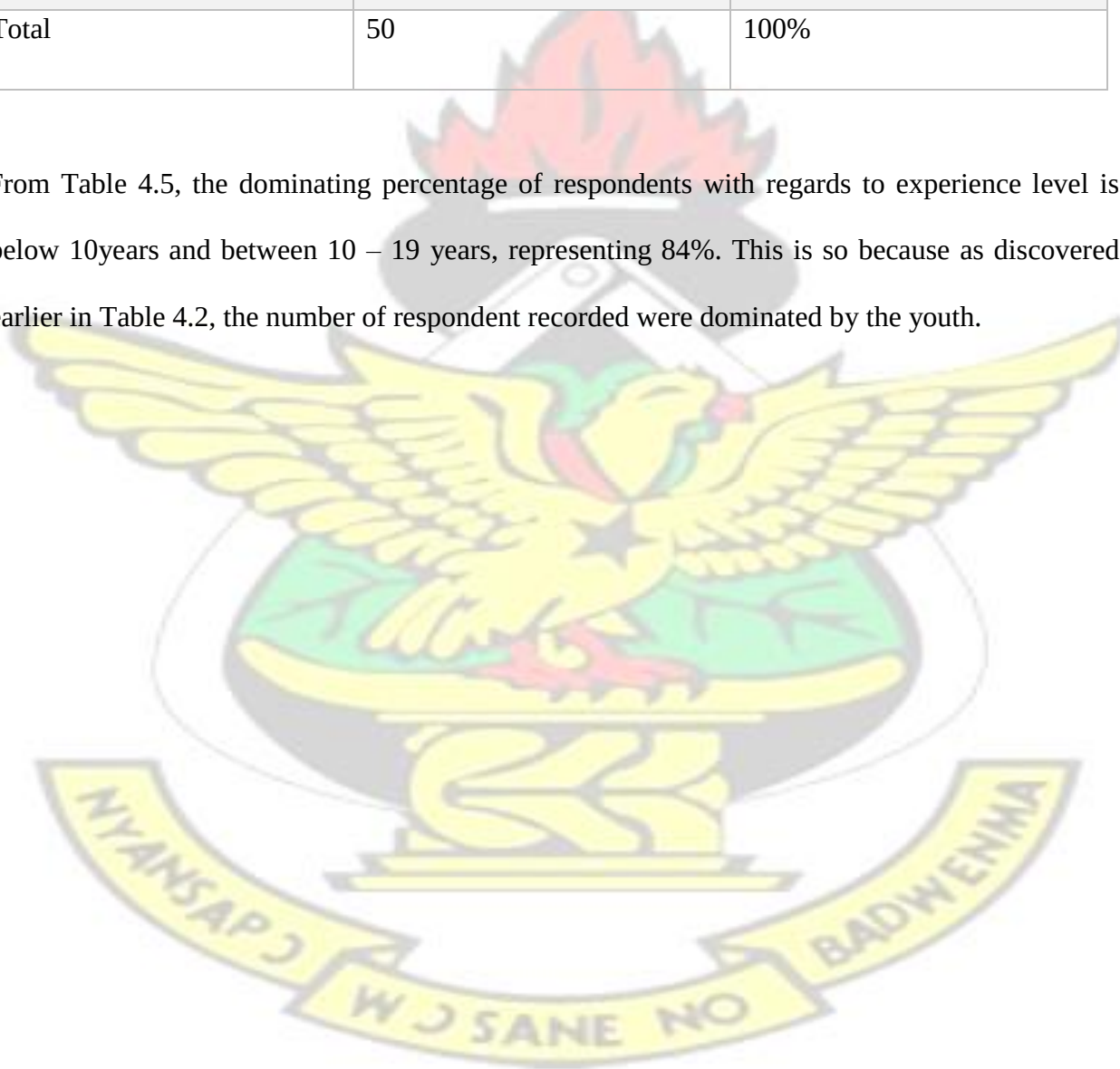
From Table 4.4, 40% of respondents were selected from CPL, 26% from Clifton Homes, 18% from Redrow estates and 16% from Fridoug Const. Ltd. This was done as a results of the fact that, CPL is presently finishing an 8-Storey condominium of 120 apartments (Oasis Park Condominium) at Tetteh Quarshie and Clifton Home is also currently doing a 5-storey residential building with over 500 apartments at Airport residential area. It was deemed fit to tap a lot of information regarding risk from these real estate firms since these are big projects and risk level remain very high too.

4.2.5 Presentation of responses for Q5 (How many years of experience do you have?) Table 4.5: Respondents' years of experience

Years of Experience	Frequency	% Distribution
---------------------	-----------	----------------

Less than 10 yrs	24	48%
10 – 19 yrs	18	36%
20 – 29 yrs	8	16%
30 – 39 yrs	0	0%
Above 40 yrs	0	0%
Total	50	100%

From Table 4.5, the dominating percentage of respondents with regards to experience level is below 10years and between 10 – 19 years, representing 84%. This is so because as discovered earlier in Table 4.2, the number of respondent recorded were dominated by the youth.



4.2.6 Presentation of responses for Q6 Subcontractors (How many projects have you been engaged in for the past 5 years?)

Table 4.6: Projects handled in the past 5 yrs

Number of Projects	Frequency	% Distribution
1 – 5 projects	26	52%
6 – 10 projects	19	38%
11 – 15 projects	5	10%
Above 16 projects	0	0%
Total	50	100%

The greater number of projects handled by respondents with the last 5 years is between 1 – 10 projects forming a percentage distribution of 90% as displayed in Table 4.6. This is also as a results of the youthful nature of professionals within these real estate industry.

4.2.7 Presentation of responses for Q7 Subcontractors (What type of project have you handled within these years?)

Table 4.7: Type of Projects handled

Type of Projects	Frequency	% Distribution
Residential apartments (1 – 5 storey)	12	24%
Residential apartments (6 – 10 storey)	10	20%
Gated community with (20 – 30 houses)	21	42%
Gated community with (31 – 50 houses)	5	10%
Office complex	2	4%
Hostel/Hotel facilities	0	0%
Total	50	100%

Since the research study is within the domain of real estate industry, it is not surprising to see the percentage distribution of specific type of projects handled by respondents to be residential apartments and gated community both forming overwhelming distribution of 96%. Real estate industry players are simply into the business of providing accommodation facilities for the working group of population in Ghana. That is why office complex project saw 4% distribution and 0% for Hostel/hotel projects as displayed in Table 4.7.

4.2.8 Presentation of responses for Q2 Subcontractors (Kindly declare your status in your organization?)

Table 4.8: Status of respondents in their organizations

Status	Frequency	% Distribution
Director/Sponsor	4	8%
Associate Partner	0	0%
Senior Management Staff	1	2%
Intern / Trainee	0	0%
	5 (N = 50)	10%

It was earlier reported in Table 4.1 that most of the respondents were Site supervisors and Civil engineers. Just 10% (Table 4.8) of these professionals were Project Directors/Sponsors and Senior Management Staff members. This could probably be as a results of the fact that, most of these professionals in the industry do not have higher educational level to occupy senior managerial roles and also do not have enough starting capital to setup up a Real Estate firm.

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4.3 PROJECT EXECUTION RISKS IN THE REAL ESTATE INDUSTRY IN GHANA

4.3.1 Statistical Presentation of responses to Project Execution Risks factors

Table 4.9: Overall mean scores of risk factor

Project execution risk	Probability of occurrence					Mean score	Rank	Degree of impact					Mean score	Rank
	1	2	3	4	5			1	2	3	4	5		
Lack of proper project organizational structure	9	14	17	6	4	2.640	11 th	9	14	17	6	4	2.640	11 th
Delay in work permit acquisition	16	7	5	1	21	3.080	4 th	16	7	5	4	18	3.020	4 th
Unavailability of skilled labour or workforce	10	10	14	11	5	2.820	7 th	10	10	14	11	5	2.820	7 th
Poor coordination amongst subcontractors	19	9	12	1	9	2.440	14 th	19	9	12	1	9	2.440	14 th
Poor supervisory work on the part of Site Supervisor	11	11	2	18	8	3.020	5 th	11	11	2	18	8	3.020	4 th
Poor work ethics/ poor attitudes towards work	5	20	9	4	12	2.960	6 th	5	20	9	4	12	2.960	6 th
Failure to meet contractual terms /specifications	4	14	8	9	15	3.340	2 nd	4	14	5	12	15	3.400	2 nd
Poor equipment conditions	7	16	24	2	1	2.480	12 th	7	16	24	2	1	2.480	12 th
Overrun of Construction schedules	6	22	7	8	7	2.760	9 th	6	22	7	8	7	2.760	9 th
Supply of substandard project materials	2	2	29	14	3	3.280	3 rd	2	2	29	14	3	3.280	3 rd
Delayed deliveries of Project materials	23	15	2	7	3	2.040	16 th	23	15	2	7	3	2.040	16 th
Poor access route to project site	35	4	10	0	1	1.560	18 th	35	4	10	0	1	1.560	18 th

Poor feasibility studies	9	16	11	4	10	2.800	8 th	9	16	11	4	10	2.800	8 th
Lack of clear constructional plan or procedure.	14	8	13	8	7	2.720	10 th	14	8	13	8	7	2.720	10 th
Inaccurate estimation of contract duration	33	5	4	6	2	1.780	17 th	33	5	4	6	2	1.780	17 th
Defective working drawings	12	15	15	3	5	2.480	12 th	12	15	15	3	5	2.480	12 th
Poor project scope definition by stakeholders	9	2	10	16	13	3.440	1 st	9	2	10	16	13	3.440	1 st
Frequent changes to specifications /scope	18	12	15	4	1	2.160	15 th	18	12	15	4	1	2.160	15 th



Discussion of results

4.3.2 on Project Execution Risks factors

Per responses given by the stakeholders in the real estate industry displayed in Table 4.9, the following project execution risks were adjudged as having very high probability of occurring on projects and have high impact level on project execution. They are listed in descending order of magnitude in terms of mean scores;

- *Poor project scope definition by stakeholders*
- *Failure to meet contractual terms /specifications*
- *Supply of substandard project materials*
- *Delay in work permit acquisition*
- *Poor supervisory work on the part of Site Supervisor*

According to Project Management Body of Knowledge (2017), poor scope definition is detrimental to the success of the project under execution and this agrees with the outcome of the study. This is because, influential stakeholders may step in at any point in time in the lifecycle of the project to add and subtract from the scope and this poses a great amount of risk since it may lead to delays in completion time and high cost.

Failure to meet contractual terms/specifications came second with both occurrence probability and impact level mean score of 3.340 and 3.400 respectively. Contractual terms may come with sanctions and penalties to defray in case there is a breach. Clients may decide to reject the project in cases of breach and this may cause eventual failure of the project.

Supply of substandard materials, delay in work permit acquisition and poor supervisory work are all risks that lead to reduced lifespan and quality of project deliverable and prolonged completion timelines.

4.4 CAUSES OF PROJECT EXECUTION RISKS IN THE REAL ESTATE INDUSTRY IN GHANA

4.4.1 Statistical Presentation of responses on Section C; Causes of Project Execution Risks

Table 4.10: Overall mean scores of risk causing factors

	<i>Causes of project execution risk</i>					<i>Least Lower High Higher Highest Mean Rank score</i>	
1. <i>Negligence on the part of project supervisors</i>	11	6	18	11	4	2.820	5 th
2. <i>Unclear work descriptions and orientation for subcontractors</i>	8	20	15	7	0	2.420	9 th
3. <i>Lack of incentives and motivation for workforce</i>	4	28	16	2	0	2.320	10 th
4. <i>Inadequate knowledge about contract administration</i>	1	2	32	4	11	3.440	2 nd
5. <i>Lack of knowledge about stakeholder engagement</i>	4	12	31	2	1	2.680	7 th
6. <i>Unlawful permit acquisition</i>	2	18	14	10	6	3.000	4 th
7. <i>Lack of competent designing team</i> <i>(the likes of Structural engineers, Architects etc)</i>	7	23	4	13	3	2.640	8 th
8. <i>Use of old and worn out equipment to carryout work</i>	11	2	21	7	9	3.020	3 rd
9. <i>Poor working conditions</i>	17	2	15	8	8	2.760	6 th
10. <i>Inadequate planning before project implementation</i>	5	12	6	9	18	3.460	1 st
11. <i>Failure to do proper feasibility studies</i>	8	26	12	2	2	2.280	11 th

Discussion of results

4.4.2 on causes of Project Execution Risks

From Table 4.10, respondents' views on the causes of project execution risks saw the following causes come top per their mean score. They are listed in descending order of magnitude;

- *Inadequate planning before project implementation*
- *Inadequate knowledge about contract administration*
- *Use of old and worn out equipment to carryout work*
- *Unlawful permit acquisition*
- *Negligence on the part of project supervisors*

According to Project Management Body of Knowledge (2017), Planning is the second process group and the first process to every knowledge area is planning. It tells how planning is essential in project execution without which project suffers a lot of risks. Inadequate planning before project implementation throws the project in a confused state and can lead to eventual failure of the project. The respondents ranking saw this as a first cause to project execution risk accruing a total mean score of 3.460.

Inadequate knowledge about contract administration came second with a score of 3.440. This is also a key cause to many of the risks usually encountered by the real estate industry during project execution. Unguided agreement on express and implied terms of a contract may lead to unfavourable conditions which have high tendency of inhibiting project success.

The use of old and worn out equipment to carryout work, unlawful permit acquisition and negligence on the part of supervisors are all causes of project execution risks which have a high potential of decreasing the lifespan and eventual collapse of a project.

4.5 ADVERSE EFFECTS OF PROJECT EXECUTION RISKS IN THE REAL ESTATE INDUSTRY IN GHANA

4.5.1 Statistical Presentation of responses on Section D; Adverse effects of Project Execution Risks Table

4.11: Overall mean scores of negative effects of risk factors

<i>Effects of Project execution risk</i>	<i>Least</i>	<i>Lower</i>	<i>High</i>	<i>Higher</i>	<i>Highest</i>	<i>Mean score</i>	<i>Rank</i>
☐ Increase in project cost	10	12	15	6	7	2.760	3 rd
☐ Delay in project completion	3	3	9	13	22	3.960	1 st
☐ Reduced project quality	16	11	16	5	2	2.320	5 th
☐ Decrease in project lifespan	28	9	10	3	0	1.760	6 th
☐ Stakeholders dissatisfaction of project	11	15	19	4	1	2.380	4 th
☐ Eventual project failure	7	4	8	14	17	3.600	2 nd

Discussion of results

4.5.2 on negative effects of Project Execution Risks

Table 4.11 records the responses of the stakeholders on the negative effects of project execution risk. The outlined adverse effects came top per their mean scores accrued, arranged in descending order of magnitude.

- *Delay in project completion*
- *Eventual project failure*
- *Increase in project cost*
- *Stakeholders dissatisfaction of project*
- *Reduced project quality*

Respondents agreed that delay in project completion is the first adverse impact posed by project execution risks. Second on the list of negative impact of project execution risk is eventual project failure accruing a mean score of 3.600. Increase in project cost comes next with a score of 2.760. With abnormal escalation of project cost, Sponsors may face financial difficulties since spending will have to rise beyond project budget. At this level, project may eventually fail since sponsor may not have enough funds to further finance the project. Project execution risks may also lead to stakeholders' dissatisfaction of project. And since stakeholders' interest and satisfaction is key to project success, project may eventually fail.

One other negative impact of project execution risk is the reduction in quality of project deliverable. Quality of project deliverable is of great essence to Stakeholders without which may eventually cause project failure.

4.6 EFFICIENT MEASURES TO MITIGATE PROJECT EXECUTION RISKS

4.6.1 Statistical Presentation of responses on Section D; Adverse effects of Project Execution Risks

Table 4.12: Overall mean scores of risk factors mitigative measures

Mitigative measures of risk	Least	Lower	High	Higher	Highest	Mean score	Rank
1. Engagement of competent Project Manager, design team and other professionals to handle project	1	6	13	18	12	3.680	3 rd
2. Conducting proper feasibility studies of site before commencement of project	9	18	15	8	0	2.440	9 th
3. Proper engagement and integration of major stakeholders in project	2	4	19	17	8	3.500	4 th
4. Legal acquisition of building permit	4	3	7	13	23	3.960	2 nd
5. The use of state-of-the-art equipment for carrying out activities on project	6	34	3	5	2	2.260	10 th
6. The use of quality materials to execute projects	9	15	21	1	4	2.520	7 th
7. Periodic training sessions on best practices for project supervisors, subcontractors and all workforce	11	9	25	4	1	2.500	8 th
8. Assigning of unambiguous roles and responsibilities to workforce	6	31	10	3	0	2.200	11 th
9. Comprehensive execution plan before project commencement	3	3	8	12	24	4.020	1 st
10. Availability of incentives and motivation for workforce	15	9	14	4	8	2.620	6 th
11. Clear organizational structure with reporting order	5	7	17	20	1	3.100	5 th

Discussion of results

4.6.2 on efficient mitigative measures of Project Execution Risks

Table 4.12 displays the responses of stakeholders on efficient measure required to mitigate the outlined project execution risks. The ranking by stakeholders saw the following measures emerge top and efficient way of checking project execution risk.

- *Comprehensive execution plan before project commencement*
- *Legal acquisition of building permit*
- *Engagement of competent Project Manager, design team and other professionals to handle project*
- *Proper engagement and integration of major stakeholders in project*
- *Clear organizational structure with reporting order*

As asserted by Project Management Institute (2017), Planning is key to project success. Respondents view tends to agree with the assertion of Project management Institute. With adequate planning and roadmap to project execution, detrimental risks will be envisaged and effective responses would be provided for them. This will ensure successful execution of projects. Legal acquisition of building permit came second with a mean score of 3.960. Legal risk such as illegal acquisition of building permit may be efficiently checked by legally applying to the appropriate government for the permit. Whiles these are ensured, legal sanctions and suspensions that come with these risks may be mitigated.

It is clear from the study that, the real estate industry lack project managers and that has accounted for most of the risks the industry is faced with. Project managers are professionals who have acquired requisite knowledge and best practices to manage risks efficiently. Whiles Project managers are hired together with competent designing team, the project stands a greater chance of being successful. According to Project Management Institute (2017), there is knowledge

area known as Stakeholder engagement. It is not without any purpose that a whole knowledge area has been dedicated to study about Project stakeholders. Stakeholders play a major in ensuring the success or failure of a project. So if stakeholders are involved and well integrated in a project from the very beginning, the project stands a high chance of thriving. This is because their views and input would be included in the project and will therefore appeal to their interest and their full support for the project.

Clear organizational structure with reporting order also helps to mitigate some of the project execution risks in the real estate industry, placing 5th with a mean score of 3.100. With welldefined organizational structure in place, each project team member figures out who he or she reports to directly. This prevents overlapping and ambiguity of responsibilities. Project team members are able to execute their task well because they will report on their activities periodically. This checks haphazard way of doing things and this ensures successful execution of the project.

The logo of Kenya National University of Science and Technology (KNUST) is centered in the background. It features a yellow eagle with spread wings perched on a shield with green and red sections. Below the shield is a yellow banner with the text 'NYANSAPU' on the left and 'BADWENMA' on the right. The entire logo is set against a white background with a faint 'KNUST' watermark above it.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

The key focus of this research study was to explore the project execution risks in the real estate industry in order to efficiently propose measures to mitigate them. With this aim in view, three research objectives were outlined which were carefully guided by four research questions in order to keep the aim still in view. This chapter throws a light back to the research objectives and questions outlined at the initial stages of the research to examine how close this work has come in accomplishing its aim. This chapter also holds the researchers recommendations for further research study based on the discoveries of the study.

5.2 RESEARCH QUESTIONS

At the initial stages of the research, four main research questions were raised. They are;

- What is Project execution risk in real estate industry?
- What are the various categories and causes of Project execution risk?
- What are the adverse impacts of these Project execution risks on the real estate industry?
- What are the requisite measures to efficiently mitigate and manage these risks

5.3 REVIEW OF RESEARCH OBJECTIVES

Research objectives were formulated as part of meeting the aim of the study which was to explore the project execution risks in the real estate industry in order to efficiently propose measures to mitigate them. These objectives are;

- To identify the project execution risks in the real estate industry.
- To identify the causes of project execution risks in the real estate industry

- To identify the adverse effects of project execution risks in the real estate industry; and □
To propose measures to efficiently mitigate these risks in the real estate industry.

5.3.1 Review of first objective

The first objective of this study being to identify the project execution risks in the real estate industry in Ghana was achieved by the reference to reliable literature materials available. A number of project execution risks were enumerated in these literature.

5.3.2 Review of second objective

The second objective of the study was to determine the causes and negative effects of the project execution risks in the real estate industry. This was also accomplished by proposing some causes and negative effects of these risks and presenting stakeholders in the industry with questionnaires to express their views. Likert scale of five point (1-5) was used to rate these factors and a mean score analysis was used in evaluating each factor to achieve three main causes and negative effects of these risks.

5.3.3 Review of last objective

The last objective which was to propose measures to efficiently mitigate these risks in the real estate industry was also accomplished by administering questionnaires to 60 stakeholders in the industry. Similarly, a five point Likert scale and a mean score analysis were used to rank and evaluate the proposed measures.

5.4 LIMITATIONS OF THE STUDY

The outcome of this research cannot be widespread statistically for the entire real estate industry in Ghana since it was restricted geographically, with only respondents selected using purposive sampling technique from the real estate organizations in Accra. Nonetheless, like Chileshe (2004) enjoined, its outcome represents a picture of actual views of professionals and subcontractors regarding the probability of Project execution risk manifestation and its degree of impact on projects.

5.5 CONCLUSION

It can be safely concluded that, the real estate industry in Ghana is faced with serious and several project execution risks. The fact also remains that, the industry lack project managers or have fewer number of project managers to handle and ensure effective management of these risks. As a results, risk management knowledge and best practices are not planned into and implemented in their project execution, something which is key to the success of projects. Also, many of the industry professionals do not have higher education and training not to talk of risk management knowledge and these collectively have contributed to the overwhelming negative effects on projects in the industry.

Moreover, risks and their negative impacts have a higher tendency of reducing the quality and lifespan of projects. However, outlining effective and comprehensive execution plan will envisage these risks and bring them into view and be mitigated.

In addition, Stakeholders have a great amount of influence on the successful execution of a project. There is therefore the need to actively engage stakeholders' right from the initial stages of the project till its completions in order not to delay or inhibit the success of the project.

Finally, permit acquisition which falls under a legal risk is key to the success of a project. Permit should be legally acquired in order not to incur legal sanctions later during the lifecycle of the project which has a higher tendency of causing failure of the project.

5.6 RECOMMENDATIONS FOR THE INDUSTRY

Risk management processes do not ensure hundred percent (100%) solution but the following recommendations which will be of benefit to the real estate industry and the nation are suggested:

- Real estate organizations in Ghana are supposed to organize periodic workshops and training programs for managing projects more particularly how to manage risk for workers in who work under them to gain requisite knowledge and skills needed in overseeing and coordinating projects particularly risk.
- There is a need for professionals in the real estate industry to build their capacity and specialization in risk management thereby setting up consulting firms purposely to provide professional direction and counsel and roadmap for performing risk management practices on projects.
- Awareness ought to be created for Clients/Sponsor to know the benefits of performing risk management processes on projects and be motivated to insist on its performance on their projects.
- Certain procurement strategies such as Contract type (Fixed Price Incentive Fee and Cost Plus Incentive Fee) enhance risk reduction and distribution. These strategies ought to be

explored, endorsed and adopted in the real estate industry players to enhance growth of the industry in terms of successful project execution.

5.7 RECOMMENDATIONS FOR FUTURE RESEARCH

Further research should be made on implementation of risk management processes and its impact on project success in the real estate industry in Ghana.

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APPENDIX: QUESTIONNAIRES FOR THE RESEARCH STUDIES

Preamble

I am Osei Poku Kennedy, a Masters student from Department of Building Technology at Kwame Nkrumah University of Science and Technology, Kumasi.

This research questionnaire has been designed to collect information and views from real estate industry stakeholders in view of their work experiences accumulated over years and the high level projects handled in these number of years. The aim is to;

- Identify the project execution risks in the real estate industry.

- Determine the causes and adverse effect of project execution risks in the real estate industry.
- Propose measures to efficiently manage these risks in the real estate industry.

The findings of this research study is for future enhancement and improvement of Projects undertaken by the real estate industry in Ghana and I assure respondents that any information given will be handled with utmost confidentiality. **Kindly answer the questions by ticking (✓) any of the boxes provided that applies to the question.**

I am so much grateful for your maximum cooperation and willingness to support this research study. Any questions and contribution concerning this questionnaires can be mailed to Yawpoku1@gmail.com or call on 0249256763. Thank you.

Regards,

Osei Poku Kennedy

Professionals

Section A: Personal details

1. What is your professional specialization?

- a) Site Supervisor ☐
- b) Project Manager ☐
- c) Civil Engineer ☐
- d) Quantity Surveyor ☐
- e) Architect ☐

2. Which age range do you fall within?

- a) 25 – 35 years ☐
- b) 36 – 45 years ☐
- c) 46 – 55 years ☐
- d) Above 56 years ☐

3. What is your educational level?

- a) Higher National Diploma (HND) ☐
- b) Professional Diploma ☐
- c) Bachelor's Degree ☐
- d) Master Degree ☐
- e) Doctorate Degree ☐

4. What is the name of your organization?

.....

5. How many years of experience do you have?

- a) Less than 10yrs ☐
- b) 10-19yrs ☐
- c) 20-29yrs ☐
- d) 30-39 ☐
- e) Above 40yrs ☐

Section B

Based on your professional experiences, kindly rank the following Project Execution Risks according to their probability of occurrence on Project Site and their level of impact. Please indicate by ticking the appropriate box provided.

Where;

1 = Least, 2 = Lower, 3 = High, 4 = Higher, 5 = Highest

Project Execution Risks	Probability of occurrence					Degree of Impact				
	1	2	3	4	5	1	2	3	4	5
1. Lack of proper project organizational structure										
2. Delay in work permit acquisition										
3. Unavailability of skilled labour or workforce										
4. Poor coordination amongst subcontractors										
5. Poor supervisory work on the part of Site Supervisors										
6. Poor work ethics/ poor attitudes towards work										
7. Failure to meet contractual terms /specifications										
8. Poor equipment conditions/ Frequent equipment failures										
9. Overrun of Construction schedules										
10. Supply of substandard project materials										
11. Delayed deliveries of Project materials										
12. Poor access route to project site										
13. Poor feasibility studies										
14. Lack of clear constructional plan or procedure.										
15. Inaccurate estimation of contract duration										
16. Defective working drawings										
17. Poor project scope definition by stakeholders										
18. Frequent changes to specifications /scope										
Others; please specify and tick accordingly										
19.										
20.										
21.										

Section C

Based on your professional experiences, kindly rank the following factors according to their tendencies to cause project execution risks. Please indicate by ticking the appropriate box provided. Where; **1 = Least, 2 = Lower, 3 = High, 4 = Higher, 5 = Highest**

Causes of Project Execution Risks	Risk Tendency				
	1	2	3	4	5
1. Negligence on the part of project supervisors					
2. Unclear work descriptions and orientation for subcontractors					
3. Lack of incentives and motivation for workforce					
4. Inadequate knowledge about contract administration					
5. Lack of knowledge about stakeholder engagement					
6. Unlawful permit acquisition					
7. Lack of competent designing team (the likes of Structural engineers, Architects etc)					
8. Use of old and worn out equipment to carryout work					
9. Poor working conditions					
10. Inadequate planning before project implementation					
11. Failure to do proper feasibility studies					
Others; please specify and tick accordingly					
12.					
13.					
14.					

Section D

Based on your professional experiences, kindly rank the following factors according to their ability to adversely impact project. Please indicate by ticking the appropriate box provided.

Where; 1 = Least, 2 = Lower, 3 = High, 4 = Higher, 5 = Highest

Negative effects of Project Execution Risks	Rank				
	1	2	3	4	5
1. Increase in project cost					
2. Delay in project completion					
3. Reduced project quality					

4. Decrease in project lifespan					
5. Stakeholders dissatisfaction of project					
6. Eventual project failure					
Others; please specify and tick accordingly					
7.					
8.					
9.					
10.					

Section E

Based on your professional expertise, kindly rank the following factors according to their ability to mitigate project execution risks. Please indicate by ticking the appropriate box provided.

Where; **1 = Least, 2 = Lower, 3 = High, 4 = Higher, 5 = Highest**

Mitigation measures of Project Execution Risks	Rank				
	1	2	3	4	5
1. Engagement of competent Project Manager, design team and other professionals to handle project					
2. Conducting proper feasibility studies of site before commencement of project					
3. Proper engagement and integration of major stakeholders in project					
4. Legal acquisition of building permit					

5. The use of state-of-the-art equipment for carrying out activities on project					
6. The use of quality materials to execute projects					
7. Periodic training sessions on best practices for project supervisors, subcontractors and all workforce					
8. Assigning of unambiguous roles and responsibilities to workforce					
9. Comprehensive execution plan before project commencement					
10. Availability of incentives and motivation for workforce					
11. Clear organizational structure with reporting order					
Others; please specify and tick accordingly					
12.					
13.					
14.					
15.					

Thank you for your participation

Subcontractors

Section A: Personal details

1. What is the name of your organization?

.....

2. Kindly declare your status in your organization?

- a) Director/ member/CEO/Sponsor Board ☐
- b) Associate partner ☐
- c) Senior management staff ☐
- d) Intern/ Trainee ☐

e) Others (Please specify)
.....

3. What is your educational level?

- a) Higher National Diploma (HND) ☐
- b) Professional Diploma ☐
- c) Bachelor's Degree ☐
- d) Master Degree ☐
- e) Doctorate Degree ☐

4. What is your professional specialization?

- a) Site Supervisor ☐
- b) Project Manager ☐
- c) Civil Engineer ☐
- d) Quantity Surveyor ☐
- e) Architect ☐

5. How many years of experience do you have in professional practice?

- a) Less than 10 yrs ☐
- b) 10-19 yrs ☐
- c) 20-29 yrs ☐
- d) 30-39 ☐
- e) Above 40 yrs ☐

6. How many projects have you been engaged in for the past 5 years?

- a) 1 – 5 projects ☐
- b) 6 – 10 projects ☐
- c) 11 – 15 projects ☐
- d) Above 16 projects ☐

7. What type of project have you handled within these years?

- a) Residential apartments (1 – 5 storey) ☐
- b) Residential apartments (6 – 10 storey) ☐
- c) Gated community with (20 – 30 houses) ☐
- d) Gated community with (31 – 50 houses) ☐
- e) Office Complex ☐
- f) Hostel/Hotel facilities ☐
- g) Others (Please specify)

.....

Section B

Based on your professional experiences, kindly rank the following Project Execution Risks according to their probability of occurrence on Project Site and their level of impact. Please indicate by ticking the appropriate box provided.

Where;

1 = Least, 2 = Lower, 3 = High, 4 = Higher, 5 = Highest

Project Execution Risks	Probability of occurrence					Degree of Impact				
	1	2	3	4	5	1	2	3	4	5
1. Lack of proper project organizational structure										
2. Delay in work permit acquisition										
3. Unavailability of skilled labour or workforce										
4. Poor coordination amongst subcontractors										
5. Poor supervisory work on the part of Site Supervisors										
6. Poor work ethics/ poor attitudes towards work										
7. Failure to meet contractual terms /specifications										
8. Poor equipment conditions/ Frequent equipment failures										
9. Overrun of Construction schedules										
10. Supply of substandard project materials										
11. Delayed deliveries of Project materials										
12. Poor access route to project site										
13. Poor feasibility studies										
14. Lack of clear constructional plan or procedure.										
15. Inaccurate estimation of contract duration										
16. Defective working drawings										
17. Poor project scope definition by stakeholders										

18. Frequent changes to specifications /scope										
Others; please specify and tick accordingly										
19.										
20.										
21.										

Section C

Based on your professional experiences, kindly rank the following factors according to their tendencies to cause project execution risks. Please indicate by ticking the appropriate box provided. Where; **1 = Least, 2 = Lower, 3 = High, 4 = Higher, 5 = Highest**

Causes of Project Execution Risks	Risk Tendency				
	1	2	3	4	5
1. Negligence on the part of project supervisors					
2. Unclear work descriptions and orientation for subcontractors					
3. Lack of incentives and motivation for workforce					
4. Inadequate knowledge about contract administration					
5. Lack of knowledge about stakeholder engagement					
6. Unlawful permit acquisition					
7. Lack of competent designing team (the likes of Structural engineers, Architects etc)					
8. Use of old and worn out equipment to carryout work					

9. Poor working conditions					
10. Inadequate planning before project implementation					
11. Failure to do proper feasibility studies					
Others; please specify and tick accordingly					
12.					
13.					
14.					

Section D

Based on your professional experiences, kindly rank the following factors according to their ability to adversely impact project. Please indicate by ticking the appropriate box provided.

Where; 1 = Least, 2 = Lower, 3 = High, 4 = Higher, 5 = Highest

Negative effects of Project Execution Risks	Rank
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	1	2	3	4	5
☐ Increase in project cost					
☐ Delay in project completion					
☐ Reduced project quality					
☐ Decrease in project lifespan					
☐ Stakeholders dissatisfaction of project					
☐ Eventual project failure					
Others; please specify and tick accordingly					
☐					
☐					
☐					
☐					

Section E

Based on your professional expertise, kindly rank the following factors according to their ability to mitigate project execution risks. Please indicate by ticking the appropriate box provided.

Where; 1 = Least, 2 = Lower, 3 = High, 4 = Higher, 5 = Highest

Mitigation measures of Project Execution Risks	Rank

	1	2	3	4	5
1. Engagement of competent Project Manager, design team and other professionals to handle project					
2. Conducting proper feasibility studies of site before commencement of project					
3. Proper engagement and integration of major stakeholders in project					
4. Legal acquisition of building permit					
5. The use of state-of-the-art equipment for carrying out activities on project					
6. The use of quality materials to execute projects					
7. Periodic training sessions on best practices for project supervisors, subcontractors and all workforce					
8. Assigning of unambiguous roles and responsibilities to workforce					
9. Comprehensive execution plan before project commencement					
10. Availability of incentives and motivation for workforce					
11. Clear organizational structure with reporting order					
Others; please specify and tick accordingly					
12.					
13.					
14.					

15.

Thank you for your participation

