A STUDY OF THE CHALLENGES ASSOCIATED WITH PROJECT COST PERFORMANCE IN GHANA

By

James Essilfie

(B.Sc. Quantity Surveying and Construction Economics)

A thesis submitted to the Department of Construction Technology and Management, Kwame Nkrumah University of Science and Technology, Kumasi in partial fulfilment of the requirement for the award degree of

MASTER OF SCIENCE

OCTOBER, 2018

DECLARATION

I hereby declare that this submission is my own work towards the MSc Project Management and that, to the best of my knowledge, it contains no material previously published by another person nor material which has been accepted for the award of any other degree of the university, except where due acknowledgement has been made in the text.

STUDENT: JAMES ESSILFIE (PG1880917)

Signature……..

Date……..

Certified by

SUPERVISOR: DR. MICHAEL ADDY

Signature……

Date……

Certified by

THE HEAD OF DEPARTMENT: PROF.B.K.BAIDEN

Signature……

Date…….

ABSTRACT

Cost overrun does not only affect the profitability of construction projects for the contractor, it also affects the whole economy especially in public projects. Therefore, the aim of this study was to explore the challenges associated with project cost performance in Ghana. To achieve the aim, three (3) objectives were established which were to identify the causes of poor project cost performance in Ghana, to identify the challenges in achieving high project cost performance in Ghana and to identify the strategies in improving project cost performance in Ghana. Establishing the objectives led to the extensive review of literature and subsequently, developing a structured questionnaire to aid in the collection of data from the respondents. Using the snowballing sampling technique, fifty-three (53) questionnaires were retrieved out of the seventy-nine (79) distributed. The data were analyzed using the Relative Importance Index (RII). From the analysis, it was realized that contractor's site management came out as the most significant cause of poor cost performance in the construction industry. The second ranked criterion was material and machinery. The third ranked criterion was design and documentation related factors. In the objective two, the first ranked factor was insufficient resources for cost management. The second ranked factor was poor budgeting and forecasting approach. In the third objective, the first ranked factor was proper planning cost control. The second ranked factor was competent personnel. The third tanked factor was realistic cost estimation. The forth ranked factor was effective risk management. With these findings, it was recommended that, the consultant in consultation with the client should endeavor to select an appropriate contractor for the execution of the works. The selection of an inappropriate and inexperienced contractor creates the possibility of project failure especially in terms of cost. Also, cost planning processes should be implemented at initial stages of the construction project and make sure that during the execution of the project, cost is adequately controlled. Lastly, excessive scope changes should be avoided as it has a significant impact on project cost performance.

Keywords: Challenges, Cost, Project Cost Performance, Project Cost, Ghana.

TABLE OF CONTENT

DECLARATION ..... **II**

ABSTRACT ..... **III**

LIST OF TABLES ..... **IX**

LIST OF FIGURES ..... **X**

ACKNOWLEDGEMENT ..... **XI**

DEDICATION ..... **XII**

CHAPTER ONE **1**

INTRODUCTION **1**

1.1 BACKGROUND OF THE STUDY 1

1.2 PROBLEM STATEMENT 5

1.3 AIM OF THE STUDY 6

1.4 RESEARCH OBJECTIVES 6

1.5 RESEARCH QUESTIONS 6

1.6 SIGNIFICANCE OF THE STUDY 7

1.7 SCOPE OF THE STUDY 8

1.8 RESEARCH METHODOLOGY 8

1.9 STURCTURE OF THE REPORT 9

CHAPTER TWO 11

LITERATURE REVIEW 11

2.1 INTRODUCTION 11

2.2 THE GHANAIAN CONSTRUCTION INDSUTRY 11

2.3 CONSTRUCTION PERFORMANCE CRTERIA 14

2.4 COST AS A CRITERIA FOR MEASURING CONSTRUCTION PERFORMANCE 16

2.5 COST OVERRUNS 18

2.5.1 Inaccurate estimation of Original cost 18

2.5.2 Inflation of project costs 19

2.5.3 Improper planning 19

2.5.4 Lack of experience 19

2.5.5 Obsolete or unsuitable construction methods and equipment 19

2.5.6 Mistake in design 20

2.5.7 Poor contract management 20

2.6 COST MANAGEMENT 22

2.6.1 Cost planning and control 23

2.6.2 ESTIMATING 24

2.6.3 Budgeting 24

2.6.4 Cash flow forecasting 24

2.6.5 Financial reporting and cost reporting 25

2.6.6 Cost code systems 25

2.6.7 Judgement 25

2.7 STRATEGIES TO IMPROVE CONSTRUCTION MANAGEMENT 27

2.8 COST CONTROL PRACTICES 28

2.8.1 Cash flow/ S-curve *28*

2.8.2 Variances *30*

CHAPTER THREE 32

RESEARCH METHODOLOGY 32

3.1 INTRODUCTION 32

3.2 RESEARCH PROCESS 32

3.3 RESEARCH PARADIGM 33

3.4 RESEARCH DESIGN 35

3.5 RESEARCH APPROACH 36

3.6 RESERARCH STRATEGY 37

3.7 RESEARCH METHOD 38

3.8 SOURCE OF DATA 39

3.9 POPULATION, SAMPLE SIZE AND SAMPLING TECHNIQUE 40

3.10 QUESTIONNAIRE DEVELOPMENT 41

3.10.1 Questionnaire distribution *42*

3.11 TOOLS FOR THE ANALYSIS 42

CHAPTER FOUR.....44

ANALYSIS AND DISCUSSION 44

4.1 INTRODUCTION 44

4.2 BACKGROUND OF THE RESPONDENTS 44

4.2.1 Respondent's profession *46*

4.2.2 Respondent's experience *46*

4.2.3 Respondent's educational level *46*

4.2.4 Number of projects *47*

4.3 RELIABILITY ANALYSIS 47

4.4 RANKING OF FACTORS 47

4.4.2 Objective two: Challenges in achieving high cost performance *51*

4.4.3 Objective three: Strategies in improving cost performance *53*

4.5 SUMMARY OF CHAPTER 55

CHAPTER FIVE 57

SUMMARY OF FINDINGS, CONCLUSION, RECOMMENDATIONS 57

INTRODUCTION 57

5.2 SUMMARY OF FINDINGS 57

5.2.1 Objective one: To identify the causes of poor project cost performance in Ghana *57*

5.2.2 Objective two: To identify the challenges in achieving high project cost performance in Ghana *58*

5.2.3 Objective three: To identify the strategies in improving project cost performance in Ghana *58*

5.3 LIMITATIONS AND FURTHER STUDY 59

5.4 CONCLUSION 59

5.5 RECOMMEDATIONS.....60

REFERENCES.....61

APPENDIX.....70

LIST OF TABLES

TABLE 2.1: CAUSES OF CONSTRUCTION COST OVERRUNS 21

TABLE 3.1: RESEARCH PARADIGMS 34

TABLE 4.1: BACKGROUND OF RESPONDENTS 45

TABLE 4.2: RII SIGNIFICANCE VALUES 48

4.3.1 OBJECTIVE ONE: CAUSES OF POOR COST PERFORMANCE 48

TABLE 4.3: CAUSES OF POOR COST PERFORMANCE 50

TABLE 4.4: CHALLENGES IN ACHIEVING HIGH COST PERFORMANCE 53

TABLE 4.5: STRATEGIES IN IMPROVING COST PERFORMANCE 55

LIST OF FIGURES

FIGURE 2.2: CASH FLOW/S-CURVE.....29

ACKNOWLEDGEMENT

I wish to render an invaluable thanks and appreciation to The Almighty God as the author and sustainer of success. I owe to him the determination, perseverance and creativeness of skills and mind during the tense period of the project work. Dr. Michael Addy, the supervisor of this project for dedicating the valuable part of his time to reading and directing this project work. All the lecturers in the department and friends and love ones who helped me in diverse ways for the materialization of this project.

DEDICATION

To God be the glory. I dedicate this work to my parents, the late Mr. Kobina Essilfie and Madam Naomi Armah; you have been my everything in life. I love you mom and dad. May the good God bless you.

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

The Ghanaian construction industry has experienced a tremendous growth. In 2014, it recorded a growth rate of 14.8% and is regarded as the largest growing sector in Ghana (Ghana Statistical service, 2015). Agyakwa-Baah (2007), indicated that, the Ghanaian construction industry is directly linked to the economy therefore, the performance of the industry in terms of schedule, budget and quality directly affects the economy's development. In view of this, construction project management has gained much popularity and has evolved over the years.

According to Munns and Bjeirmi (1996), construction project management is a professional and scientific specialization as it is generally limited, temporary and it requires innovation. Therefore, various scientific tools have being developed to the aid in the improvement of the performance of the construction industry. Numerous studies conducted concentrated on identifying the challenges in the Ghanaian construction industry. For instance, Ofori (2012), indicated that, some the challenges facing the Ghanaian construction industry are the inability to secure adequate funding, inadequate management, insufficient engineering capacity and poor workmanship. Also, Badu and Owusu-Manu (2012), indicated that, large and small construction firms in Ghana face huge difficulty in accessing financing for projects. In situations where debt financing is available, the interest tends to be very high. The normally leads to abandonment of construction projects.

Therefore, the performance of the Ghanaian construction industry is a major cause of concern amongst client groups and other stakeholders in the construction industry.

The concept of construction project performance is very complex to define as different stakeholders have varying perceptions about the concept of project success (Zoltan, 2017). Lim and Mohammed, (1999), indicated that, there are two (2) fundamental approaches of project performance. These are the micro approach and the macro approach. Lim and Mohammed (1999), indicated that, the macro approach of project performance is considered under the conceptual and operational phase of a project whiles the micro viewpoint is considered at the construction phase of a project. During the construction phase of a project, the performance of the project is tied up to factors like schedule, cost and quality. Thus, the performance of a construction project can be measured in terms of cost, schedule and or quality. However, other stakeholders regard health and safety as a critical variable in defining project performance. According Frimpong et al., (2003); Olawale and Sun, (2010), numerous studies have shown that, cost performance is the main significant indicator of project success (Frimpong et al., 2003; Olawale and Sun, 2010). This assertion is true for many reasons. For instance, cost performance gives an indication of the construction firm's success. Furthermore, it shows the productivity of the organization at any stage throughout the construction process (Rahman et al., 2013). Lastly, it is always indicated in the project account and used to measure project performance. However, there are situations where a construction project takes longer periods to be planned, designed, tendered, adjudicated and awarded. These inadequacies manifest themselves during the construction phase and affects its performance (Lim and Mohammed, 1999).

The macro approach of project performance limits construction project success to end-used satisfaction only as it tries to determine if the initial concept of the project was achieved.

Performance is the way project managers, consultants and contractors respond to their workload. Tools for performance are able to monitor system variables and give instant feedback on the way the system has dealt with the workload. The management of performance is a strategic use of performance standards, measures, progress reports and quality improvement efforts to make sure that, an agency achieves the required results. Performance management consist of three (3) phases. These are setting expectations, for employee performance, maintaining a dialogue between supervisor and employee and measuring actual performance relative to performance expectations (Omran et al., 2012). Atkinson et al. (1997), indicated that, the success of a construction project can be realized wen stakeholders meet their requirements, both individually and collectively. The performance level in executing any construction project significantly relies on the quality of the managerial, financial, technical and organizational performance of the various participants. It also considers the associated risk management, the working environment and economic and political stability.

Wang (1994), postulated that, as construction projects becomes come complex, amore detailed approach is needed to execute the initiating, planning, financing, designing, approving, implementing and completing of a project. Chan (1996), indicated that, an accurate planning is needed to ensure that, the delivery of a project is done to meet budget and schedule requirements.

Mostly, the construction industry faces numerous cases of cost overruns. A cost overrun can be described as an unforeseen cost incurred in excess of estimated amount. Avots (1983), described

cost overrun as when the project's purposes are not attained within the estimated budget. By Angelo and Reina (2002), cost overrun is the main challenge facing both developed and developing countries. This was shown in a study conducted in twenty (20) nations on 258 projects. The study detected that that, almost nine (9) out of ten (10) projects faces cost overruns. Furthermore Cantarelli (2009), postulated that, poor cost performance is the commonest challenge with a typical cost increase of 10.3% of the project cost. He further indicated described the cost overrun in the road projects as the highest with a percentage of 18.5%, then that of the rail projects with a rate of 7.6% and then fixed link projects having 4.5%.

A study conducted by Zujo and Car (2008), indicated that, reconstruction projects have a higher cost overruns than that of new construction projects. Reconstruction projects were said to have a rate of cost overruns at 9.23% while new construction projects have 6.84%. In Malaysia, a study of 359 projects in which had 308 public projects and 51 private projects indicated that, 46.8% and 37.2% of public sector and private sector projects completed within budget respectively with an average cost deviation of 2.08% (Endut et al., 2009). Abdullah et al. (2009), indicated in their study that as a result of cost overruns over 90% of large construction projects experience delays.

These Worldwide studies shows that, poor cost performance is a menace in the construction industry and it affects all types of projects. It is very significant to conduct a study in Ghana to look at the nature of cost performance, therefore, this study was conducted to ascertain the challenges associated with cost performance in the Ghanaian construction industry.

1.2 PROBLEM STATEMENT

The construction is one vital industry which serves a part in the growth of the country's socio-economy. Economically, it plays a significant role in the development of the country's GDP (Rahman et al., 2013). Furthermore, the construction industry improves the quality of life by providing facilities like roads, hospitals, schools and other facilities. Therefore, it is basically important to ensure the successful completion of construction projects within time, budget and required quality. However, the industry is complex, fragmented and schedule driven therefore, it faces challenges like the low quality, low productivity, cost overrun, time overrun, construction waste and others (Rahman et al., 2013). Notwithstanding the severity of each of the problems listed, cost overruns has been shown to be the most severe (Cantarelli, 2009, Olawale and Sun, 2010). Cost overrun does not just affect the profitability of construction projects for the contractor, it also affects the overall economy as a whole especially in public projects. Construction cost is an important element in determining a project's success throughout its lifecycle and a priority to various stakeholders in the construction industry. Poor cost performance of construction projects has been a major concern for clients, project managers and construction managers.

Globally, poor cost performance is of concern even in the developed countries like UK whereby about one third of client's complaints are generally overrun of allotted budget (Jackson, 2002; Olawale and Sun, 2010). In developing countries such as Ghana, the problem of cost overrun is at the extreme where in some cases the cost overruns go over 100% of the estimated project's cost (Vaardini et al., 2016). The issue of cost overrun poses fear to investors, therefore numerous studies has been conducted in countries like UK, Malaysia and Australia to ascertain the causes and solutions to cost overrun in the construction industry.

However, little has been done in Ghana to study the challenges in put forward solutions to curb the problem of poor cost performance in the country. Therefore, this study was conducted to ascertain the challenges associated with cost performance in the Ghanaian construction industry.

1.3 AIM OF THE STUDY

The aim of this study is to explore the challenges associated with project cost performance in Ghana.

1.4 RESEARCH OBJECTIVES

In achieving the aim for the research, the following objectives were established;

1. To identify the causes of poor project cost performance in Ghana;
2. To identify the challenges in achieving high project cost performance in Ghana; and
3. To identify the strategies in improving project cost performance in Ghana.

1.5 RESEARCH QUESTIONS

This study seeks to answer the following questions;

1. What are the causes of poor cost performance in the Ghanaian construction industry?
2. What are the challenges in achieving high cost performance in the Ghanaian construction industry?
3. What are the strategies in improving cost performance in the Ghanaian construction industry?

1.6 SIGNIFICANCE OF THE STUDY

As already indicated, the Ghanaian construction industry provides a significant contribution to the socio-economic development of the country by the provision of infrastructure and contribution to the country's GDP. Therefore, any study that aids in improving the performance of the construction industry consequently improves the economy of the country. Therefore, this study is very significant in boosting the performance of the Ghanaian economy as it improves the performance of the construction industry.

Construction cost overruns is a big challenge both locally and globally. Therefore, this study will make an approximate contribution to the management aspect of construction as it could guide policy makers, consultants as well as contractors in addressing the challenge of cost overruns facing the Ghanaian construction industry thereby enhancing the delivery of construction projects. Furthermore, this study will raise the awareness of construction firms on cost overruns issues and hence increase their understanding of implementing a good project cost control technique. This study will also serve as a guideline for further studies that pertains to the management of construction projects and for future development to lessen the risks involved in cost overruns. The study will also contribute the literature pertaining to cost overruns, it causes, challenges and strategies to eliminate its occurrence.

Lastly, the findings of this study will serve as a stepping stone for more advance researches to be conducted in the area of cost management and performance management as a whole

1.7 SCOPE OF THE STUDY

In social researches, scope definition is a significant aspect of the process as it creates a focus for the researcher contextually and geographically. For this study, the contextual scope is limited to only cost performance. There are other performance criteria like schedule, quality, health and safety etc. However, this study concentrated on only cost performance. This is because, according to Frimpong et al. (2003); Olawale and Sun, (2010), studies have shown that, cost performance is the main significant indicator of project success. Thus, cost performance gives an indication of the construction firm's success. Furthermore, it shows the productivity of the organization at any stage throughout the construction process (Rahman et al., 2013). Lastly, it is always indicated in the project account and used to measure project performance.

The construction industry is broad involving a lot of diverse stakeholders. Therefore, a study of this caliber must be limited to specific professionals who have must input in managing and controlling the cost of a construction project. For these reasons, this study was limited to project managers in Ghana. Geographically, this study was limited to project managers in the Accra metropolis. These categories of firms were chosen because they are mostly involved in high profile projects in Ghana. Furthermore, the Accra metropolis was selected due to the volume of firms that meet that criteria in the vicinity.

1.8 RESEARCH METHODOLOGY

This study employed the quantitative research method as the data collected was converted into numerical data and subsequently analyzed using mathematical statistical tools. According to Carrie (2007), the quantitative method basically makes use of numerical data form. Since this

study employed the numeric data, the quantitative method was deemed most appropriate. Also, this study made use of only primary data. The primary data involves the use of developed questionnaires administered to the selected respondents. The questionnaire developed was structured using the five-point Likert scale. The questionnaires provided feedback on the perception of the respondents on the subject matter. Mathematical tools like the Relative Importance Index (RII) was employed in analyzing the data. There exist two basic research approaches indicated by Gabriel, (2013). These are inductive and deductive research approach. The deductive research approach is adopted when the researcher aims at testing a theory and it fundamentally begins with a hypothesis. Gabriel (2013), stipulated that, deductive research emphasizes on causality. The deductive research approach was deemed suitable based on the nature of this study.

There exist numerous research strategies for researchers. These are the action research, ethnographic research, survey research, case study research and experimental research. This study adopted the survey research strategy. Isaac and Micheal (1997) postulated the usage of survey research is to describe what already exist, the quantity and in what context. It also responses to developed questions, finds solution to observed problems and assesses needs.

1.9 STURCTURE OF THE REPORT

The chapter one (1) constitutes the general introduction to the study. The introduction of the study touches on the background of the research, the problem statement, research aim, research objectives, the scope, significance of the study and the methodology. The chapter two (2) involved a comprehensive review of literature pertaining to the study. The chapter three (3) gave an

elaborate discussion on the methods, approaches and strategies employed for this study. It also discusses the type, method and processes of collating and analyzing the data. The chapter four (4) provided a report on the analysis of the data retrieved from the respondents. It establishes the procedures espoused i for the analysis and a discussion of the results of the analysis. The chapter five (5) summarized and gave a conclusion to the entire report. This covered a discussion on the attainment of the established the objectives, the findings and recommendations made.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter reviews literature pertaining to the subject of study. The literature review aids in gathering information from existing studies conducted in the subject area. This serves as a guide for the achievement of the aim and objectives of the study. This review begins with a discussion on the Ghanaian construction industry. This is followed by a review of construction performance and cost as a criterion for measuring construction performance. Also, literature is reviewed on cost overruns and the causes of cost overruns in the construction industry. Subsequently, literature is reviewed on cost management and the challenges involved in cost management. Finally, the strategies in effectively managing cost is reviewed.

2.2 THE GHANAIAN CONSTRUCTION INDSUTRY

According to Ghana Statistical Services (2015), the Ghanaian construction industry experienced a growth rate of 30.6% and a share of 14.8% of nominal GDP. According to Agyakwa-Baah (2007), the Ghanaian Construction Industry is directly linked to the Ghanaian economy because the Government of Ghana is the industry's major client. The Ghanaian construction industry has experienced a steady growth from 26.6% in 2014 to 26.9% in 2015 (Ghana Statistical Services, 2015). Therefore, the Ghanaian construction industry is the fastest growing sector compared to other industries in the country. Even though the construction industry in Ghana has experienced steady growth over the years, there are inherent problems facing the industry.

A report written by the Road sector of the industry in 2000 indicated series of challenges facing the sector. They included considerable maintenance problems, ineffective reporting and management information system, decentralization of the road sector, inability to secure adequate working capital, poor workmanship and so on. The building segment of the industry also faces similar problems and requires serious attention. Due to these inherent problems, the industry faces performance problems in terms of cost, time, quality, safety and health of the workers. These problems brought out the need to develop national programs to improve the effectiveness and efficiency of the industry. There is a connection that exist between economic growth and the construction industry as construction activities aids in the provision of physical infrastructure and asset-based-development on which growth and development are realized (Songwe, 2014). It drives linkage with other industries in the economy. Thus construction drives the performance of the industries as well.

Ofori (2012), examined the challenges facing Ghanaian construction firms. In his research, he identified problems like the inability to secure adequate working capital, inadequate project management skills and poor workmanship as significantly affecting the progress of the Ghanaian construction industry. Badu and Owusu-Manu (2012) explained that, construction firms in Ghana find it difficult in accessing financing for projects, therefore, they normally opt for debt financing which usually is accompanied by high interest rates.

Furthermore, delays in payment is a significant problem facing the Ghanaian construction industry. Adams (2008), postulated that, the delays in the payment of contractors for completed work are very common and forms a major cause in the delays in the completion of projects in

Ghana. Delays in construction projects may lead to high escalations in costs owing to high inflationary rates. It is therefore not surprising that, construction projects in Ghana recorded an average cost overrun of 60% to 180% (Kpamma and Adjei-Kumi, 2010). Also, there is a lack of commitment towards the health and safety of Ghanaian construction workers, who work in generally unsafe environments. According to Ofori-Kuragu (2013), the problems that affects the performance of Ghanaian contractors includes poor access to credit, delays in payment, cumbersome payment process, bias in contract awards among others.

Contractors in the Ghanaian construction industry are categorized by now the Ministry of Works and Housing which limits the value of works they can execute. This is shown in table 2.1.

Table 2.1: Categorization of Contractors in the Ghanaian construction industry

CATEGORY	**VALUE OF WORK**
D4K4	> $75,000.00
D3K3	$ 75,000.00 - $ 250,000.00
D2K2	$ 250,000.00 - $ 500,000.00
D1K1	< $ 500,000.00

Source: Frimpong and Kwasi, (2013)

An estimated value of over 1,600 building contractors are working in Ghana since October 2012 (Oxford Business Group, 2014). The construction industry is regarded as the spine of every economy (Rameezdeen, 2005). In Ghana, the industry creates revenue for the Government and also creates employment. Statistically, the construction industry provides an average of 10.5% of the Gross Domestic Product (GDP) and provides employment for about 6% of the Ghanaian

population who are economically active (Ghana Statistical Service, 2007). According to Agyakwa-Baah, (2007), the Government of Ghana is the biggest client in the Ghanaian construction industry and thus has a direct bearing on the Ghanaian economy. Also, the construction industry has a huge impact on other sectors like the manufacturing, mining, electricity and water sectors. The construction industry in Ghana has realized steady growth over recent years. According to Agyakwa-Baah, (2007), the Ghanaian construction industry is regarded as one of the quickest developing sectors with 7-8% average per year.

These problems facing the Ghanaian construction industry affects the performance of the industry especially in terms of project cost performance. However, the Ghanaian construction industry can draw useful lessons from the experiences of other countries (Ofori et al., 2012). Benchmarking against countries with better developed industry structures will provide guidance on the way forward in the struggle to achieve industry-wide organizational and project improvements in the Ghanaian construction sector.

Therefore, it is very crucial to enhance the performance of the construction industry in other to experience significant economic growth.

2.3 CONSTRUCTION PERFORMANCE CRTERIA

The three (3) most significant performance criteria as identified in literature are cost, time and quality. They are popularly known as the iron triangle. Chan and Chan (2004) described construction schedule as the duration for completing a project. The schedule of a project is normally arranged to allow the building to be used by a date determined by the client. Time is one of the major factors that is used to measure the success of a project (Swan and Khalfan, 2007).

Thus, the component of time may suggest to project managers and all stakeholders that the project was completed smoothly and on schedule. Therefore, project managers prefer contracts with reasonable amount of time to execute completely. The timely completion of a construction project is seen as the hallmark of the design and built industry. However, construction delays have become a major component of construction projects as projects continue to experience delays even with the vast advancement in technology and management understanding (Stumpf, 2000). The duration of a construction project is affected by various factors which includes post award-negotiations, pre-tender proceedings and poor schedule planning by the contractor (Westring 1997). Also, bureaucratic interference and availability of resources as planned affects the timely completion of a construction project.

According to Egemen and Mohamed (2005), completing a project to meet the required quality standards is one of the major criteria in measuring project success. Quality is achieved when the legal, aesthetic and functional requirements of a project of the customers/client is achieved (Tang et al., 2005). Quality involves meeting or exceeding the expectations of clients. According to Ling et al., (2009), quality is the output of the service provided or work done. Arditi and Lee (2004) defined quality as the ability to conform with a quality plan designed to satisfy customer needs. Thus, in the construction industry, quality is determined by the ability to conform with set standards. From the definitions above, it can be deduced that, quality can be described from two (2) main perspective. The first being the perspective of the finished project (Ling et al., 2009). The second perspective as adopted by Arditi and Lee (2004). It should be noted that, low cost and speedy construction should not be highly focused on at the expense of quality of the construction project. The three (3) significant components of quality management on a construction project are

quality planning, quality assurance and quality control (Project Management Institute, 2000). Quality planning can be defined as the process of setting quality objectives and specifying necessary operational processes and related resources to fulfil the quality objectives. Quality assurance also describes the process of providing the confidence that quality requirements can be achieved while quality control describes the process of monitoring specific project results to determine they comply with relevant quality standards. These components aid in the achievement of high-quality performance in construction when they are properly executed.

2.4 COST AS A CRITERIA FOR MEASURING CONSTRUCTION PERFORMANCE

The performance of a construction project gives an indication of how successful the project was executed. How construction project's stakeholders determine the success of a project varies from each party (Zoltan, 2017). However, according to Agarwal and Rathod (2006), for a project to be successful, it must be delivered on time, budget and specifications. Since the emergence of this description, various researchers have broadened the scope of project success over the years. For instance, Atkinson et al. (1997) incorporated the performance of the stakeholders, assessing their contributions and understanding their expectations. Wateridge (1998) indicated that, the benchmarks for a successful construction project is very broad and it integrates the performance of the stakeholders, assessing their contributions and coming to terms with their expectations.

Despite all these advancements in the description of the concept of project success, cost performance is regarded by many researchers as the most important success criteria (*see* Azhar et al., 2008; Cantarelli, 2009; Olawlae and Sun, 2010). Gido and Clements (2003), indicated that, cost performance is an effective method in project management effort expended and it is generally

recognised in literature and industry. Furthermore, Salter and Torbett (2003), indicated that, the use of cost performance is one common means to measure project success with ease. Apart from the tender sum, the cost from inception to completion make up the cost of project. A comprehensive site investigation helps in proper planning which aids in get a clear scope for the project and later results in project cost performance. According to Georgy et al. (2005) the cost variance of project results from the difference between the actual cost and the budgeted cost which good way of measuring project success.

The performance of a construction project in terms of cost can be assessed using Earned Value Analysis (EVA). Also, cost control, cost estimating and cost budgeting are three cost related processes that interact among each other and with other scopes of construction projects. However, Gido and Clements (2003), identified four cost-related measures in cost performance analysis used in evaluating whether the project is being performed within the budgeted cost or whether it is in line with the actual cost. The four (4) cost-related measures are;

- Total budgeted cost (TBC)
- Cumulative budgeted cost (CBC)
- Cumulative actual cost (CAC)
- Cumulative earned value (CEV)

At often times, the estimation of cost is done prior to the start of a project to enable it to be controlled with the cost budget. Projects at certain instances may demand more than one person which is most at times dependable on the complex nature of the project. The management of the

cost of a project may be described as simple or very complex. According to Gido and Clements (2003), consideration of the needs of stakeholders is very necessary in project cost. Ashworth (1994) postulated that it is necessary to have a detailed study on cost of building and also studying cost of buildings should involve application of strategies and proficiency of economics to construction projects. Moreover, it aids in efficient use of existing resources and to increase the rate of growth of construction work in the most efficient manner.

2.5 COST OVERRUNS

The outcome of poor cost performance is cost overruns at the close of a construction project. Similarly, Sriprasert (2000), indicated that, cost overrun is basically as a result of futile construction management and the poor establishment of cost control systems. Cost overrun is currently a common challenge with most of the construction projects. There are some factors that contributes to poor cost performance leading to cost overruns in construction projects. These factors are discussed as follows.

2.5.1 Inaccurate estimation of Original cost

Peeters and Madauss (2008), postulated that the main element contributing to the overrun of cost is the original estimation of the original cost. Poor cost estimation may be caused by technical problems on how to estimate project costs and/or absence of adequate project information in the initial stage of the project. Cost estimation gives the basics for budgeting for a construction project and also forms the foundation for cost control. Therefore, any inaccuracies in cost estimation subsequently affects the efficient management of cost leading to cost overruns.

2.5.2 Inflation of project costs

The inflation of market prices can lead to the increase of project cost if not properly catered for (Harrison, 1981). Inflation of materials, equipment and labor cost may change depending on the geographical location within a country. Furthermore, contract with subcontractors and suppliers may involve different inflation protection clauses. As inflation of prices occurs, interest rates will go up and cost subsequently follows.

2.5.3 Improper planning

Improper planning and management experience limitation leads to project cost overruns (Frimpong, 2003). The procedure to produce a product becomes slower and takes much time in completing the project. Extension of project durations also affects the final cost of construction project.

2.5.4 Lack of experience

Chan and Park (2005), realized that a lot of contractors are inexperienced in project management and cost management can contribute significantly to cost overruns. If cost distribution in a project is not planned well, it might cause over cost or project to exceed budget.

2.5.5 Obsolete or unsuitable construction methods and equipment

Obsolete and unsuitable equipment and methods affects the progress of activities negatively. Certain countries take up the steps in importing and transferring the modern technology into their countries. Yet, due to the unskilled nature of their human personnel, most of these imported technology fails in their operation (Long et al., 2004). This can consequently lead to cost overruns in a construction project.

2.5.6 Mistake in design

Incompetent designers cause poor design and mistakes in design (Long et al. 2008). The unrealistic design may be realized at the start of the construction project and any changes could lead to cost overrun. Therefore, it is very crucial for project managers to spot mistakes at the beginning of a project to avoid its ripple effects.

2.5.7 Poor contract management

Ogunlana and Olomolaiye (1989), stated that most contractors in developing countries take up their commercial programs by themselves. Most of the construction firms are owned by businessmen who acquainted themselves with the management of expenses. They pay low wages, submit low bids and poor in planning and coordination of contracts. Often times, they breech the agreement that was stated in contract. Their poor management of contracts led to excessive cost overruns in construction projects.

Rahman et al. (2013), categorized the causes of cost overruns from literature as shown in table 2.1. They gathered the variables from review of various literature in different countries. The causes of cost overruns were categorized under contractor's site management, design and documentation, financial management, information and communication technology, labor management, material and machinery and project management and contract administration.

Table 2.1: Causes of construction cost overruns

SN	CAUSES OF COST OVERRUNS
A	**Contractor's site management**
1	Poor site management and supervision
2	Incompetent subcontractors
3	Lack of experience
4	Inadequate monitoring and control
5	Inaccurate cost estimates
B	**Design and documentation related factors**
1	Frequent design changes
2	Mistakes and errors in design
3	Incomplete design at the time of tender
C	**Financial management**
1	Financial difficulties of the owner
2	Delays in payment
D	**Information and communication technology**
1	Lack of coordination between parties
2	Lack of effective communication among parties
E	**Labor management**
1	Shortage of site workers

2	High cost of labor
3	Labor absenteeism
F	**Materials and machinery**
1	Fluctuation of prices of materials
2	Shortage of materials
3	Late delivery of materials and equipment
G	**Project management and contract administration**
1	Change in project scope
2	Inaccurate quantities take-off
3	Delays in decision making

Source: Rahman et al., (2013).

2.6 COST MANAGEMENT

One key element in project management and vital instrument in controlling and improving cost performance is Cost management. Godey (1994), indicated that, cost management is different from cost control. Cost management is a strategic process with emphasis on the optimization of efficiency and centers on customer and on profitability (Abdul-Azis et al., 2012). Poor cost management in construction projects leads to cost overruns hence, effective cost management is significant in understanding cost structure and analyzing the costs flowing through the structure (Henningan, 1990). Tang (2005), indicated the under listed items as the cost management systems;

1. Cost planning and control;
2. Estimating;

3. Budgeting;
4. Cash Flow forecasting;
5. Financial reporting and cost reporting;
6. Cost code systems;
7. Value management; and
8. Judgement.

2.6.1 Cost planning and control

Effective Assessment of the cost of projects is termed as cost planning. Ashwort (2010) stated that cost planning can lead to cost-effectiveness and value for money during the design stage. Furthermore, cost planning aids in a balance distribution of expenditure to generate a more balanced design. Lastly, cost planning gives a sound basics to compare different projects.

Basak (2006), described cost control as a team endeavor and how effective a cost control is relies on how appropriate the implementation of the element of project management practices are done on projects, including defining of items such as governance, owner organization and rosters, roles and responsibilities, project execution strategies, reporting and communication. Furthermore Halpin (1985), indicated that, project cost control data are not useful only in decision-making process but can also be used to give feedback information which are vital to projects organization's estimating and planning departments for preparing proper estimates and bids on new projects. Therefore, a project cost control system aid in both existing project management efforts and give the field performance database for estimating future projects (Tang, 2005).

2.6.2 Estimating

The usage of the estimating technique is normally at the pre-tender phase of the project to give a possible cost of the construction. According to Schuette and Liska (1994), estimating is the basic procedure of providing answers to the question "How much is the project expected to cost?". The financial commitment to a construction project is very important therefore any inappropriate estimation may cause damages to the project. The aim for producing a pre-tender estimate is to do budgeting, controlling and comparing (Ashworth, 2010).

2.6.3 Budgeting

A budget is a financial assessment of any future occurrences established in a business plan. Weetman (2003), described a budget as an in-depth plan which establishes the monetary terms, the strategies for income expenditure in relation to the future period of time. The budgetary process suits into the whole planning process, it assesses the concerns relating to finances of the plan and gives feedback to enable monitoring and revision (Marsh, 2009). The main aim for budget system is to deliver the requirement of management in the area of the judgments and decisions needed in providing basis for the management functions of planning and control.

2.6.4 Cash flow forecasting

According to Weetman (2003), cashflows are total cash inflows to the organization minus cash outflows. A lot of contractors are profit motivated, everyone has its own cash cycle which depends on the project activity costs and payments made by a client which are inscribed in the contract. Hyung (2005) argued out that, a classic cash flow of a construction project involves cash-outs such as bid costs, preconstruction costs engineering, design, mobilization, materials and

supplies, equipment and equipment rentals, payments of subcontracts, labor and overhead; and cash-in such as billings less retentions, retentions, claims and change orders.

2.6.5 Financial reporting and cost reporting

Burke (1992), stated that, financial report and cost report is to document all the financial transactions involving payments in and out and amounts owed and owing. These types of details are vital for making decisions by the managements as well as for financing of projects (Burges 1982). It is very necessary for the financial performance status to be known to the senior management so as provisions can be made for the financial performance by the end of the project. Frisby (1990), also postulated that a very firm financial plan, an idea of cost and cost report are characteristics of a successful contractor.

2.6.6 Cost code systems

According to Pilcher (2009), a satisfactory coding system makes the data-handling facility easier and also offers economy of storage in the case of a computer. A good and adequate system of coding makes the whole concept of referring to items in codes easier. The drive for the cost code method is to make sure of easy identification of large cost data and coded for the most efficient application of cost management throughout the contract period.

2.6.7 Judgement

Judgment application is a requirement for the use of any of the cost management techniques. (Fortune and Lees, 1996). Al-Tabtabai and Diekmann (1992), indicated that making an appropriate price forecast requires the involvement of both historical trend-based data and proficient “judgments” depending on the construction experience and knowledge.

Many organizations face difficulties in managing cost on construction projects. Bergeurd (2012), identified some major challenges facing project managers in managing and controlling construction project cost.

The first challenge is the perception that, cost accountants are in-charge of accounting for work that has been undertaken, reconciling and ensuring that data is recorded accurately. However, a capital planner or cost analysts of a project create circumstances, plan and analyze the data of a project.

Furthermore, there are inconsistencies in the process of budgeting and forecasting. With some circumstances, the approach to budget and forecast changes depending on the experience and method of the person performing the task. Also, an attempt to collect an integrated master schedule from the various subcontractors is a difficult job. The procedure involved in collecting progress data like the percentage completed or ensuring that sign-offs are correctly reported from the various subcontractors is a tedious task to execute. This inhibits effective cost management and control on projects. Aligning data between different springs has been referred as a major challenge in cost management (Bergeurd, 2012). In most cases projects needs to align data from variety springs like the time sheet system, asset management systems, funds management systems, contract management systems and so on,

There is also a challenge of insufficient resources for providing a detailed accurate cost management and controls reports in a timely manner. Change control on a project is described as the challenging feature of cost management. Unavoidably, scope change or variation may occur even when budget for a project has been established. Following the set up business rules

depending on the project type and the clients' organization is necessary. A lot of questions come up in relation to correct reporting as to who is to approve and when there is a change and when. How did the variable affect the budget and the forecast? Were all changes correctly reported on? Does the current budget and forecast mirrors the change? Building on the other challenges faced (insufficient resources, disconnected data and systems, manual compilation of data), inadequate management of change can have a severe influence on how correctness of reporting and destroy the future success of a construction project

2.7 STRATEGIES TO IMPROVE CONSTRUCTION MANAGEMENT

Certain measures are identified from researcher's study in managing and controlling construction costs. Some of the measures and strategies are discussed below.

Kaliab et al. (2009), indicated that, delays of schedule can take place because of delays in payment. Complex financial processes from the client's organization can lead to delay in payment which can lead to financial difficulties of contractors and further lead delay in completion of project. Furthermore, Kaliaba et al. (2009), stated that contractors, consultants and clients in their capacity have to make sure to get the correct personnel who has the required credentials to efficiently manage their projects.

Nega (2008), indicated that, the contractor should fully concentrate on works required to complete the project successfully. The contractor should try as much as possible to prevent incomplete identification of scope and frequent scope changes. Ashworth (1994), mentioned that, one requirement demanded from client in regards to construction project is to evaluate its probable cost. Proper cost control is vital as it is the actual means to achieve a higher cost-effectiveness and

ensure construction costs and life-cycle costs appraisal. Proper risk management is very significant in ensuring risk that might result in cost overruns is eliminated (Peeters and Madauss, 2008).

Accuracy of the initial cost estimation should be ensured. The accuracy of cost estimation makes clients to ensure and determine the availability of the needed funds for the execution of projects (Kaliba et al., 2009). Also, Frimpong et al. (2003), realized that, adequate provisions should be made for emergency cases so as to cover the cost increase of materials resulting from inflation. Lastly, choosing the appropriate contractual framework is very significant in ensuring that cost overruns does not occur (Peeters and Madauss, 2008).

2.8 COST CONTROL PRACTICES

Project cost control is regarded as a very significant management responsibility. When construction work starts, the project cost management system retrieves cost of labor, equipment-hours and production quantities from the job site as the work progress (Clough, 1986). There are numerous cost control techniques used in the construction industry.

Abbasi and Al-Mharmah (2000), Hutchings and Christofferson (2000), Yang, et al., (1997), White and Fortune (2002) have examined various management tools and techniques. These tools and techniques are: Cash flow/S-curve, Variances, and Earned Value.

2.8.1 Cash flow/ S-curve

Cash flow can be described as the transfer of money into or out of the company (Harris and McCaffer, 1995). The cash flow aids the contractor in determining the economic feasibility of the construction project. The inflow represents the payments to the contractor whiles the outflows

represents payments made or expenditure incurred (Ahuja, et al., 1994). According to Harris and McCaffer (1995), cash flow aids in making provisions for difficult times before they arrive. The cash flow chart is mostly used as a means of control by plotting the actual expenditure curve against the budget curve as shown in Figure 2.2 (Pilcher, 1992).

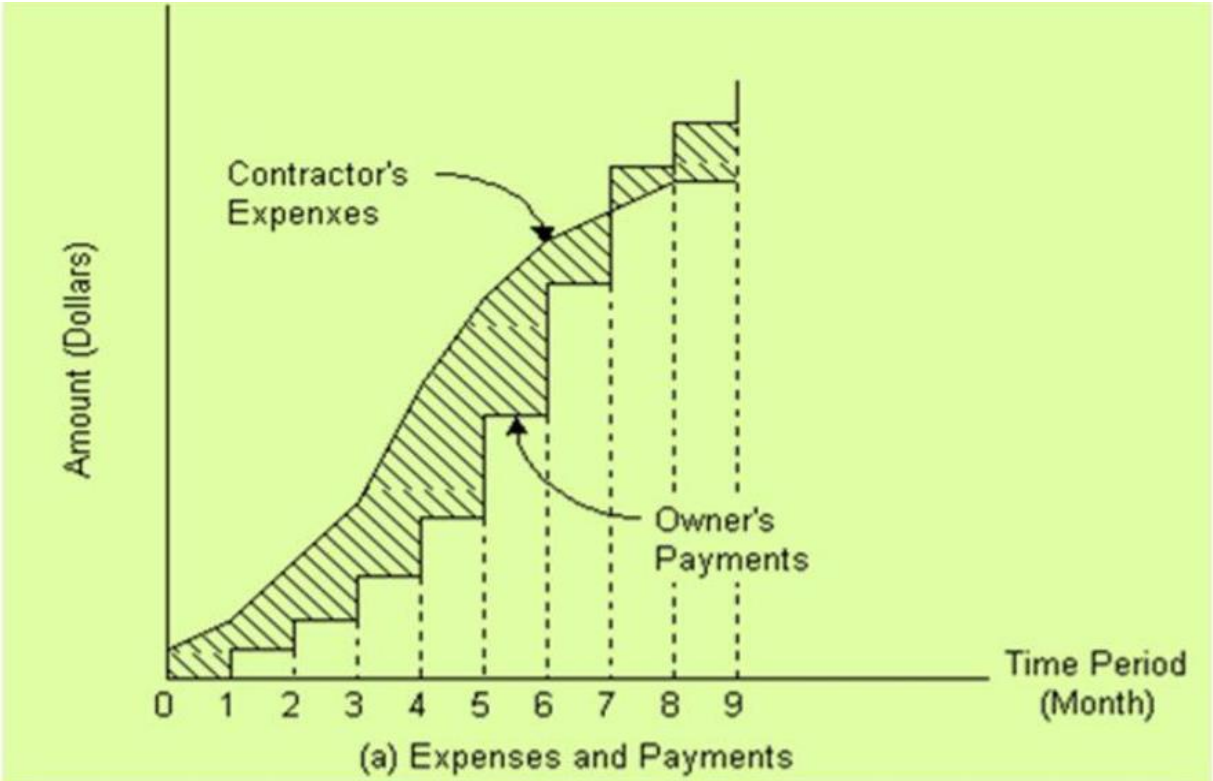

Figure 2.2: Cash flow/S-curve

Source: Pilcher, (1992).

According to Ritz (1994), the shape of the curve follows the project life-cycle bell curves. Any deviation from the anticipated S-curve should prompt a review with the contractor to determine the cause of the variation and whether any problems may cause cost and schedule slippage (Bramble et al., 1990).

Furthermore, the owner may want to monitor the amount of contract change orders and how they relate to the S-curve. Owners should monitor the number of change orders and its cost implications to ensure that the job is brought in on budget (Bramble *et. al.*, 1990). The timing of cash flow is important to the client. The client's consultants must therefore need to prepare an expenditure cash flow that is linked to the contractor's program of activities. A standard S-curve can be used to help predict the expenditure flow for future contracts (Ashworth, 1994). Cash flows that occur at different points in time have different values and cannot be compared directly with one another.

2.8.2 Variances

Variance involves comparing actual project results to planned resulted. Cost and schedule variances are the most frequently analyzed. However, variances from plan in the areas of scope and quality are of equal significance (PMI, 1996). Variances may occur when the price actually paid for a resource is grater or less than that estimated in the standard. Secondly, the quantity of resource actually used is either greater or less than the estimated standard (Picher, 1992). To the extent that significant variances are observed, adjustment to the plans is made by repeating the appropriate project planning process. Variance analysis must be supplemented by other methods as it is inadequate, often misleading and sometimes meaningless guide to project and performance (Harrison, 1992).

The following are common variances used in control of projects;

- Schedule start/finish versus actual start/finish.
- Schedule time for an activity versus actual time.
- Budgeted cost versus actual cost.

- Measured value versus actual value.
- Budgeted man-hours versus actual man-hours.
- Budgeted unit cost versus actual unit cost.
- Budgeted percentage completes versus actual percentage complete (Harrison, 1992).

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter covers the methodology espoused by this research. The methods adopted for a study indicates the systems and approaches the researcher adopted for the study. Research methodology details out the procedures and methods needed to put together the requisite knowledge for the set research questions and by so doing realizing the aim as well as the objectives of the study. This chapter will discuss the research process, research paradigm research approach, the research design, research strategy and research method adopted for the study. Also, this chapter describes how the primary data was gathered and handled, and how it was used in solving the problems conveyed by the research aim and objectives. It also explained data analysis method that was used in analyzing the acquired primary data, how the sampling population and sample size was determined.

3.2 RESEARCH PROCESS

The aim of this study was to explore the challenges associated with project cost performance in Ghana. In achieving the aim for the research, three (3) objectives were set which were to identify the causes of poor project cost performance in Ghana, to identify the challenges in achieving high project cost performance in Ghana and to identify the strategies in improving project cost performance in Ghana. The research process adopted include the review of literature and identify various factors whiles focusing on the study area. From the review, a structured questionnaire was

designed to collect data from the participants of the research. The questionnaire was designed based on the objectives of the study. The data collected aided in the achievement of the research objectives and making recommendations from the study.

3.3 RESEARCH PARADIGM

According to Remenyi and Williams (1998), the subject under research and its corresponding research questions dictates the type of philosophical position adopted. There are two broad philosophical positions. These are positivism and constructivism. These positions are selected under two main paradigms which are ontology and epistemology (Crotty, 1998). Ontology tries to find out what reality is. The positivist ontologist indicates that, there is a single reality or truth whiles the constructivism ontologist indicates that, there is no single reality or truth. Reality is only created by individuals or groups.

Epistemology tries to measure reality. Under positivism, it indicates that, reality can be measured by applying the appropriate analytical tools. Under constructivism, it indicates that reality needs to be interpreted. For this study, the positivist philosophical position was adopted for both ontology and epistemology. The aim of this was to explore the challenges associated with project cost performance in Ghana. Thus, this study aims to measure the reality of challenges associated with cost performance, thus, the positivist positions was deemed more suitable. Table 3.1 shows a summary of the paradigms.

Table 3.1: Research paradigms

Paradigm	**Ontology** (***What is reality?***)	**Epistemology** (***How can I know reality?***)	**Methodology** (***How do you go about finding out?***)	**Method** (***What techniques do you use to find out?***)
Positivism	There is a single reality or truth	Reality can be measured and hence the focus on reliable and valid tools to obtain that.	Experimental research Survey research	Usually quantitative
Constructivism	There is no single reality or truth. Reality is created by individuals in groups	Reality needs to be interpreted. It is used to discover the underlying meaning of events and activities.	Ethnography Action research	Usually qualitative

Source: Crotty, (1998).

3.4 RESEARCH DESIGN

According to Spencer-Oatey (1993), research design is a plan created to answer a research question or test a research hypothesis and to control variance. Social researchers ask two (2) basic types of research questions. These are;

1. What is going on?
2. Why is it going on?

These questions give rise to the two (2) types of research design which the descriptive research design and the explanatory research design are. This section discusses the two (2) research designs and selects the most suitable for this dissertation.

Descriptive research answers the question "What is going on?" (De-Vaus, 2001). This involves the systematic and accurate description of facts and characteristics of a given population or area of interest. It can also be defined as the provision of an accurate account of characteristics of a particular individual, situation or group as a way of discovering new meanings, describing what exists, determining frequency and categorizing information (Kerlinger, 1986; Weekes, 1992). Some researchers disregard descriptive research as a mere description which can degenerate to mindless fact gathering as described by Mills (1959), as abstract empiricism. However, these occurrences are normally attributed inconsequential descriptions rather than an indictment to descriptive research itself as good descriptions is fundamental to the research enterprise (De-Vaus, 2001). Examples of descriptive research are the description of the ethnic mix of a community, population census and the extent of use of concrete based materials in construction.

Explanatory research answers the question “why is it going on?” (De-Vaus, 2001). This involves the development of causal explanations which hinges on the fact that, one phenomenon is affected by various factors. Explaining causality is sometimes simple and other times very complex. Explanatory research can also be referred to as causal research as it is conducted in order to identify the extent and nature of cause-and-effect relationships (Zikmund et al., 2012). However, De-Vaus (2001), advocated that, correlation is mostly confused with causation which are all geared towards explanatory research. He argued that, the link between two events may be coincidental rather that causal. For instance, students at private Junior High School (JHS) perform better in their final external examination than students at government Junior High School (JHS). This assertion does not necessarily mean attending a private JHS causes (leads to) good performance. “Attending a private JHS” and “good performance” may result from other external factors like poverty, educational facilities and so on. Instead, it can be stated that, there is a correlation between “attending a private JHS” and “good performance”. Thus, explanatory research can either be based on causality or correlation. In some occasions, the two (2) principles are combined in one study.

Based on the discussions, the descriptive research design was adopted for the study. This is because, this study tries to explain the challenges and causes of cost under-performance in the Ghanaian construction industry.

3.5 RESEARCH APPROACH

There exist two basic research approaches indicated by Gabriel, (2013). These are inductive and deductive research approach. Actually, inductive research approach consists of the development of

new theories derived from data. Gabriel (2013) stated that an inductive research approach basically consists the use of research questions which narrows the scope of the study. It can also be exploring old phenomenon from a new perspective. Burney (2008), describes inductive research approach as a migration from the specific to the general as it involves the movement from specific observations to broader generalizations and theories. The deductive research approach is adopted when the researcher aims at testing a theory and it fundamentally begins with a hypothesis. Gabriel (2013), stipulated that, deductive research emphasizes on causality. Thus, deductive research is purposely adopted for testing hypothesis in other to verify theories by using observations with the intention of validating the pattern. Burney (2008), describes deductive research approach as a migration from the general to the specific as it involves the movement from broader generalizations and theories to specific observations. Generally, quantitative research is suitable for deductive research approach even though qualitative research can be used (Gabriel, 2013).

The deductive research was suitable based on the nature of this study. This study aimed at exploring the challenges associated with cost management in the Ghanaian construction industry. Therefore, this study investigated the issues related to cost management. Thus, the deductive approach was deemed more suitable.

3.6 RESERARCH STRATEGY

There exist numerous research strategies for researchers. These are the action research, ethnographic research, survey research, case study research and experimental research. This study adopted the survey research strategy. Isaac and Micheal (1997) postulated the usage of survey research is to describe what already exist, the quantity and in what context. It also responses to

developed questions, finds solution to observed problems and assesses needs. Kraemer (1991) described three distinguishing features of survey research. Firstly, survey research talks about a particular section of a population. Secondly, the data needed for the study is retrieved from people which makes it personal. Lastly, survey research make use of a section of the population which enable the generalization of the outcome for the population.

3.7 RESEARCH METHOD

According to Carrie (2007), there are three (3) basic research methods. These are namely qualitative research method, quantitative research method and integrated research method.

Qualitative research involves discovery (Carrie, 2007). Creswell (1994) indicated that, qualitative research method normally takes place in the natural setting which allows the researcher to undertake a thorough investigation from the perspective of the participants. In qualitative research method, the data collected are normally described and interpreted. Qualitative research method in other means is described as an effective ideal of researching that allows the researcher to generate details through their participation in the actual experiences (Creswell, 2003). A major feature of qualitative research is that, no traditions exist for which the researcher builds on (Leedy and Ormod, 2001). It is normally used in explaining phenomena relating to social behaviors in new and emerging theories.

Quantitative research on the other hand is very straight forward in its surveying and experimentation which expands on prevailing theories (Leedy and Ormod, 2001). Also, Creswell (2003), stipulated that, quantitative research adopts the theory of an empiricist paradigm as the research itself is does not depend on the researcher. Therefore, quantitative data are objective and

are used in measuring reality. Furthermore, Leedy and Ormrod, (2001), postulated that, quantitative research method is designed to respond to questions associated with relationship between variables and make predictions. Thus, quantitative research method aids in establishing and validating relationships as well as generating generalization which contributes to theory. Quantitative research generally starts with a research problem which points hypothesis formation, collection of data and data analysis. The outcome of quantitative research can be predictive, explanatory and/or confirming.

Mixed method combines method of gathering and analyzing data from the quantitative and qualitative method in a particular study (Tashakkori and Teddlie, 2003). Mixed method is regarded as an addition and not a substitute for quantitative and qualitative research approaches (Johnson and Onwuegbuzie, 2004). Thus, the mixed method relies on the advantages of the two approaches and decreases in its flaws.

This study espoused the quantitative research method. This outcome of this study will be explanatory therefore, the quantitative research method is more suitable. Furthermore, the quantitative method utilize mathematical tools for the analysis and the questionnaire design is mostly structured to easily aid in converting responses to numerical data.

3.8 SOURCE OF DATA

The primary data and secondary data are the two (2) basic source of data. Hox and Boeije (2005), defined primary data as the data gleaned for a specific research problem. Primary data are collated by the researcher as such data may be unavailable. Therefore, the collection of primary data implies that, new data are added to existing store of social knowledge that exists already for use to

the general research community. Hox and Boeije, (2005) indicated that, when collected data (primary data) are reused by other researchers, it is called secondary data. The data are used for;

- The description of contemporary and historical attributes;
- Comparative research or replication of an original research;
- Reanalysis;
- Research design and methodological advancement; and
- Teaching and learning.

For the purpose of this research, only primary data will be utilized.

3.9 POPULATION, SAMPLE SIZE AND SAMPLING TECHNIQUE

A research population is the universal within which a sample is selected (Bryman, 2004). The population for the research was project managers working in the Accra metropolis. Naoum (2003), described a sample as section of population selected to mirror the remaining of the population. In selecting a sample from a population, Sarantakos (2012), stipulated that, researchers must consider the views that has influence on the study. The population size of the project managers could not be ascertained therefore; the snowball sampling technique was used to reach the respondents. Bryman (2004), defines sampling technique as the process to select a unit or an entity from a sample frame or population that its attribute will reflect. Ross (2005), stated that the selection of a correct sampling technique is important in a study as it helps to carry out a rich research to obtain data which can help in generalisation for an entire population by a usage of a section of a population rather than using the entire population. Snowballing is a sampling technique where research participants recruit other participants for a study. With the absence of a sample frame, the

snowballing sampling technique was regarded as the suitable method to adopt. Using the snowballing non-probability sampling technique, seventy-nine (79) questionnaires were distributed. However, only fifty-three (53) were retrieved for the analysis which represents 67.01% response rate.

3.10 QUESTIONNAIRE DEVELOPMENT

In attaining the aim and objectives of the study, questionnaire was generated which were grounded on the established objectives of the study. Questionnaire survey is an effective tool in retrieving and analyzing people's opinion (Spector, 2006). A pilot survey was conducted before the questionnaire were distributed so as to authenticate the contents of the questionnaire. The questionnaire as presented in the appendix was made up of two (2) sections. The first section emphasized on the background of the respondents. With the background of the respondents, the participants were asked to indicate their profession, years of experience, level of education and number of jobs they have handled. The background of the respondents gives an indication of the reliability of the responses given by the participants.

The other sections were developed based on each objective of the study. With the objective one, the respondents were asked to indicate the significance of the general causes of poor cost performance in the construction industry. They were to rate their responses using the five-point Likert scale of 1 =Not significant, 2 = Slightly significant, 3 = Moderate and 4 = Significant 5 = Very significant. With the second objective, the respondents were asked to indicate the severity of the challenges in achieving high cost performance. They were to rate their responses using the five-point Likert scale of 1= Not severe, 2 = Slightly severe, 3 = Moderate, 4 = Severe 5 = Very

severe. With the objective three, the respondents were asked to indicate the significant strategies for improving cost performance construction industry. They were to rate their responses using the five-point Likert scale of 1 =Not significant, 2 = Slightly significant, 3 = Moderate and 4 = Significant , 5 = Very significant.

3.10.1 Questionnaire distribution

The questionnaire was distributed by hand. It was supplemented by delivery through e-mail. The distribution covered a period of two (2) weeks as ample time was given to the respondents to answer the questions. The questions were simple and concise thus, it took an average of 10minutes to complete one questionnaire. In all seventy-nine (79) questionnaires were distributed. Sixty-one (61) were retrieved however, eight (8) were deemed invalid due to its incompleteness. Therefore, fifty-three (53) questionnaires were used for the analysis.

3.11 TOOLS FOR THE ANALYSIS

The intended tools for the analysis were frequencies and the Relative Importance Index (RII). The frequencies were used in the analysis of the background of the respondents. The RII was used to analyze the other sections of the study. The ranking was done using RII. The computation of RII was done using the formula;

$$RII = \frac{\Sigma W}{A * N}$$

Where; **W = weightings**

A = highest rating

N = sample size

The higher the RII value, the more significant the factors and vice versa. Chen et al. (2010), indicated that, the comparison of RII with the corresponding significance level can be measured.

CHAPTER FOUR

ANALYSIS AND DISCUSSION

4.1 INTRODUCTION

This section analyzes and discuss the data collected from consulting firms in the Accra metropolis. Using the snowballing non-probability sampling technique, seventy-nine (79) questionnaires were distributed. However, only fifty-three (53) were retrieved for the analysis which represents 67.01% response rate. The section A of the questionnaire was analyzed with the aid of frequencies whiles the section B was analyzed with the aid of Relative Importance Index (RII). The discussion was done with the aid of tables and text.

4.2 BACKGROUND OF THE RESPONDENTS

The section covers the background of the respondents. The respondent's background is very crucial in any social research as it indicates the reliability of the responses given by the participants. It normally forms the first section of a questionnaire. For this study, the respondents were required to show their profession, number of years of experience, highest level of education and number of projects they have handle since 2010. The responses were analyzed using frequencies. Their responses are summarized in table 4.1 and discussed in the subsequent sub-sections.

Table 4.1: Background of respondents

DESCRIPTION	FREQUENCY
Profession	
Architect	17
Quantity surveyor	29
Structural engineer	7
Experience	
Below 5 years	9
6-10 years	31
11-15 years	11
Above 15 years	2
Educational level	
HND	3
BSc	42
Postgraduate	8
Number of projects	
Below 5 projects	2
5-10 projects	11
Above 10 projects	40

Source: Field Survey, (2018)

4.2.1 Respondent's profession

Consulting firms comprise of numerous professions who come together to provide construction advisory services to clients. Therefore, the respondents were asked to indicate their profession as part of ascertaining their background information. Their responses as indicated in table 4.1 indicates that, most of the respondents were Quantity Surveyors. This was followed by Architects and finally Structural Engineers.

4.2.2 Respondent's experience

As part of the background information of the participants, the respondents were asked to indicate their professional experience. This question was posed because, the professional experience of a person can give an indication of his knowledge level in the processes of the firm. Also, it gives an indication of how familiar the respondent is with the systems in the construction industry. High level of experience level is good for any study as it improves on the reliability of responses given by respondents. With this question, majority of the respondents indicated 6-10 years. This was by 11-15 years which was ticked by eleven (11) respondents. Nine (9) respondents indicated below 5 years and finally two (2) indicated above 15 years. (see table 4,1).

4.2.3 Respondent's educational level

The third question wanted to ascertain the respondent's educational level. The options include HND, BSc and postgraduate. Just like experience level, educational level can give an indication of his knowledge level in the processes of the firm. Inferring from table 4.1, majority of the respondents had a Bsc degree whiles the lowest was HND. Eight (8) of the respondents indicated having post graduate qualification.

4.2.4 Number of projects

This question was posed as part of ascertaining the background information of the respondents to give an indication of how active the participants have been for the past decade. If respondents are dormant in the industry, it can deprive them of current trends and knowledge in the construction industry. Therefore, it was deemed a very significant question to explore. The respondent's response showed that, majority of the respondents had been involved in above 10 projects. They formed 75.47% of the respondents which were very significant (see table 4.1).

4.3 RELIABILITY ANALYSIS

The Cronbach's Alpha test was used in checking the reliability of the responses. According to Tavakol and Dennick (2011), reliability can be described as the ability of a test, to correlate with itself. Researchers have reported on acceptable values of Cronbach's alpha ranging from 0.700 and 0.950 (DeVellis, 2003). The Cronbach's Alpha value for this study was 0.817. According to Tavakol and Dennick (2011), a low alpha value may depict a poor correlation between variables. Therefore, they suggest that, a maximum alpha value of 0.900. Therefore, the Alpha value of 0.817 was regarded as adequate.

4.4 RANKING OF FACTORS

The section B of the questionnaire was set to suit the objectives of the study. Therefore, the section consisted of three (3) questions. Each question for one (1) objective. Their responses were rated using the five-point Likert scale and subsequently analyzed by ranking. The ranking was done using RII. The computation of RII was done using the formula;

$$RII = \frac{\Sigma W}{A * N}$$

Where; **W = weightings**

A = highest rating

N = sample size

The higher the RII value, the more significant the factors and other way round. Chen et al. (2010), indicated that, measuring of the comparison of RII with the corresponding significance level can also be done using information in table 4.2.

Table 4.2: RII significance values

RII VALUES	**INFERENCE**
High (**H**)	0.8 < RII < 1.0
High-Medium (**H-M**)	0.6 < RII < 0.8
Medium (**M**)	0.4 < RII < 0.6
Medium-Low (**M-L**)	0.2 < RII < 0.4
Low (**L**)	0.0 < RII < 0.2

Source: Chen et al., (2010).

The results of the ranking are discussed in subsequent sections.

4.4.1 Objective one: Causes of poor cost performance

The performance of a construction project gives an indication of how successful the project was executed. How construction project's stakeholders determine the success of a project varies from

each party (Zoltan, 2017). However, according to Agarwal and Rathod (2006), for a project to be successful, it must be delivered on time, budget and specifications. Since the emergence of this description, various researchers have broadened the scope of project success over the years. For instance, Atkinson et al., (1997) incorporated the performance of the stakeholders, assessing their contributions and understanding their expectations. The outcome of poor cost performance is cost overruns at the close of a construction project. Similarly, Sriprasert (2000), indicated that, cost overrun is basically as a result of futile construction management and the poor establishment of cost control systems. Cost overrun is currently a common challenge with most of the construction projects. There are some factors that contributes to poor cost performance leading to cost overruns in construction projects.

For this objective, sub-criteria were identified under every criterion. Thus, in analyzing the results, RII values for each criterion was given as an average of all the RII of each sub-criterion. From the results as shown in table 4.3, contractor's site management came out as the most significant cause of poor cost performance in the construction industry. It consisted of five (5) sub-criteria which were poor site management and supervision, incompetent subcontractors, lack of experience, inadequate monitoring and control and inaccurate cost estimate. The sub-criterion which appeared as most significant under contractor's site management was inaccurate estimates. Peeters and Madauss (2008) stated that the biggest factor which contributes to cost overruns is the inaccurate estimation of the initial cost. Poor cost estimation may be caused by technical problems on how to estimate project costs and/or inadequate project information in the beginning stages of the project. Cost estimation gives the basics for budgeting for a construction project and also forms the

foundation for cost control. Therefore, any inaccuracies in cost estimation subsequently affects the efficient management of cost leading to cost overruns.

Table 4.3: Causes of poor cost performance

S/N	DESCRIPTION	RII	RANK
A	**Contractor's site management**	**0.776**	**1ST**
1	*Inaccurate cost estimates*	*0.812*	*1st*
2	*Lack of experience*	*0.800*	*2nd*
3	*Inadequate monitoring and control*	*0.784*	*3rd*
4	*Incompetent subcontractors*	*0.762*	*4th*
5	*Poor site management and supervision*	*0.724*	*5th*
B	**Material and machinery**	**0.751**	**2ND**
1	*Fluctuation of prices of materials*	*0.766*	*1st*
2	*Late delivery of materials and equipment*	*0.748*	*2nd*
3	*Shortage of materials*	*0.740*	*3rd*
C	**Design and documentation related factors**	**0.750**	**3RD**
1	*Mistakes and errors in design*	*0.768*	*1st*
2	*Incomplete design at the time of tender*	*0.742*	*2nd*
3	*Frequent design changes*	*0.740*	*3rd*
D	**Project management and contract administration**	**0.723**	**4TH**
1	*Change in project scope*	*0.732*	*1st*
2	*Inaccurate quantities take-off*	*0.720*	*2nd*
3	*Delays in decision making*	*0.718*	*3rd*
E	**Labor management**	**0.710**	**5TH**
1	*High cost of labor*	*0.726*	*1st*
2	*Labor absenteeism*	*0.710*	*2nd*
3	*Shortage of site workers*	*0.694*	*3rd*
F	**Financial management**	**0.697**	**6TH**
1	*Delays in payment*	*0.704*	*1st*
2	*Financial difficulties of the owner*	*0.690*	*2nd*
G	**Information and communication technology**	**0.679**	**7TH**
1	*Lack of effective communication among parties*	*0.688*	*1st*
2	*Lack of coordination between parties*	*0.670*	*2nd*

Source: Field Survey, (2018)

The second ranked criterion was material and machinery which consisted of three (3) sub-criteria which were fluctuation of prices of materials, shortage of materials and late delivery of materials and equipment. The first ranked sub-criterion was fluctuation of material prices. The inflation of market prices can lead to the increase of project cost if not properly catered for (Harrison, 1981). Inflation of materials, equipment and labor cost can change based on geographical location within a country. Furthermore, contract with subcontractors and suppliers could add dissimilar inflation protection clauses. As inflation of prices occurs, interest rates will go up and cost subsequently follows.

The third ranked criterion was design and documentation related factors. This had three (3) sub-criteria which were frequent design changes, mistakes and errors in design and incomplete design at the time of tender. The first ranked sub-criterion was mistakes and errors in design. Long et al. (2008) stated that mistakes in design or poor design are as a result of incompetent designers. The approval design or drawing procedure becomes low quality and ineffective especially for projects that are funded by governments government. Unrealistic design may be realized at the start of the construction project and any changes could lead to cost overrun.

All the main criteria used in this objective had a High-Medium (H-M) significance as indicate by Chen et al. (2010), in table 4.2.

4.4.2 Objective two: Challenges in achieving high cost performance

Which this objective, the respondents were asked to rate the severity of seven (7) challenges in achieving high cost performance using the five-point Likert scale. A summary of their responses is shown in table 4.4. The first ranked factor was insufficient resources for cost management. There

is a challenge of insufficient resources for providing a detailed accurate cost management and controls reports in a timely manner. Controlling changes within project can prove to be the most difficult aspect of cost management. While a budget can be defined for a project, certainly variations or change in scope may occur. Established business rules must be abided based on the type of contract or type of project and the client's organization involved.

The second ranked factor was poor budgeting and forecasting approach. Some situations the approaches to budgeting and forecasting may change depending on the experience and approach of the person performing the task. Also, attempt in pulling together an integrated master schedule from the various subcontractors is tedious assignment. The idea of collecting the percentage completion or ensuring that sign-offs are correctly reported from various subcontractors is a difficult assignment to perform. This inhibits effective cost management and control on projects. Aligning data from different sources is also referred as a major challenge in cost management (Bergeurd, 2012). In most cases projects will have to align data from diverse sources like time sheet system, asset management systems, funds management systems, contract management systems and among others. The third rank factor was little control over project changes. Excessive changes in project scope is a major challenge that can lead to cost overruns. This is a phenomenon termed as scope creep. All the variables used in this objective had a High-Medium (H-M) significance as indicate by Chen et al. (2010), in table 4.2.

Table 4.4: Challenges in achieving high cost performance

SN	DESCRIPTION	RII	RANK
1	Insufficient resources for cost management	0.764	1ST
2	Poor budgeting and forecasting approach	0.760	2ND
3	Little Control over project changes	0.755	3RD
4	Inaccurate reporting	0.747	4TH
5	Perception of cost management as cost accounting	0.721	5TH
6	Integrating schedule and cost	0.699	6TH
7	Assembling progress data from multiple subcontractors	0.672	7TH

Source: Field Survey, (2018)

4.4.3 Objective three: Strategies in improving cost performance

One key element in project management and vital instrument in controlling and improving cost performance is Cost management. Godey (1994), indicated that, cost management is different from cost control. Cost management is a strategic process that emphasis on the optimization of efficiency and centers on customer and on profitability (Abdul-Azis et al., 2012). Poor cost management in construction projects leads to cost overruns hence, effective cost management is significant in understanding cost structure and analyzing the costs flowing through the structure (Henningan, 1990).As part of achieving the last objective, the respondents were enquired to rate the significance of the strategies for improving cost performance using the five-point Likert scale

of 1 = Not significant, 2 = Slightly significant, 3 = Moderate, 4 = Significant and 5 = Very significant. Their responses were ranked and shown in table 4.5.

The first ranked factor was proper planning cost control. Cost planning may be effectively used to evaluate the cost of a project. According Ashwort (2010), cost planning can lead to cost-effectiveness and value for money during the design stage. Furthermore, cost planning aids in a balance distribution of expenditure to provide a more logical design. Lastly, cost planning provides a clear bases to compare different projects. Basak (2006), described cost control as a team endeavor and the effectiveness of cost control depends on how well the basic project management practices are implemented on the project, including the definition of items such as governance, owner organization and rosters, roles and responsibilities, project execution strategies, reporting and communication.

The second ranked factor was competent personnel. Kaliaba et al. (2009), mentioned that, contractors, consultants and clients are to make sure that they have the comptetent personnel with right credentials to adequately manage projects. Incompetent work personnel can cause unnecessary wastage which can increase the overall cost of production and consequently lead to cost overruns.

The third tanked factor was realistic cost estimation. The estimating technique is normally used in construction at the pre-tender stage to provide an indication of the future cost of the construction. According to Schuette and Liska (1994), estimating is the fundamental process of answering the question “How much is the project expected to cost?”. The financial commitment to a construction project is very huge therefore any wrong project estimates can have a detrimental effect on all

parties. The main focus of providing a pre-tender estimate is to do budgeting, controlling and comparing (Ashworth, 2010).

The forth ranked factor was effective risk management. Proper risk management is very significant in ensuring risk that might result in cost overruns is eliminated (Peeters and Madauss, 2008). Unforeseen circumstances that have negative impact on a project can lead to cost overruns if not properly managed. The first six (6) variables used in this objective had a High-Medium (H-M) significance as indicate by Chen et al. (2010), in table 4.2.

Table 4.5: Strategies in improving cost performance

SN	DESCRIPTION	RII	RANK
1	Proper cost planning and control	0.744	1ST
2	Competent personnel	0.720	2ND
3	Realistic cost estimation	0.682	3RD
4	Effective risk management	0.676	4TH
5	Appropriate scope definition	0.655	5TH
6	Appropriate contractual framework	0.631	6TH
7	Increase material supply	0.599	7TH

Source: Field Survey, (2018)

4.5 SUMMARY OF CHAPTER

This chapter analyzed and discussed the various questions posed in the questionnaire. The section A of the questionnaire which concentrated on the background of the respondents was analyzed

using frequencies. The section B of the questionnaire which concentrated on the research objectives was analyzed using RII. From the analysis of the objectives it was realized in objective one that, contractor's site management came out as the most significant cause of poor cost performance in the construction industry. The sub-criterion which appeared as most significant under contractor's site management was inaccurate estimates. The second ranked criterion was material and machinery. The first ranked sub-criterion was fluctuation of material prices. The third ranked criterion was design and documentation related factors. The first ranked sub-criterion was mistakes and errors in design. In the objective two, the first ranked factor was insufficient resources for cost management. The second ranked factor was poor budgeting and forecasting approach. The third rank factor was little control over project changes. In the third objective, the first ranked factor was proper planning cost control. The second ranked factor was competent personnel. The third tanked factor was realistic cost estimation. The forth ranked factor was effective risk management.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION, RECOMMENDATIONS

INTRODUCTION

This chapter is the last chapter on the study and it concentrates on discussing the summary of findings, conclusions and making recommendations. The study was aimed at exploring the challenges associated with project cost performance in Ghana. Three (3) objectives were set in order to attain the aim of the study. They were to identify the causes of poor project cost performance in Ghana, to identify the challenges in achieving high project cost performance in Ghana and to identify the strategies in improving project cost performance in Ghana. Establishing the objectives led to the extensive review of literature and subsequently, developing a structured questionnaire to aid in the collection of data from the respondents. Using the snowballing sampling technique, fifty-three (53) questionnaires were retrieved out of the seventy-nine (79) distributed. The data were analyzed using RII. The findings are discussed in subsequent sections.

5.2 SUMMARY OF FINDINGS

This section summarizes the findings of this research. The three (3) objectives were achieved through literature review and questionnaire survey. The findings are discussed as follows.

5.2.1 Objective one: To identify the causes of poor project cost performance in Ghana

With the objective one, contractor's site management came out as the most significant cause of poor cost performance in the construction industry. The sub-criterion which appeared as most significant under contractor's site management was inaccurate estimates. The second ranked

criterion was material and machinery. The first ranked sub-criterion was fluctuation of material prices. The third ranked criterion was design and documentation related factors. The first ranked sub-criterion was mistakes and errors in design.

5.2.2 Objective two: To identify the challenges in achieving high project cost performance in Ghana

In the objective two, seven (7) factors were identified from literature which were perception of cost management as cost accounting, poor budgeting and forecasting approach, assembling progress data from multiple subcontractors, integrating schedule and cost, inaccurate reporting, insufficient resources for cost management and little control over project changes. Using the RII, the first ranked factor was insufficient resources for cost management. The second ranked factor was poor budgeting and forecasting approach. The third rank factor was little control over project changes.

5.2.3 Objective three: To identify the strategies in improving project cost performance in Ghana

In the third objective, seven (7) factors were identified which were increase in material supply, appropriate contractual framework, effective risk management, realistic cost estimation, appropriate scope definition, proper cost planning and control and competent personnel. Using the RII, the first ranked factor was proper planning cost control. The second ranked factor was competent personnel. The third tanked factor was realistic cost estimation. The forth ranked factor was effective risk management.

5.3 LIMITATIONS AND FURTHER STUDY

The study was limited to only consulting firms in the Accra metropolis. In terms of geographical location, the study can be expanded to cover more areas in Ghana. In terms of respondents, the study can be expanded to cover other construction stakeholders like the client. Also, further studies can be conducted in exploring the cost control practices used in Ghana for cost management.

5.4 CONCLUSION

The aim of this study was successfully achieved. With this, the study showed that the poor cost performance is caused by numerous factors. However, the most significant factor demonstrated by the study was contractor's site management. Also, the study showed the challenges associated with achieving high project cost performance. Cost performance is an effective technique in project management effort expended and it is globally recognized in literature and industry. Furthermore, the easiest and common technique used to measure project success is by determine the cost performance. Despite all these advancements in the description of the concept of project success, cost performance is regarded by many researchers as the most important success criteria. Therefore, it is necessary of overcome the challenges to eliminate the causes of poor cost performance in the construction industry.

5.5 RECOMMENDATIONS

In regards to the findings of the study, the following recommendations were generated;

1. The consultant in consultation with the client should endeavor to select an appropriate contractor for the execution of the works. The selection of an inappropriate and inexperienced contractor creates the possibility of project failure especially in terms of cost.

2. Cost planning processes should be implemented at early stages of the construction project and ensure that during the execution of the project, cost is adequately controlled.

3. Excessive scope changes should be avoided as it has a significant impact on project cost performance.

REFERENCES

Abbasi, G., and Al-Mharmah, H. (2000), Project Management by the Public Sector in a Developing Country, "*International Journal of Project Management"*, Vol. 18, No. 2, pp. 105-109.

Abdul-Azis A. A., Memon H. A., Abdul Rahman I., Latif Q. B. A. and Nagapan S. (2012), Cost management of large construction projects in South Malaysia, "*IEEE Symposium on Business, Engineering and Industrial Applications"* pp. 625-629.

Abdullah, M.R., Aziz A.A.A. and Rahman I.A., (2009), Potential effects on large construction projects due to construction delay, "*International Journal of integrated Engineering"*, Vol.6, No 18,pp.53-62.

Adams, F.K., 2008. Risk perception and Bayesian analysis of international construction contract risks: The case of payment delays in a developing economy. *International Journal of Project Management*, *26*(2), pp.138-148.

Agarwal, N.,and Rathod, U., (2006), Defining success for software projects: an exploratory revelation. "*International Journal for Project Management"*. Vol. 24, No 5,pp. 358–370.

Agyakwa-Baah A., (2007), Stakeholders' perceptions of the causes of delay on construction projects, Vol. 1, No 8, pp.1-27.

Ahuja, H.A., Dozzi, S. P., and Abourizk, S. M. (1994), Project management techniques in planning and controlling construction projects, 2nd ed., John Wiley & Sons, Inc., New York.

Al-Tabtabai H. and Diekmann J. E., (1992), Judgmental Forecasting in Construction Projects", Construction Management and Economics, Vol.10, No 3, pp 19-30, 1992.

Angelo W. J. and Reina P., (2002), Megaprojects need more study up front to avoid cost overruns, Retrieved March 29, 2010, from http://flyvbjerg.plan.aau.dk/News%20in%20English/ENR%20Costlies%2 0150702.pdf.

Arditi, D. and Lee, D. E. (2004). "Service quality performance of design/build contractors using quality function deployment." Construction Management and Economics, 22(1), pp. 123–127.

Ashworth A., (2010), Cost Studies of Buildings. 5th ed. Harlow, England: Pearson Education Limited.

Ashworth, A. (1994). Cost studies of buildings. Essex: Longman Group Limited.

Atkinson, A.A., Waterhouse, J.H., and Wells, R.B. (1997). A stakeholder approach to strategic performance measurement. *Sloan Management Review; Cambridge*, **38** (3) pp 25-37.

Avots I. (1983), Cost-relevance analysis for overrun control, "*International Journal of Project Management*", Vol. 1, No 9, pp.142-148.

Azhar, N., Rizwan U. Farooqui and Ahmed, S.M. (2008), Cost overrun factors in construction industry of Pakistan. Advancing and Integrating Construction Education, Research & Practice, pp. 499-508.

Badu, E., Edwards, D.J. and Owusu-Manu, D., (2012). Trade credit and supply chain delivery in the Ghanaian construction industry: Analysis of vendor interactions with small to medium enterprises. *Journal of Engineering, Design and Technology*, *10*(3), pp.360-379.

Basak B. G., (2006), Cost Management in an Imperfect World: Bridging the Gap Between Theory and Practice", ICEC Cost Management Journal.Vol.5, No 20, pp.342-456

Bergerud, C. (2012), The top 10 challenges to effective cost controls. Paper presented at PMI® Global Congress 2012—North America, Vancouver, British Columbia, Canada. Newtown Square, PA: Project Management Institute.

Bramble, B. B., D'Onofrio, M., and Stetson, J. (1990), Avoiding and resolving construction claims, Rs Meams Company, Inc.

Bryman A., (2004), *The Disneyization of society*. Sage.

Burgess (1982), Construction Projects: Their Financial Policy and Control, Construction Press, UK.

Burke R., (1992), Project Management: Planning and Control, New York: John Wiley and Sons.

Burney A. S. M. (2008), Inductive and deductive research approach, assessed at [https://www.google.com.gh/url?sa=t&rct=j&q=&esrc=s&source=web&cd=16&ved=0ahUKEwixwO7ok9jXAhXJBsAKHUPDACEQFgh4MA8&url=http%3A%2F%2Fwww.drburney.net%2FINDUCTIVE%2520%26%2520DEDUCTIVE%2520RESEARCH%2520APPROACH%252006032008.pdf&usg=AOvVaw2U1eqAyiH3qyXfcVuZRfys] on 24th November, 2017.

Cantarelli, C.C., (2009), Cost overruns in Dutch transportation infrastructure projects. Bijdrageaan het Colloquium Vervoersplanologisch Speunverk (Contribution to the Transport Planning Research Colloquium). http://www.cvs-congres.nVcvspdfdocsIcvs09-156.pdf.

Carrie W., (2007), Research method, "*Journal of Business and Economic research",* Vol 5, pp. 65-71.

Carrie W., (2007), Research method, "*Journal of Business and Economic research",* Vol 5, pp. 65-71.

Chan, S. and Park, M. (2005), Project cost estimation using principal component regression. Construction Management and Economics, Vol. 23, No 12, pp. 295-304.

Creswell, J. (2003). Research design: Qualitative, quantitative and mixed methods approaches *(2nd ed.).* Thousand Oaks, CA: SAGE Publications

Creswell, J. W. (1994). *Research design: Qualitative and quantitative approaches*. Thousand Oaks, CA: SAGE Publications.

Crotty, M., 1998. Foundations of social research: Meaning and Perspective in the Research Process. p.256.

De Vaus A. D., (2001), Research Design in Social Research, pp.1-52.

DeVellis R., (2003), Scale development: theory and applications: theory and application. Thousand Okas, CA: Sage;.

Egemen, M. and Mohamed, A. N. (2005). "Different approaches of clients and consultants to contractors' qualification and selection." *Journal of Civil Engineering and Management*", 11(4), pp. 267-276.

Endut, LR, Akintoye A. and Kelly J., (2009), Cost and time overruns of projects in Malaysia, pp: 243-252, http://www.irbnet deldatenliconddCLB10633 .pdf.

Fortune C.J. and Lees M.A., (1996), The relative performance of new and traditional cost models in strategic advice for clients, RICS Research Paper Series, Vol. 2, No. 2.pp 24-32

Frimpong, Y., Oluwoye, J. and Crawford, L. (2003), Causes of delay and cost overruns in construction of groundwater projects in developing countries; Ghana as a case study. "*International Journal of Project Management*", Vol. 21, pp. 321-326.

Frisby T. N, (1990), Survival in the Construction Business: Checklists for Success", R. S. Means Company Inc., America.

Gabriel D., (2013), Inductive and deductive approaches to research, assessed at [http://deborahgabriel.com/2013/03/17/inductive-and-deductive-approaches-to-research/] on 24th November, 2017

Georgy, M.E., Chang, L.M. and Zhang, L. (2005) Prediction of engineering performance: A Neurofuzzy approach. "*Journal of Construction Engineering and Management*" Vol. 131 No. 5, pp. 548–557.

Ghana. Statistical Service, (2015). Annual Gross Domestic Product.pp.1-9.

Gido, J. and Clements, J.P. (2003), Successful project management. New York: South-Western.

Godey J., (1994), Six Steps to Effective Cost Management (CPA in Industry),"*The CPA Journal Online*".

Halpin D. W., (1985), Financial and Cost Concepts for Construction Management, John Wiley and Sons, America.

Harris, F., and McCaffer, R. (1995), Modern construction management, Blackwell Science LTD, UK.

Harrison, F.L., (1981), Advanced Project Management. England: Gower Publishing Company Limited.

Henningan P., (1990), Follow This Model for Effective IT Cost Management, Tech Republic, Enterprise: Management.

Hox J.J and Boeije H. R., (2005), Data collection, primary vs. secondary, *"Encyclopedia of social management",* Vol. 1, pp. 593-599.

Hutchings, D. M. and Christofferson, J. P. (2000), A Study of Management Practices in Small-volume Home Building Companies, *ASC Proceeding of 36th Annual Conference,* Purdue University, Indiana.

Hyung K. P., (2005), Cash Flow Forecasting Model for General Contractors Using Moving Weights of Cost Categories, "J*ournal of Management in Engineering*", Vol. 20, pp.12-45.

Isaac, S., and Michael, W. B. (1997), Handbook in research and evaluation: A collection of principles, methods, and strategies useful in the planning, design, and evaluation of studies in education and the behavioral sciences. (3rd Ed.). San Diego: Educational and Industrial Testing Services.

Jackson, S., (2002), Project cost overruns and risk management, Proceedings of the 18th Annual Conference on Association of Researchers in Construction Management, September 2-4, 2002, Newcastle, UK.

Johnson, R. B. and Onwuegbuzie, A. J. (2004), Mixed methods research: A research paradigm whose time has come. *Educational Researcher*, (Vol. 7), No 14, pp. 14-26.

Kaliba C., Muya M. and Mumba K., (2009), Cost escalation and schedule delays in road construction projects in Zambia. International Journal of Project Management, 27, 522-531.

Kpamma, Z.E. and Adjei-Kumi, T., (2010), The lean project delivery system (LPDS): application at the design and documentation stage of building construction projects in Ghana. In *WEST AFRICA BUILT ENVIRONMENT RESEARCH (WABER) CONFERENCE* (p. 597).

Kraemer, K. L. (1991), Introduction. Paper presented at The Information Systems Research Challenge: Survey Research Methods.

Leedy, P. and Ormrod, J. (2001). *Practical research: Planning and design* (7th ed.). Upper Saddle River, NJ: Merrill Prentice Hall. Thousand Oaks: SAGE Publications.

Lim C. S. and Mohamed M. Z. (1999), Criteria of project success: An explanatory re-examination, *"International Journal of Project Management"*, Vol.17, pp.243–248.

Ling, F. Y. Y., Low, S. P., Wang, S. O. and Lim, H. H. (2009). "Key project management practices affecting Singaporean firms' project performance in China." International Journal of Project Management, 27, pp. 59-71.

Long, L.H., Young, D.L., and Jun, Y.L.. (2008), Delays and cost overrun in Vietnam large construction projects: A comparison with other selected countries. KSCE Journal of Civil Engineering, Vol. 12, No13 pp. 367-377.

Long, N.D., Ogunlana, S.O., and Lan, D.T.X. (2004), A study on project success factors in large construction projects in Vietnam, "*Journal of Engineering, Construction and Architectural*", Vol. 11, pp. 404-413.

Marsh C., (2009), Mastering Financial Management, Britain: Pearson Education Limited.

Mills, E.S., (1959). Uncertainty and price theory. *The Quarterly Journal of Economics*, *73*(1), pp.116-130.

Munns A. K. and Bjeirmi B. F. (1996), The role of project management in achieving project success, *"International Journal of Project Management",* Vol.14, pp.81–87.

Naoum, S., (2003). An overview into the concept of partnering, "*International journal of project management"*, Vol.1, pp.71-76.

Nega, F. (2008). Causes and effects of cost overrun on public building construction projects in Ethiopia. Phd Thesis. Addins Ababa University, Ethiopia.

Ofori G. (2012). Developing the Construction Industry in Ghana: the case for a central agency, Vol.1, pp.45-64.

Ofori-Kuragu, J.K., 2013. *Enabling world-class performance in Ghanaian contractors: A framework for benchmarking* (Doctoral dissertation).

Ogunlana, S.O. and Olomolaiye, P.O. (1989), A survey of site management practice on some selected sites in Nigeria. Building Environment, Vol. 2, pp. 191-196.

Olawale, Y.A. and Sun M., (2010), Cost and time control of construction projects: Inhibiting factors and mitigating measures in practice, "*Journal of Construction Management Economics*", Vol. 28, pp. 509-526.

Orman, G.K., Labatut, V. and Cherifi, H., (2012). Comparative evaluation of community detection algorithms: a topological approach. *Journal of Statistical Mechanics: Theory and Experiment*, *2012*(08), p.P08001.

Oxford Business Group, (2014), Laying the cornerstones: Government expenditure is supporting increased activity. http://www.oxfordbusinessgroup.com/news/layingcornerstones-government expenditure-supporting-increased-activity (Assessed May 19,2014).

Peeters, W. and Madauss, B. (2008), A proposed strategy against cost overruns in the space sector: The 5C approach. Space Policy, Vol. 24, pp. 80-89.

Pilcher R., (1985), Project Cost Control in Construction, Collins, UK,.

Rahman I. A., Memon A. H. and Abd.Karim A. T., (2013), Significant factors causing cost overruns in large construction, "*Journal of Applied sciences"*, Vol. 13, No. 2, pp. 286-293.

Rameezdeen R. (2005), Study of linkages between Construction sector and other sectors of the Sri Lankan economy.

Ross, K.N., (2005), Quantitative research methods in educational planning. *International Institute for Educational Planning/Unesco. Retrieved from www. unesco. org/iiep.[Accessed: 8th may 2014]*.

Salter, A. and Torbett, R., (2003). Innovation and performance in engineering design. "*Construction Management and Economics"*, Vol. 21, No. 6, pp.573-580.

Sarantakos S., (2012), Social Research, Publisher: Palgrave Macmillan, 2012 ISBN: 1137292474, 9781137292476

Schuette S. D. and Liska R. W., (1994), Building Construction Estimating, MacGraw-Hill Series, America.

Songwe V., (2014), Africa's Capital Market Appetite; Challenges and Opportunities for Financing Rapid and Sustained Growth. Foresight Africa Report; pp.1-44.

Spector, P.E., (2006), Method variance in organizational research: truth or urban legend? "*Organizational research methods"*, *9*(2), pp.221-232

Sriprast E., (2000), Assessment of cost control system: A case study of Thai Construction Organizations. Asian Institute of Technology, Bangkok.

Stumpf, G.R., (2000), Schedule delay analysis, "*Cost engineering-and larbor then morgantown"*, *Vol.* 7, pp.32-32.

Tang W.K (2005), Cost management for Building Contractors in Hong Kong, The University of Hong Kong: Master of Science in Construction Project Management.

Tashakkori, A. and Teddlie, (2003), *Handbook of mixed methods in social & behavioral research*. Thousand Oaks, CA: SAGE Publications.

Tavakol, M. and Dennick, R., (2011), Making sense of Cronbach's alpha. "*International journal of medical education"*, *2*, p.53.

Vaardini U. S., Karthyiyayini S., and Ezhilmathi P. (2016), Study on cost overruns in construction projects- A review, "*International Journal of Applied Engineering research",* Vol. 11, No.3, pp. 356-363.

Wateridge, J., (1998), How can IS/IT projects be measured for success. *International Journal of Project Management*, Vol. 16, No. 1, pp 59-63.

Weetman P., (2003), Financial and Management Accounting an introduction, 3rd ed. Harlow, England: Pearson Education Limited.

White, D., and Fortune, J. (2002), Current Practice in Project Management - An Imperial Study, *"International Journal of Project Management". Wiley & Sons Inc. New York.*

Yang, M. L., Chuah, K. B., Rao Tummala, V. M., and Chen, E. H. (1997), Project Management Practices in Pudong, "*The International Journal of Project Management",* Vol. 15, No. 5, pp. 313-319.

Zikmund, W., Babin, B., Carr, J. and Griffin, M. (2012). Business Research Methods. 9th ed. Ohio, p.160.

Zoltan S., (2017), Further considerations in project success, "*Creative construction conference"* pp. 571-577.

Zujo, V. and Car D., (2008), Application of "time-cost" model in construction project management. http://bib.irb.hr/datoteka/444400.92-uj o-Car-Pui.pdf.

APPENDIX

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
COLLEGE OF ART AND BUILT ENVIRONMENT
DEPARTMENT OF BUILDING TECHNOLOGY

RESEARCH QUESTIONNAIRE

TOPIC: A STUDY OF THE CHALLENGES ASSOCIATED WITH PROJECT COST PERFORMANCE IN THE GHANA

Dear Sir/ Madam

I am an Msc student at Kwame Nkrumah University of Science and Technology, Department of Building Technology currently undertaking a "**study into the challenges associated with project cost performance in Ghana".**

The research is ongoing under the supervision of Dr. Michael Addy and requires a questionnaire survey to be undertaken to collect data from professionals in the construction industry. Your experience and knowledge in the area of the research is very important and much appreciated. The information you shall provide shall be STRICTLY CONFIDENTIAL and for academic purposes only and findings from this research will be made available to you on request.

I know you have a very busy schedule and this will take some time off you, I will plead that you help me with your knowledge as it means so much to the achievement of this research. I appreciate your effort and time very much in advance, kindly return the completed questionnaires to this email: jamesessilfie@ymail.com.

Yours Sincerely,

James Essilfie……., MSc. Student, KNUST
Dr. Michael Addy, Project Supervisor, Department of Building Technology (KNUST)

SECTION A

RESPONDENT'S PROFILE

1. Please indicate your profession in the consulting firm?

( ) Architect

( ) Quantity surveyor

( ) Structural engineer

If other please specify …….

2. Please indicate your years of experience in your profession?

( ) Below 5 years

( ) 6-10 years

( ) 11-15 years

( ) Above 15 years

3. What is your highest level of education?

( ) HND

( ) BSc

( ) Post Graduate

Others (specify)……

4. Please indicate the number of projects you have worked on since 2010?

( ) Below 5 projects

( ) 5 – 10 projects

( ) Above 10 projects

SECTION B

OBJECTIVE ONE: CAUSES OF POOR COST PERFORMANCE

5. The following are general causes of poor cost performance in the construction industry. Rate these causes in terms of its significance in the Ghanaian construction industry.

1 = Not significant 2 = Slightly significant 3 = Moderate 4 = Significant 5 = Very significant

NO.	CAUSES OF POOR COST PERFORMANCE	1	2	3	4	5
A	**Contractor's site management**					
1	Poor site management and supervision					
2	Incompetent subcontractors					
3	Lack of experience					
4	Inadequate monitoring and control					
5	Inaccurate cost estimates					
B	**Design and documentation related factors**					
1	Frequent design changes					
2	Mistakes and errors in design					
3	Incomplete design at the time of tender					
C	**Financial management**					
1	Financial difficulties of the owner					
2	Delays in payment					
D	**Information and communication technology**					

1	Lack of coordination between parties					
2	Lack of effective communication among parties					
E	**Labor management**					
1	Shortage of site workers					
2	High cost of labor					
3	Labor absenteeism					
F	**Materials and machinery**					
1	Fluctuation of prices of materials					
2	Shortage of materials					
3	Late delivery of materials and equipment					
G	**Project management and contract administration**					
1	Change in project scope					
2	Inaccurate quantities take-off					
3	Delays in decision making					

OBJECTIVE TWO: CHALLENGES IN ACHIEVING HIGH COST PERFORMANCE

6. The following are general challenges in achieving high cost performance. Rate these challenges in terms of most severe in the Ghanaian construction industry.

1 = Not severe 2 = Slightly severe 3 = Moderate 4 = Severe 5 = Very severe

NO.	CHALLENGES IN ACHIEVING HIGH COST PERFORMANCE	1	2	3	4	5
1	Perception of cost management as cost accounting					
2	Poor budgeting and forecasting approach					
3	Assembling progress data from multiple subcontractors					
4	Integrating schedule and cost					
5	Inaccurate reporting					
6	Insufficient resources for cost management					
7	Little Control over project changes					
	If other, please specify					

OBJECTIVE THREE: STRATEGIES FOR IMPROVING COST PERFORMANCE

7. The following are general strategies in achieving high cost performance. Rate these strategies in terms it significance in the Ghanaian construction industry.

1 = Not significant 2 = Slightly significant 3 = Moderate 4 = Significant 5 = Very significant

NO.	STRATEGIES IN IMPROVING COST PERFORMANCE	1	2	3	4	5
1	Increase material supply					
2	Appropriate contractual framework					
3	Effective risk management					
4	Realistic cost estimation					
5	Appropriate scope definition					
6	Proper cost planning and control					
7	Competent personnel					
	If other, please specify					