

EXPLORING THE CHALLENGES OF COST MANAGEMENT IN THE
GHANAIAIAN REAL ESTATE INDUSTRY.

By

Edward Maalevoru Dery

(B.Sc. Operation and Project Management)

A Thesis submitted to the Department of Construction Technology and Management,
Kwame Nkrumah university of science and Technology, Kumasi in partial fulfilment
of the requirements for the award degree of

MASTER OF SCIENCE IN PROJECT MANAGEMENT

November, 2019.

DECLARATION

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma at Kwame Nkrumah University of Science and Technology, Kumasi or any other educational institution, except where due acknowledgement is made in the thesis.

Edward Maalevoru Dery (PG5323718)
 Name of student and ID Signature Date

Certified by:

Dr. Ernest Kissi
Name of supervisor Signature Date

Certified by

Prof. Bernard Baiden

Name of Head of Department
Signature
Date

ABSTRACT

The study aimed at exploring the challenges of cost management by project managers in the Ghanaian real estate industry. With this aim, three (3) objectives were established which were to identify the significant cost management practices used by project managers in real estate projects in Ghana, to identify the challenges faced by project managers in cost management in real estate projects in Ghana and to identify the significant strategies that can be adopted by project managers to improve cost management in real estate projects in Ghana. Literature review was conducted on the objectives to identify relating variables to aid in the development of an instrument for the study. The study adopted a quantitative research method which informed the use of questionnaire in the collection of data. After the development and distribution of the questionnaire, fifty-four (54) questionnaires were retrieved for the analysis. The data collected were analyzed using percentages and one-sample t-test. From the analysis, it was realized that, the superficial area method was the frequently used cost planning tool among real estate project managers. Also, with cost budgeting and estimating, the detailed estimating method was the only significant tool rated by the respondents. Finally, at the cost control phase, the project managers indicated that, the cash flow method is the most frequently used tool during real estate projects. With the challenges associated with cost management practices in real estate projects, the most frequently occurring challenge was poor reliability of project budget. With the strategies to improve cost management, the first ranked factors were the use of qualified and experienced project team and given a clear definition of scope. With these findings, it was recommended that, project managers must explore various options with regards to the tools used for cost management so as to adopt the most suitable approach for every specific project and project managers must endeavor to continuously keep accurate data on cost in order to enhance their cost planning processes.

Keywords: Cost management, Real estate, Project manager.

TABLE OF CONTENT

DECLARATION	II
ABSTRACT.....	III
LIST OF TABLES	VII
LIST OF FIGURES	VIII
ACKNOWLEDEMENT	IX
DEDICATION	X
CHAPTER ONE	1
INTRODUCTION.....	1
1.1 BACKGROUND OF THE STUDY	1
1.2 PROBLEM STATEMENT	3
1.3 AIM AND OBJECTIVES OF THE STUDY	4
<i>1.3.1 Objectives of the study</i>	<i>4</i>
1.4 RESEARCH QUESTIONS	5
1.5 SIGNIFICANCE OF THE STUDY	5
1.6 SCOPE OF THE STUDY	5
1.7 RESEARCH METHODOLOGY	6
1.8 RESEARCH STRUCTURE	6
CHAPTER TWO	8
LITERATURE REVIEW	8
2.1 INTRODUCTION.....	8
2.2 OVERVIEW OF THE GHANAIAN CONSTRUCTION INDUSTRY	8
2.3 OVERVIEW OF THE GHANAIAN REAL ESTATE INDUSTRY	9
2.4 THE CONCEPT OF COST MANAGEMENT	10
2.5 COST MANAGEMENT PRACTICES	13
<i>2.5.1 Cost planning.....</i>	<i>13</i>
2.5.2 COST ESTIMATING AND COST BUDGETING	15
<i>2.5.3 Cost control.....</i>	<i>16</i>
2.6 CHALLENGES IN COST MANAGEMENT	19
<i>2.6.1 Unrealistic estimate</i>	<i>19</i>
<i>2.6.2 Poor reliability of project budget</i>	<i>20</i>
<i>2.6.3 Unpractical working drawing budget.....</i>	<i>20</i>
<i>2.6.4 Poor management of subcontractors and other external workers.....</i>	<i>20</i>

2.6.5 Numerous change orders	21
2.6.6 High interest rates on funds from financial institutions	21
2.6.7 Unscientific cost management process	21
2.7 STRATEGIES TO IMPROVE COST MANAGEMENT	22
2.7.1 Adopt the use of scientific cost management tools.....	22
2.7.2 Regularize the process of design change orders.....	22
2.7.3 Decrease the dependency on financial institutions for funds	23
2.7.4 Attain accurate cost information	23
2.7.5 Usage of qualified and experienced project team.....	23
2.7.6 Selection of a suitable procurement method.....	23
2.7.7 Clear definition of scope.....	24
2.8 SUMMARY OF CHAPTER	24
CHAPTER THREE.....	25
RESEARCH METHODOLOGY	25
3.1 INTRODUCTION.....	25
3.2 RESEARCH DESIGN	25
3.3 RESEARCH METHOD	26
3.4 RESEARCH APPROACH.....	27
3.5 RESEARCH POPULATION	28
3.5.1 Sample size.....	29
3.6 DATA COLLECTION METHOD AND TOOLS	29
3.7 DATA ANALYSIS TECHNIQUES	30
3.8 ETHICAL CONSIDERATIONS	31
CHAPTER FOUR.....	32
DATA ANALYSIS AND DISCUSSION.....	32
4.1 INTRODUCTION	32
4.2 BACKGROUND OF THE RESPONDENTS	32
4.2.1 Respondents profession.....	33
4.2.2 Level of education	34
4.2.3 Years of experience	34
4.2.4 Level of knowledge.....	34
4.3 ONE- SAMPLE T-TEST ANALYSIS	35
4.3.1 Cost management practices in real estate projects	35

4.3.2 Challenges associated with cost management practices in real estate projects.....	38
4.3.3 Strategies to improve the effectiveness of cost management practices for real estate projects.....	40
4.4 CHAPTER SUMMARY	42
CHAPTER FIVE	44
SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS ..	44
5.1 INTRODUCTION.....	44
5.2 SUMMARY OF FINDINGS.....	44
5.2.1 Objective one: to identify the significant cost management practices used by project managers in real estate projects in Ghana.....	45
5.2.2 Objective two: to identify the challenges faced by project managers in cost management in real estate projects in Ghana	45
5.2.3 Objective three: to identify the significant strategies that can be adopted by project managers to improve cost management in real estate projects in Ghana.	46
5.3 CONCLUSION	46
5.4 LIMITATIONS AND FURTHER STUDIES	47
5.5 RECOMMENDATIONS	47
REFERENCES	48
APPENDIX.....	57
QUESTIONNAIRE	57

LIST OF TABLES

Table No.	Title	Page
TABLE 4.1:	BACKGROUND OF THE RESPONDENTS	33
TABLE 4.2:	FREQUENCY OF USAGE OF COST MANAGEMENT PRACTICES	37
TABLE 4.3:	CHALLENGES ASSOCIATED WITH COST MANAGEMENT PRACTICES	39
TABLE 4.4:	STRATEGIES TO IMPROVE COST MANAGEMENT	41

LIST OF FIGURES

Figure No.	Caption	Page
FIGURE 1.1:	STRUCTURE OF THE REPORT	7
FIGURE 2.1:	DATA FLOW DIAGRAM FOR A COST MANAGEMENT SYSTEM	12

ACKNOWLEDEMENT

I am most grateful to the Almighty God for His knowledge, strength (physical and spiritual) and His wisdom giving me throughout my program.

I wish to express my profound gratitude to my supervisor Dr. Ernest Kissi of the College of construction and Management, Kwame Nkrumah University of Science and Technology, Kumasi. I deeply appreciated his dedicated support, directions and constructive criticism throughout the writing of the research work.

My sincere gratitude goes to the following for their suggestion and contribution, Madam Ayisha Abu, Mr. Kalmoni Salah, Amankwa Isaac Okai, Richard Aryeetey, Emmanuel Ayihi and Conna Crwnwell.

Finally, to everyone who supported me, but their names could not be mentioned, I say God bless you all.

DEDICATION

I dedicated this work to my late beloved Father Mr. Mahama Dramani who words had kept me in school, My mother Madam Piikuu Ann, my son Edgar N. Dery, |my Daughter Eliana N. Dery, my siblings' Charles Abeiryel Mahama, Felix Annoyang Mahama, Ordillos Sag-uu Dery and Sakang Mahama for their moral support and encouragements. Lastly but not the least to my lovely wife Vivian Yuoni.

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

In the United States, the Real estate industry significantly contributes to its economy as is one of the major investment assets category (Brent & Kenneth, 2008). In China, along with the booming economy, the real estate industry has realized tremendous success, pulling economic development immensely and contributing significantly to the country's development (Gao, 2009). In 2008, 3000 billion Renminbi (RMB) were invested in real estate construction in China. Liang and Gordon (2003), indicated that, the impact of real estate to the economy of a country can be measured using the Gross Domestic Product (GDP). In African the real estate industry contribution to GDP ranges from 8% to 28%. Specifically, in the Ghana, it is estimated that, the real estate industry contributes 15% GDP to the economy using Huges and Arissen formula (Anim-Odame, 2010). A study conducted by the Bank of Ghana (2007), indicated that, a major challenge facing the Ghanaian real estate industry is its source of finance and structural rigidities and prices of inputs. The high cost of building inputs coupled with low investment opportunities in Ghana creates the need to effectively manage the cost of real estate projects.

The cost of a project is sometimes limited to the tender sum, however, it constitutes the cost from the start to finish of a project. Project cost is regarded as a fundamental and a significant aspect for consideration throughout a project lifecycle. Project cost is the simplest way to measure the success of a project (Salter & Torbett, 2003). Georgy et al. (2005) opined that, the measurement of cost performance can be done using the cost

variance which is calculated as the difference between the actual cost and the budgeted cost of a project. Similarly, cost performance can be measured using the Cost Performance Index (CPI). CPI is a measure of the cost efficiency of the project being executed. It is a function of the cumulative earned value and cumulative actual cost (Olaoluwa, 2013). The total cost of a project can be affected by the project manager's ability to effectively plan resources, estimate, budget and control cost (Gyadu-Asiedu et al., 2013). This process is termed as cost management.

Cost management is a key component of project management as it aids to control and improve cost performance of a project. It must be noted that, cost management differs from cost control as cost management is more proactive and focus on the elimination of waste in the procedures of the project (Godey, 1994). Kwak and Ibbs (2002), defined cost management as the process of controlling the expenditure on a project throughout the entire phases of the project within the approved budget. There are basically three (3) components of cost management. These are cost estimating, cost budgeting and cost control (Owens et al., 2009). It may also involve resource planning which focus on determining the nature and quantities of resources (people, equipment and materials) required to execute the project (PMBOK, 1996).

Gao (2009), opined that, the cost of a real estate construction project can be categorized into four (4) main parts. The first part is the cost of land which accounts for 30% of the total cost. The cost of land consists of the building land, greening land, equipped facility land and property management land (Gao, 2009). The second part is the construction cost which covers 20% to 50% of the total cost. The materials components of the construction cost covers approximately 60%. The third part is the cost for equipment and machines to meet operation needs, management and maintenance. The final part

consists of other cost including the cost for investigation and design, the cost for project supervision and management cost. Gao (2009), indicated that, serious problems exist in the cost control and management of real estate construction. This is mostly caused by the nature of the real estate industry. Therefore, it is very important to ascertain the challenges associated with cost management in the real estate industry so as to proposed strategic solutions to eradicate the problem. Thus, this study is conducted to explore the challenges of cost management by contractors in the Ghanaian real estate industry.

1.2 PROBLEM STATEMENT

Project cost overruns is a menace to project managers across the World. According to Avots (1983), cost overruns occurs when the project objectives are not realized within the estimated budget. According to Angelo and Reina (2002), cost overrun is a major problem facing both developed and developing countries. This was shown in a study conducted in twenty (20) nations on 258 projects. The study detected that, nine (9) out of ten (10) projects face cost overruns. Furthermore, poor cost performance is a familiar issue with a normal cost increase of a percentage of 10.3 of cost of a project (Cantarelli ,2009). According to Cantarelli (2009) there is 18.5% of cost overrun in road projects followed by projects in relation to rail with a percentage of 7.6 and a percentage of 4.5 for fixed link project. The high cost of building inputs coupled with low investment opportunities in Ghana creates the need to effectively manage the cost of real estate projects.

There are huge investments made in the Real Estate Industry Worldwide. This is evident in studies conducted by Gao (2009) in China and Brent and Kenneth (2008) in UK. Similar relative investment trends are evident in the Ghanaian real estate industry. Therefore, effective cost management of real estate projects is very significant. The

level of investment and stakeholder involvement of real estate construction projects is high therefore, the cost management process is more complicated and has multiple levels (Gao, 2009). Hence, there are numerous issues of cost overruns in real estate projects. However, the cost of constructing a house has a direct relationship to the final selling prices (Glaeser et al., 2005). Eventually, price level of real estate houses become very expensive and low patronage affects the level of project implementation. Studies conducted by Agarwal-Gupta et al. (2011) and Chritamara et al. (2012) showed that, the contractor is the major cause of cost overruns in project management.

In view of the above, it is very important to effectively manage the cost of real estate projects. Lowering the construction cost through effective cost management will consequently affect the final selling prices and improve patronage. Therefore, this study is aimed at exploring the challenges of cost management by contractors in the Ghanaian real estate industry.

1.3 AIM AND OBJECTIVES OF THE STUDY

The aim of the study was to explore the challenges of cost management by project managers in the Ghanaian real estate industry.

1.3.1 Objectives of the study

With the above aim, the study had three (3) objectives. They were:

1. To identify the significant cost management practices used by project managers in real estate projects in Ghana,
2. To identify the challenges faced by project managers in cost management in real estate projects in Ghana and
3. To identify the significant strategies that can be adopted by project managers to improve cost management in real estate projects in Ghana

1.4 RESEARCH QUESTIONS

The study seeks to answer the following questions;

1. What are the cost management practices used by contractors in real estate projects in Ghana?
2. What are the challenges faced by contractors in cost management in real estate projects in Ghana?
3. What are the strategies that can be adopted by contractors to improve cost management in real estate projects in Ghana?

1.5 SIGNIFICANCE OF THE STUDY

This study is intended to aid the real estate industry in becoming more effective in cost management. This will help improve the value for money for investors and increase the profitability. Cost overruns is a major problem that faces both developed and developing countries (Angelo and Reina, 2002). Therefore, this study will provide a theoretical basis and strategies for effectively managing cost within a proposed budget. The study will also be significant for application by various stakeholders like Government agencies, project managers, contractors as well as professional bodies. Furthermore, this study will help in the theoretical training of policy makers to address practical issues in the sector and also provide insights to managers on the significance of project cost management.

1.6 SCOPE OF THE STUDY

The study was limited to the Accra metropolis as real estate projects in Ghana are concentrate in this area. Furthermore, the only project managers were involved in the study. This is because, studies conducted by Aggarwal-Gupta et al. (2011) and Oguulana and Bach, (2012) showed that, the project manager is the major cause of cost

overruns in project management. However, the construction firms will be purposively selected as only project managers who have worked on real estate projects will be involved in the study.

1.7 RESEARCH METHODOLOGY

The study adopted a purely quantitative research method. This study was conducted through the reviewed of relevant literature and analyzed the research papers gotten. This was aid in the development of a structured questionnaire which were answered by professionals in the construction industry (Contractors and Civil engineers). Their responses were coded in SPSS and subsequently analyzed using mean score ranking technique. Also, the research design is explanatory as the study seeks to assess the challenges associated with cost management used by construction firms in Ghana real estate industry. Furthermore, this research used only primary data as a source of information for the study. Primary data can be described as data that are gathered by the researcher because at the time of study, data was not available.

1.8 RESEARCH STRUCTURE

The structure of the report is shown in figure 1.1. The study comprises of five (5) chapters. The chapter one focused on the introduction of the study which includes the background of the study, the problem statement, aim, objectives and significance of the study. The chapter two (2) focused the review of literature whiles the chapter three discussed the methodological approach adopted for the study. The chapter four focused on the analysis and discussion of results and finally the chapter concluded the study by providing recommendations based on the findings of the study.

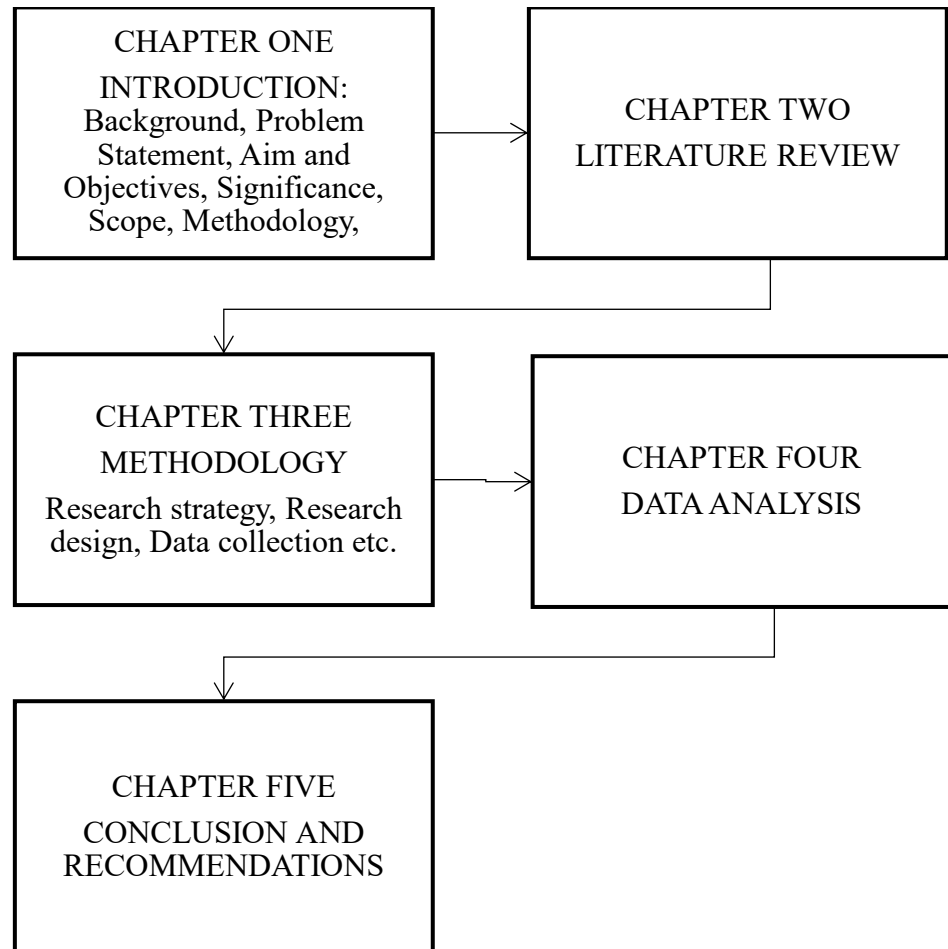


Figure 1.1: Structure of the report

Source: Author's construct, (2019).

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter reviews literature pertaining to the area of study. The literature review aids in gathering secondary information which aids in the formulation of an instrument for distribution. The review was basically based on the research objectives of the study. However, before delving into a review on the objectives of the study, an overview of the Ghanaian construction industry was done followed by an overview of the concept of cost management. This led straight to the review on the three (3) objectives of the study which included the cost management practices, challenges faced by contractors in cost management and strategies to improve cost management practices.

2.2 OVERVIEW OF THE GHANAIAN CONSTRUCTION INDUSTRY

There are numerous challenges facing the Ghanaian construction industry. From a report written by the Road sector of the industry in 2000, they listed some the challenges to include 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 close relationship between economic growth and the construction industry as construction activities aid in the provision of physical infrastructure and asset-based-development upon which growth

and development are realized (Songwe, 2014). According to Ghana Statistical Services, (2015) the Ghanaian construction industry experienced a growth rate of 26.9% and a share of 14.8% of nominal GDP. Therefore, the Construction Industry is the largest growing industry in Ghana. According to Agyakwa-Baah (2007), the Ghanaian Construction Industry is directly linked to the Ghanaian economy because the Ghana's government is regarded as the biggest client in the industry. The Ghanaian construction industry has experienced a steady growth from 26.6% in 2014 to 26.9% in 2015 (Ghana Statistical Services, 2015). Even though the construction industry in Ghana has experienced steady growth over the years, there are inherent problems facing the industry. It is therefore very important to enhance the performance of the construction industry in order to experience significant economic growth.

2.3 OVERVIEW OF THE GHANAIAN REAL ESTATE INDUSTRY

Smith et al. (1981), described a real estate as a physical entity which includes land and improvement affixed to the land while a real property is a legal concept that gives the individual the right to use and control the real estate.

The Ghanaian Real Estate industry contributes significantly to the development of the Ghanaian economy with regards to the provision of houses. This sector consists of both private and public sector developers of residential and commercial. In 2008, a report from the Ministry of Works and Housing indicated that, the public sector Real Estate developers built approximately 2,500 units of the country's annual estimated output of 40,000 housing units (Appau, 2015). Benjamin (2000), also indicated that, between 1987 and 1997, the Real Estate developers provided 11,934. These records show a significant improvement in real estate house provision.

Despite the significant contribution of the Real Estate industry, there are inherent challenges facing the industry due to the current debt increase of the country coupled with unsustainable macro-economic stability. One of the most significant challenges facing the Real Estate industry is the high cost of credit (Appau, 2015). The investments made in the Real Estate industry is very expensive and on a long-term basis. Therefore, there is the need for a long-term financing plan to enable Real Estate developers stay in business. Hence, a high interest rate coupled with short repayment period makes it difficult to expand the Real Estate activities and stay in business. It is also an undisputable fact that, the industry also lacks government support in the form of making land available for development, reducing reserve ratio to enable more banks to give out mortgages at affordable rate and making a policy that provide free environment to operate but rather doing the downside. There is the need to introduce a more flexible housing fiancé system which would encourage a lot of stakeholders in the Real Estate sector to invest. Furthermore, Real Estate contractors should endeavor to implement proper cost management practices to efficiently control the cost involved in the execution of Real Estate projects. The level of investment and stakeholder involvement of Real Estate construction projects is high therefore, the cost management process is more complicated and has multiple levels (Gao, 2009).

2.4 THE CONCEPT OF COST MANAGEMENT

The easiest technique used in measuring the success of a project is cost performance (Salter and Torbett, 2003). The cost of a project does not only comprise of the tender sum but also, the cost from inception to completion. Project cost performance usually arise from comprehensive site investigation aided in profound efficient planning which successively clarify the scope. The difference between the actual cost of project and the budgeted cost of project is called the cost variance and it is a good measure of project

success (Georgy et al. 2005). The overall cost of a construction project is affected by the contractor's ability to effectively plan resources, estimate, budget and control cost (Gyadu-Asiedu et al., 2013). These processes are classified as project cost management which is a major component of project management as it aids in controlling and improving cost performance. Project cost management helps in ensuring that the project is kept within the confines of the budget. Hence poor cost management may lead to project cost overruns. Most often, cost management is used synonymously with cost control. However, Godey (1994), indicated that, cost management differs from cost control as cost management is a proactive process that focusses on the elimination of waste in business processes.

According to Jha (2011), construction project cost management can be categorized into four major phases. This include resource planning schedules, cost planning, cost budgeting and cost control. According to the PMI (2000), the project cost management process comprises of the following steps; planning, estimating, budgeting, financing, managing and controlling costs within approved budget. However, Pereira and Imriyas (2010), developed an integrated project cost management scheme as shown in figure 2.1. This system comprised of the sub-systems and the interactions between them.

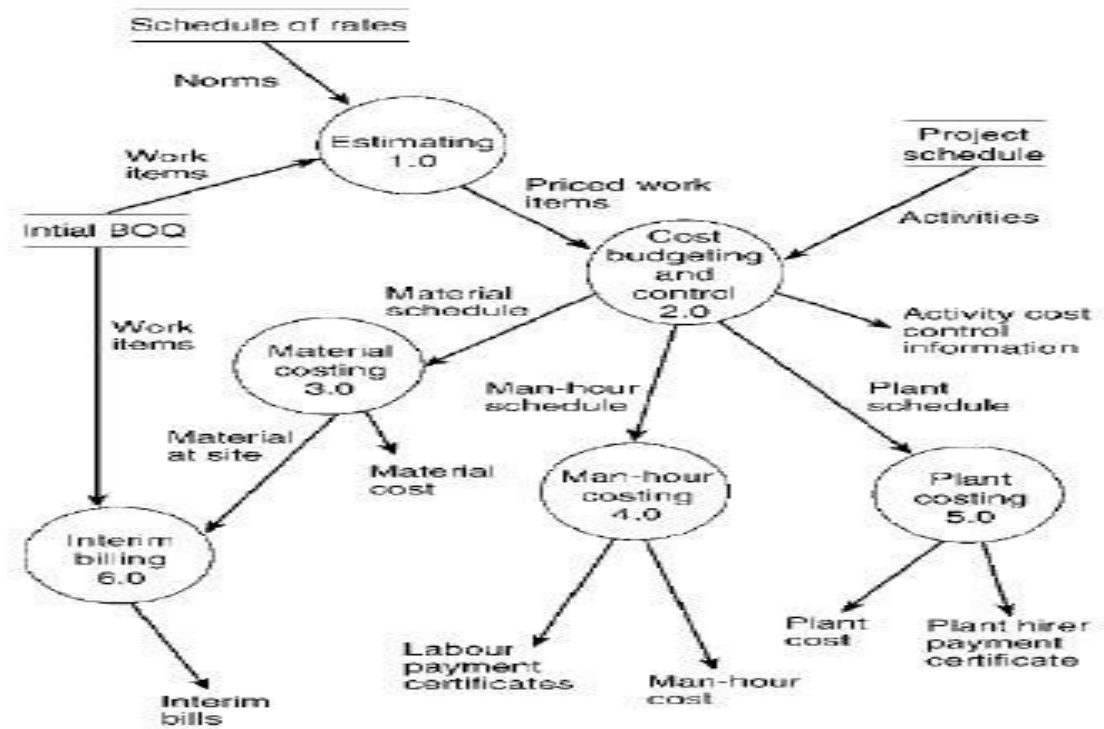


Figure 2.1: Data flow diagram for a cost management system

Source: Pereira and Imriyas, (2010).

From the framework, it is observed that, the schedule of rates is used in preparing the project estimates which then subsequently used in cost budgeting and cost control. The integrated process ensures that the entire project cost is effectively managed to improve on cost performance. However, Cindrela and Ananthanarayan (2017), indicated that, there are too many complexities in construction projects which does not allow the effective management of the cost of a project. Hence most projects face issues of cost overruns mostly caused by scope creep, construction delays, rework and practices of awarding the contract to the lowest evaluated bidder.

The cost of a real estate construction project can be categorized into four (4) main parts (Gao,2009). The first part is the cost of land whiles the second part is the construction cost which covers. The third part is the cost for equipment and machines to meet operation needs, management and maintenance and the final part consists of other cost

including the cost for investigation and design, the cost for project supervision and management cost. All these cost need to managed effectively to ensure that the project is executed within the constraints of budget.

2.5 COST MANAGEMENT PRACTICES

Godey (1994), indicated that, effective cost management consist of the following six steps:

1. Understanding the causes of cost and revenue structure of an organization.
2. Reduction of inter-functional complexities.
3. Provision of effective tools for cost management.
4. Involve employees in decisions.
5. Increase effectiveness and continuously improve cost and
6. Measure decisions against the strategic business plan.

Ashworth (2004), categorized cost management into three (3) broad concepts. These are cost planning, cost estimating/budgeting and cost control. Cost planning is best executed at the time when strategizing construction project cost at the initial stage of a project (Corbett and Rowley, 1999). Cost estimating/budgeting is done during the tendering stage of a project by the construction firm whiles cost control is executed during the construction phase of a project. This section discusses the various practices that are executed at each phase of cost management.

2.5.1 Cost planning

Cost planning can be described as the effective assessment of the cost a project. According to Ashworth (2004), cost planning can lead to cost-effectiveness and value for money during the design stage. Cost planning is an essential technique that helps the client's consultant to prepare adequate budgets to identify the client's financial

commitments for the project. Ostrowski (2013), postulated that, a good cost planning system should ensure that, the tender price is close to the first estimate, or that any likely difference between the two is anticipated. The following are cost planning practices used in the construction industry.

2.5.1.1 Elemental

Ashworth (2004), described the elemental cost analysis as a systematic breakdown of cost data into pre-determined elements. An element can be described as a significant part of a building, which performs the same function irrespective of its location or specification (Kirkham, 2007). This system of cost planning is very popular as it aids in monitoring cost at every stage of the project.

2.5.1.2 Comparative

Ashworth (2004), opined that, comparative cost planning is adopted to estimate the cost of a project using a known project cost of similar nature. Thus, this form of cost planning is based on the experience of the estimator and accuracy of cost data used. Comparative cost planning is a very popular form of cost planning tool used in the construction industry.

2.5.1.3 Functional

The functional method basically relies on monetary rates applied to a unit commensurate with the function of the building (Ashworth, 2004). This is can be applied to examine the component costs of a product in relation to the value as perceived by the customer.

2.5.1.4 Lifecycle cost

Ashworth (2004), described Lifecycle cost analysis (LCCA) as the process of estimating the overall cost of project alternatives to select a design that ensures that, the

facility provides the lowest overall cost of ownership consistent with its quality and function. Hence, LCCA is ideally performed at the early stages of the design phase of a project.

2.5.1.5 Superficial area

Berthouex (1972) described the superficial area method as a method that involves the use of the area of each floor measured from the internal dimensions of the building with no deductions made for internal walls, stairs and lift zones and subsequently compared to the previous similar building cost per square meter. Adjustments can be made for location and price increases (Brook, 1998).

2.5.1.6 Unit cost

This method of cost planning involves the selection of a standard unit of accommodation and multiplying by an appropriate cost per unit. For instance, hospital-cost per bed, school-cost per pupil, car parks-cost per car space (McNeil and Hendrickson, 1982). According to Brook (1998), this method is usually used by national bodies such as educational and health services at the inception stage of construction.

2.5.1.7 Cubic

The cube method is based on cubic volume of a building and is obtained by multiplying the length, width and height (external dimensions) of each part of the building. A single cost rate applied to the internal volume of a building (Ashworth, 2004).

2.5.2 Cost estimating and cost budgeting

The construction cost estimate basically deals with the cost of resources required to completely execute the activities of a project (PMI, 1996). The following are tools that can be adopted for cost estimating/budgeting.

2.5.2.1 Analogous estimating

This is a form of estimating that relies heavily on the experience of the estimator (Ashworth, 1994). Analogous estimating is done by using the actual cost of a previous, similar project as the basis for estimating the cost of a current project. This form of estimating is normally used when there is limited information on the current project (PMI, 1996).

2.5.2.2 Parametric estimating

Parametric estimation are estimates that are based on parameter costs. Parametric estimating is common with building construction projects. This method of estimating uses the total cost of a project against a few physical measures that reflect the scope and size of the project. For instance, the gross internal floor area. Barrie and Paulson (1992), opined that, the parametric cost estimating is a useful tool if there is a good historical data on similar structures.

2.5.2.3 Detailed estimating

According to PMI (1996), the detailed cost estimating is a technique that involves estimating the cost of individual work items. This form of cost estimation assumes that, skills, labor-hours and materials can be identified for each work element (Stewart, 1991). The addition of indirect cost, plant and equipment, home-office overhead, profit, escalation and contingency will develop the total estimated project cost (Barrie & Paulson, 1992).

2.5.3 Cost control

2.5.3.1 Variance

Variance involves comparing actual project results to planned results. 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 greater 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).

Basically, variances can be categorized in four (4) different kinds. They are material cost variance, labor cost variance, sales variance and overhead variance.

Material cost variance: This denotes the difference between the actual cost and the standard cost of a material. In analyzing material variance, the material prices can be used as well as the material usage and material mix.

Labor cost variance: This is the difference between the actual wages paid and the standard direct wages budgeted. In analyzing the labor cost variance, the wage rate can be used as well as the labor efficiency.

Sales variance: This is the difference between the actual cost and the standard cost budgeted. With the sales variance, there are four different kinds which are the mix, quantity, volume and price variance.

Overhead variance: This depicts the difference between the actual overhead cost and the standard overhead cost absorbed. The forms of overhead variance are the overhead expenditure and the overhead efficiency variance.

2.5.3.2 Earned value

In project, the progress measurement of a project can be done using earned value. Earned value gives a standard unit of measure for reporting the progress of a project (Wilkins, 1999). It is the combination of cost and time on a personalized basis which involves the work separated into Work Breakdown Structure (WBS). Hence, in ascertaining the earned value, the completed activities are subsequently based on the budgeted value of the completed work segments (Harrison, 1992). Oberlender (1993), indicated that, earned value is used to define overall percentage complete for the whole project. Earned value can be calculated using the following equation.

Earned value = (percent complete) x (budget for the account). Performance against schedule is a comparison of what was planned against what was done. Thus, a comparison of budgeted against earned.

2.5.3.3 Cash flow/S-curve

Cash flow can be described as the transfer of money into or out of the company (Harris & 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 while the outflows represent payments made or expenditure incurred (Ahuja, et al., 1994). According to Harris & McCaffer (1995), cash flow aids in making provisions for difficult times before they arrive.

According to Ritz (1994), the shape of the curve follows the project life-cycle bell curves

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.

2.6 CHALLENGES IN COST MANAGEMENT

There are numerous challenges that hinder the effective management of cost in real estate projects. Some of these challenges are discussed as follows;

2.6.1 Unrealistic estimate

The investment estimation for real estate projects are done at the feasibility stage of the project. At the feasibility stage, there are numerous uncertainties that affect the accuracy of the estimate provided. Odusami & Onukwube (2008), opined that, the lack or inadequacy of quality information at the early stages of a project affects the quality of the estimate given. Furthermore, Gao (2009), indicated that, at the feasibility stage,

factors that may increase or decrease the cost of project are not easily ascertained and hence, the precision of the cost estimate is drastically affected.

2.6.2 Poor reliability of project budget

At the design stage of a real estate project, there is inadequate project investigation and thus, some basic materials for the design are inaccurate (Gao, 2009). Hence the design may be irrational leading to numerous changes. Consequently, the budget that are estimate are not reliable. Oladokun et al. (2011), conducted a study in Nigeria and the outcome of the study showed that, the size of the project and the sector of the project affects the cost estimate and consequently affects the management of the cost. Unreliable cost estimates inevitably lead to challenges during cost management.

2.6.3 Unpractical working drawing budget

The working drawing budget is the estimation of the cost of design to given an estimate of the cost of the entire project. Hence the working drawing budget includes the organization of the construction and how to reach the design requirements, the construction methods to adopt and the project schedule, how to manage workers and equipment according to scientific processes (Gao, 2009). Therefore, for all these tasks to be executed by only design organizations may lead to unrealistic budgets and consequently affects the cost management process.

2.6.4 Poor management of subcontractors and other external workers

Most real estate developers have inadequate experience to manage subcontractors and external workers effectively (Gao, 2009). He indicated that, they do not strictly follow the terms written in the contract document governing subcontractors and other external workers. Hence, managing the cost involved becomes problematic and affects the whole project cost management process.

2.6.5 Numerous change orders

According to Gao (2009), real estate developers do not have the capabilities to produce a very accurate design and hence, there are numerous change orders during the course of the project. However, Osman et al. (2009), indicated that, one of the major effects of change orders is the increase in cost of the project. Aluaumi (2010); Arain & Pheng (2005) had similar assertions. Therefore, real estate projects are challenged in terms of effectively managing cost due to the number of change orders made.

2.6.6 High interest rates on funds from financial institutions

It has been established that, funds for real estate projects are normally sourced from financial institutions in the form of loans. The long credit periods which leads to large interest rates which does not match the investment return increases risk and hence the cost of the project. Gao (2009), indicated that, the high interest rate on loans affects the effective management of cost for real estate projects

2.6.7 Unscientific cost management process

Song (2014) attested that most proprietors have little degree or no knowledge on how cost is being managed and this impedes the practice of controlling of cost. In the usage of old method or practices in relation to management of cost in projects, the challenge is that these old practices cannot be applied to solve current situation in the real world. Therefore, Song (2014) indicated that, the usage of out of date techniques and ideas without continuously upgrading them do not assist in the practice of cost control. Also, it is very necessary for cost managers to develop a cost control template for every project. However, most managers are not prepared to do that because it takes much time in formulating a cost control template. Furthermore, only aspects of construction projects likely to experience cost variance is attended to. A helpful way is by the establishment of a template with structured procedures for managers in the corporate

world at all levels. Cost control should be looked into repeatedly and not once. This connotes that cost management for delivery of construction projects especially controlling of cost should be simplified (Adjei et al., 2015).

2.7 STRATEGIES TO IMPROVE COST MANAGEMENT

2.7.1 Adopt the use of scientific cost management tools

Song (2014), attested that, most construction managers overlook the methods involved in controlling of cost during the construction phases. The process involved in controlling of cost of projects should be active all the time and operational as well and not with series of records of cost only but the propensity of subsequent committees involved in cost control of the project as affirmed by Bahaudin et al., (2012). Furthermore, the commitment into management of cost methods by most contractors is very poor as it is considered as a waste of money to the firm although it could save the organization huge sums of money with the practice of cost control.

2.7.2 Regularize the process of design change orders

Design is the very important for cost control and cost management in real estate construction. Therefore, it is necessary to select a design company carefully, checking its quality, experience, and general competence. By following the principle of convenience, select reasonable design indexes and control construction cost. Select the scheme properly and optimize the design to decrease the investment cost. Strengthen contracts management and supervise subcontracts and external workers. Control the changes of design strictly. Build a system for changing designs which will effectively sets limits in the number of change orders.

2.7.3 Decrease the dependency on financial institutions for funds

Investors must decrease their dependency on financial institutions for funds. Gao (2009), indicated that, investors must further enlarge their financing channels. They must explore other suitable financing channels such as assets reengineering, stock financing, issuing corporate debts, short-term financing, BOT, auction, listing in market etc.

2.7.4 Attain accurate cost information

The accuracy of cost information used for cost planning has a high effect on the accuracy of the cost plan. According to Toor & Ogunlana (2008), the accuracy of historical cost information determines the accuracy of the final estimate. Furthermore, all the cost planning methods available relies of historical data. Therefore, the accuracy of cost information is very key in improving the effectiveness of cost planning practices.

2.7.5 Usage of qualified and experienced project team

Knowledge and experience is a vital tool in every construction organization to be competitive in the construction sector (Martin 2010; Ademola, 2012). The knowledge of cost planning can be regarded as technical and managerial knowledge and the lack of it affects the whole practice (Ademola, 2012). Lack of knowledge in the use of the cost planning process affects the effectiveness of the entire cost planning process.

2.7.6 Selection of a suitable procurement method

The suitability of a procurement system depends largely on the nature of the project. If a suitable procurement system is selected for a particular project, it will affect the general cost management procedures adopted. Hence it is crucial for project managers to adopt the most suitable procurement method for a particular project.

2.7.7 Clear definition of scope

The scope of a project can be defined as all the features and functions that are to be included in a product or service (PMI, 2000). Clearly defining project scope eliminates any uncertainty surrounding the nature of the project. This in turn clears any assumptions that are made during the estimation of a real estate project.

2.8 SUMMARY OF CHAPTER

The real estate industry is a significant contributor to a countries infrastructural development. However, the high cost of building inputs coupled with low investment opportunities creates the need to effectively manage the cost of real estate projects. Therefore, this chapter reviewed literature pertaining the real estate industry and cost management. The review begun with an overview of the Ghanaian construction industry followed by an overview of the real estate industry in Ghana. The concept of cost management was subsequently reviewed which led to the review of cost management practices. Finally, a review was conducted on the challenges and strategies in dealing with ineffective cost management.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 INTRODUCTION

Research methodology is a crucial part of a research that is used in disclosing the various steps of research executed by the researcher as to solve the research problem. For every study, it is significant to follow logical approaches in solving the research problem. This ensures the reliability of the results gotten out of the study. The research methodology consisted of discussion on research strategy, research method, research approach, data collection method and tools, population, sample size, sampling technique, research process, data analysis and ethical considerations.

3.2 RESEARCH DESIGN

The research design basically aids to analyze the research objectives by using certain research methods. This section provides a brief description of the seven (7) research strategies namely; experimental, action, case study, grounded, survey, ethnography and archival.

The experimental research basically involves the examination of a limited number of variables and the connection between the factors are analyzed and interpreted with regards to the expected research outcome. Action research requires that the researcher works with practitioners (Bradbury-Huang, 2010). Hence, this form of research is done in life working environment to improve on systems of those involved in the process. Case study research aids researchers to make explore deeper into a particular theory using specific setting. Ethnographic research is a study concentrated on specific entity or group within their own working environment through the use of observations or face-to-face interviews.

Grounded research is a systematic and qualitative which fundamentally follows the inductive research approach whereby data of a certain study derives a pattern as a precondition. For instance, data of an interview can be transcribed and coded according to the factors they are usually exhibited among respondents. The survey research basically gives a description of what exists, its quantum and specific context. For survey research, a portion of a population is used to make a generalization for the entire population. Archival research fundamentally establishes results using historical or existing studies. Hence, archival research is also referred to as historical research.

The study identifies the survey research design as the most suitable research strategy for this study. Kraemer (1991) described three (3) distinguishing features of survey research. First, survey research describes specific aspects of a population. Secondly, the data needed for the research are collected from people hence making it subjective. Lastly, survey research uses a selected portion of the population from which the outcome can be generalized for the population. The study followed all the three (3) features in achieving the three (3) objectives of the study and thus, making survey research strategy the most suitable.

3.3 RESEARCH METHOD

The fourth layer of the onion ball describes the research choices which consist of three (3) elements namely: Mono method, mixed method and multi method.

The mono method uses only one method. Thus, either quantitative or qualitative method. The quantitative method basically carries single or multiple variables that can be measured by applying appropriate analytical tools. The quantitative method is mostly objective and measures reality. Furthermore, the outcome of quantitative research may be predictive, explanatory or confirming. Leedy and Ormrod (2001),

opined that, quantitative research method is more suitable for survey and experimental research strategies. The qualitative research method is mostly involving the use of data collection techniques that cannot be measured with numbers. Results are based on interpretations and analysis by the researcher as no statistical tools can analyze qualitative data. Carrie (2007), indicated that, qualitative research method is mostly adopted for studies that involves discovery. Qualitative research method can also be described as an effective model of researching that enables the researcher to develop a level of detail by being highly involved in the actual experiences (Creswell, 2003).

The mixed research method is used for research where it neither be fully qualitative or quantitative and hence a mixed method is adopted where there is mixture of the two distinct approaches (Ashwin, 2011). The mixed method is seen to draw from the strengths of quantitative and qualitative research methods and limits their weaknesses.

A multi method study uses more than one method study. Moreover, multi methods are easily understandable when it is well differentiated from mixed method as mixed method is the integration of quantitative and qualitative methods whiles multi method research is the use of multiple quantitative or qualitative methods.

For this study, the quantitative research method was adopted under mono method. This study adheres to the features of a quantitative study as statistical tools was used for the analysis. Also, the researcher did not influence or interfere with the opinion of the respondents hence objective conclusions could be made from the data collected.

3.4 RESEARCH APPROACH

The research approach basically looks at how the research study should be executed to reach conclusion. There are two (2) main approaches in conducting studies. They are the deductive and inductive approach.

The deductive approach mainly works on predefined hypothesis and conclusions. Gabriel (2013), indicated that, the deductive research approach is used by the researcher when aimed at testing a theory and basically begins with a hypothesis. Conventionally, the deductive research approach moves from the general to the specific as it involves the movement from broader generalizations and theories to specific observations (Burney, 2008). On the other hand, the inductive research approach is related to the formulation of hypothesis and getting results. The inductive research is basically involved in the formulation of theories. The inductive research approach moves from the specific to make generalizations and theories (Burney, 2008).

This study is aimed at assessing the challenges of cost management by contractors in the Ghanaian real estate industry. It is established that, cost management practices are hindered by various barriers which mostly leads to cost overruns. However, the study is concerned with assessing the significant challenges in the Ghanaian real estate industry so as to make proposals for its effective application. Therefore, the deductive research approach is deemed suitable as the study moves from the general to the specific as it involves the movement from broader generalizations (general challenges) and theories to specific observations (significant challenges) to make strategic recommendations.

3.5 RESEARCH POPULATION

According to Bryman (2004), a population of a study comprise of the universe of units in which a sample is chosen. The population for this study were project managers within the Greater Accra Region. The Accra metropolis is concentrated with numerous Real Estate construction projects; hence it was deemed a good location to collected data on the subject area.

3.5.1 Sample size

The exact number of these project managers could not be ascertained due to the lack of information from the registry department. In such situations, non-probability sampling techniques are employed to aid in reaching the required respondents. According to Ross (2005), the selection of an appropriate sampling technique is very important in research studies as it helps in executing a comprehensive study to gather data that be generalized for the whole population.

3.5.2 Sampling Technique

The purposive sampling technique was utilized in reaching the needed respondents. Bryman (2004), described sampling technique as the process from which an entity from the sample frame is selected to reflect the whole population.

The purposive sampling technique was deemed suitable as only project managers who have worked on real estate projects were sort for. This category of project managers has the requisite knowledge in cost management for real estate projects due to their prior experience. Using the purposive sampling technique sixty-two (62) questionnaires were distributed however, fifty-four (54) were retrieved for the analysis. This represents a response rate of 87.10%. According to Spector (2006), a sample size of thirty (30) is satisfactory for survey researches hence, fifty-four (54) was deemed adequate.

3.6 DATA COLLECTION METHOD AND TOOLS

According to Spector (2006), a questionnaire survey is an efficient tool for collecting data from respondents. The questionnaire had four (4) sections. The first section of the questionnaire concentrated on the background of the respondents. The respondents were asked to indicate their number of years of experience, highest level of education and finally rate their knowledge on cost management processes for real estate projects.

The section B of the questionnaire focused on the first objective of the study. The respondents were asked to indicate the cost management practice that is used often by their construction firm when executing real estate projects using a five-point Likert scale of “1 = *Not often*; 2 = *Slightly often*; 3 = *Moderate*; 4 = *Often*; 5 = *Very often*”. The section C focused on the second objective in which the respondents were asked to indicate the challenges that occurs often in the use of cost management in your construction firm when executing real estate projects using the same Likert scale as before described. The last section focused on the third objective of the study where the respondents were asked to indicate the applicability of the strategies in the improvement of cost management when executing real estate projects using a five-point Likert scale of “1 = *Not applicable* 2 = *Slightly applicable* 3 = *Moderate* 4 = *Applicable* 5 = *Very applicable*”

The questionnaire was administered online so as to reach project managers with ease. Using the purposive sampling technique sixty-two (62) questionnaires were distributed however, fifty-four (54) were retrieved for the analysis. This represents a response rate of 87.10%.

3.7 DATA ANALYSIS TECHNIQUES

The collected data were scrutinized to ensure that all data were complete prior to the analysis. The data were coded to enable SPSS to suitable accept the data for analysis. The Statistical Package for Social Scientist (SPSS) version 20 was utilized as the platform for the data analysis. After the coding into the SPSS software, the descriptive analysis and one-sample t-test was used to analyze the data. The descriptive analysis was used in the analysis of the background of the respondents. Under the descriptive analysis, percentages were used to give an indication of the quantum for each category. The one-sample t-test was used to ascertain the significance of the various variables

identified for each objective. A similar approach was used in a study conducted by Ahadzie et al., (2007). The analyzed data were presented in the form of tables.

3.8 ETHICAL CONSIDERATIONS

Ethical consideration is one of the most significant parts of a research. Bryman and Bell (2007) described some principles of ethical considerations. These are discussed as follows;

Those involved in the study must not be subjected to any form of harm (Bryman and Bell, 2007). Also, information discovered through research should not be used to harm people. There must be a high degree of respect for the dignity of research participants.

Furthermore, full consent should be obtained from the research participants before commencement. Fisher (2007), regarded informed consent as a key issue in research ethics. He stated that, anybody used as a source of information for research must agree and have a complete understanding of what they are being involved in and its purpose. There must also be a full protection of the privacy of the research participants and an adequate level of confidentiality of the research data. This may also include anonymity of individuals and organizations involved in the research. Furthermore, communication in relation to the research should be done with honesty and transparency. Lastly, it is very important for the research to avoid unnecessary exaggeration of the purpose of the study as any form of misleading information is seen as unethical.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION

4.1 INTRODUCTION

This chapter concentrates on the analysis and discussion of the data collected from the respondents. The respondents for this study were purposively selected and they included project managers who have been involved in real estate projects. Fifty-four (54) questionnaires were used for the analysis. The first part of the analysis concentrated on the background of the respondents where percentages were used in the data analysis. The subsequent part of the analysis concentrated on the objectives of the study which were to identify the significant cost management practices used by contractors in real estate projects in Ghana, to identify the challenges faced by contractors in cost management in real estate projects in Ghana and to identify the significant strategies that can be adopted by contractors to improve cost management in real estate projects in Ghana. The data collected on the objectives were analyzed using the one-sample t-test. The discussion of the results was facilitated using tables. This chapter concluded by providing a summary on the findings.

4.2 BACKGROUND OF THE RESPONDENTS

The background of the respondents is a significant component of every data analysis as it shows the demographic nature of the respondents. For this study, the respondents were asked to indicate their profession, level of education, level of experience and their level of knowledge on the subject area. A summary of the responses is shown in Table 4.1.

Table 4.1: Background of the respondents

DESCRIPTION	FREQUENCY	PERCENTAGE
Profession		
Quantity surveyor	18	33.30
Contractor	25	46.30
Civil engineer	5	9.30
Architect	6	11.10
Level of education		
HND	6	11.10
BSC	34	63.00
Postgraduate	14	25.90
Years of experience		
1-5 years	9	16.70
6-10 years	16	29.60
11-15 years	16	29.60
16-20 years	13	24.10
Over 20 years	0	0.00
Level of knowledge		
No knowledge	4	7.40
Medium	34	63.00
High knowledge	16	29.60

Source: Author's construct, (2019)

4.2.1 Respondents profession

The first question required that the respondents indicate their profession in the construction industry. The difference in profession leads to difference in opinion among

the respondents. Therefore, it was necessary to get an idea about the various professionals who responded to the questionnaire. From Table 4.1, 33.30% were Quantity Surveyors, 46.30% were Contractors, 9.30% were Civil Engineers and 9.30% were Architect.

4.2.2 Level of education

The respondents were also asked to indicate their highest level of education. This aided the researcher to ascertain the level of reliability of the responses based on their educational level. With education comes knowledge hence, higher levels of education indicate higher level of knowledge. From Table 4.1, 11.10% had HND, 63.00% had BSC and 25.90% had postgraduate degree. Hence, over 70% of the respondents had higher levels of education to depict higher knowledgeability.

4.2.3 Years of experience

Similar to education, higher number of years of experience depicts higher level of knowledge. Hence, the respondents were asked to indicate their level of experience in their profession. Based on their responses, 16.70% had 1-5 years, 29.60 had 6-10 years, 29.60 had 11-15 years and 24.10 had 16-20 years of experience. However, none of the respondents had above 20 years of experience. In general, over 60% of the respondents had more than six (6) years of experience.

4.2.4 Level of knowledge

Finally, the respondents were asked to rate their level of knowledge on cost management in real estate projects. From the responses, all the respondents had a level of understanding on project cost management. The background of the respondents was satisfactory for further analysis to be conducted on the data collected.

4.3 ONE- SAMPLE T-TEST ANALYSIS

This section analyzes and discuss the data collected pertaining to the three (3) objectives of the study. Their responses were analyzed using the one-sample t-test. For each variable, the mean must be greater than or equal to 3.5 for it to be deemed as significant at a confidence level of 95% as used in numerous constructions related studies (Ling 2002; Ahadzie et al., 2008; Kissi, 2013). The tables presented for the one-sample t-test shows the means, standard mean error and significance level. The standard error was described by Field (2005), as the standard deviation of sample mean. It gives an indication of how the sample represents the population. Standard errors closer to zero (0) depicts a low variability between the sample and population mean and vice versa.

4.3.1 Cost management practices in real estate projects

The overall cost of a construction project is affected by the contractor's ability to effectively plan resources, estimate, budget and control cost (Gyadu-Asiedu et al., 2013). These processes are classified as project cost management which is a major component of project management as it aids in controlling and improving cost performance. There are three (3) components of project cost management namely, cost planning, cost budgeting and cost control. There are a number of different practices that are done at each phase of project cost management. For this study, the respondents were asked to indicate the cost management practice that is used often by firms when executing real estate projects.

From Table 4.2, it can be realized that, the superficial area method was the only significant tool among cost planning with a mean of 3.78. This indicates that, the superficial area method is the frequently used cost planning tool among real estate project managers. Berthouex (1972) described the superficial area method as a method that involves the use of the area of each floor measured from the internal dimensions of

the building with no deductions made for internal walls, stairs and lift zones and subsequently compared to the previous similar building cost per square meter.

Also, with cost budgeting and estimating, the detailed estimating method was the only the significant tool rated by the respondents. Thus, detailed estimating method is the most used cost budgeting/estimating tool among real estate project managers. According to PMI (1996), the detailed cost estimating is a technique that involves estimating the cost of individual work items. This form of cost estimation assumes that, skills, labor-hours and materials can be identified for each work element (Stewart, 1991).

Finally, at the cost control phase, the project managers indicated that, the cash flow method is the most frequently used tool during real estate projects. From Table 4.2, it had a mean of 3.56 and a standard mean error of 0.169. Cash flow can be described as the transfer of money into or out of the company (Harris & McCaffer, 1995). The cash flow aids the contractor in determining the economic feasibility of the construction project. 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.

Table 4.2: Frequency of usage of cost management practices

Cost management practices	Mean	Std. Err.	Sig (1-tailed)	Rank
Cost planning				
Elemental	3.24	0.187	0.086	3 RD
Comparative	3.26	0.161	0.07	2 ND
Functional	3.00	0.175	0.00	6 TH
Life cycle cost	3.11	0.166	0.01	5 TH
Unit cost	3.17	0.173	0.03	4 TH
Superficial area	3.78	0.151	0.01	1 ST
Cost estimating and cost budgeting				
Analogous estimating	3.06	0.178	0.00	3 RD
Parametric estimating	2.89	0.188	0.00	4 TH
Detailed estimating	3.91	0.152	0.00	1 ST
Cash flow/S-curve	3.24	0.167	0.06	2 ND
Cost control				
Variance	3.06	0.180	0.01	3 RD
Earned value	3.15	0.172	0.02	2 ND
Cash flow/S-curve	3.56	0.169	0.37	1 ST

Source: Author's construct, (2019)

4.3.2 Challenges associated with cost management practices in real estate projects

There are numerous challenges that hinders the effective management of cost in real estate projects. The respondents were asked to rate the challenge that occurred often in the use of cost management during real estate projects. Their responses were analyzed using the one-sample t-test. A summary of the analysis is shown in Table 4.3.

From the analysis, the most frequently occurring challenge was poor reliability of project budget. At the design stage of a real estate project, there is inadequate project investigation and thus, some basic materials for the design are inaccurate (Gao, 2009). Hence the design may be irrational leading to numerous changes. Consequently, the budget that are estimate are not reliable. This affects the overall accuracy of the cost plan consequently affecting cost management. The respondents deemed it as the most occurring challenge with a mean of 3.93.

The second ranked challenge was unpractical working drawing budget. The working drawing budget is the estimation of the cost of design to give an estimate of the cost of the entire project. Hence the working drawing budget includes the organization of the construction and how to reach the design requirements, the construction methods to adopt and the project schedule, how to manage workers and equipment according to scientific processes (Gao, 2009). Hence, if the working drawing budget is prepared by only designers, it may lead to the production of unrealistic budgets and consequently affect the cost management process.

The third ranked challenge was unrealistic estimate. Odusami & Onukwube (2008), opined that, the lack or inadequacy of quality information at the early stages of a project affects the quality of the estimate given. Furthermore, Gao (2009), indicated that, at the feasibility stage, factors that may increase or decrease the cost of project are not easily

ascertained and hence, the precision of the cost estimate is drastically affected. Project estimates affects project budget and consequently, the cost management.

Table 4.3: Challenges associated with cost management practices

Challenges	Mean	Std. Err.	Sig (1-tailed)	Rank
Unrealistic estimate	2.76	0.196	0.00	3 RD
Poor reliability of project budget	3.93	0.095	0.00	1 ST
Unpractical working drawing budget	3.87	0.144	0.00	2 ND
Complex contractual terms	3.54	0.141	0.40	8 TH
Poor management of subcontractors and other external workers	3.70	0.156	0.08	5 TH
Numerous change orders	3.46	0.166	0.41	9 TH
High interest rates on funds from financial institutions	3.72	0.186	0.09	4 TH
Unscientific cost management process	3.22	0.186	0.07	10 TH
Inexperienced project manager	3.17	0.186	0.04	11 TH
Frequent changes in prices	3.57	0.188	0.35	7 TH
Unsuitable procurement system	3.11	0.183	0.02	12 TH
Frequent tax rate changes	3.63	0.184	0.242	6 TH

Source: Author's construct, (2019)

Finally, the fourth ranked challenge was high interest rates on funds from financial institutions. It has been established that, funds for real estate projects are normally sourced from financial institutions in the form of loans. The long credit periods which

leads to large interest rates which does not match the investment return increases risk and hence the cost of the project. Gao (2009), indicated that, the high interest rate on loans affects the effective management of cost for real estate projects.

4.3.3 Strategies to improve the effectiveness of cost management practices for real estate projects

From the review of literature, nine (9) strategies were identified. The respondents were asked to rate the applicability of the strategies in the improvement of cost management when executing real estate projects. Their responses were analyzed using the one-sample t-test. A summary of the analysis is shown in table 4.4.

From the analysis, the first ranked factors were the use of qualified and experienced project team and given a clear definition of scope. Knowledge and experience is a vital tool in every construction organization to be competitive in the construction sector (Martin 2010; Ademola, 2012). The knowledge of cost planning can be regarded as technical and managerial knowledge and the lack of it affects the whole practice (Ademola, 2012). Lack of knowledge in the use of the cost planning process affects the effectiveness of the entire cost planning process. Clearly defining project scope eliminates any uncertainty surrounding the nature of the project. The scope of a project can be defined as all the features and functions that are to be included in a product or service (PMI, 2000). This in turn clears any assumptions that are made during the estimation of a real estate project. Hence, the respondents ranked it among the most applicable strategy in real estate projects.

The third ranked factor was the adoption of suitable procurement system for specific contracts. The suitability of a procurement system depends largely on the nature of the project. If a suitable procurement system is selected for a particular project, it will affect

the general cost management procedures adopted. Hence it is crucial for project managers to adopt the most suitable procurement method for a particular project.

The fourth ranked factor was the usage of appropriate management tools. Song (2014), attested that, most construction managers overlook the methods involved in controlling of cost during the construction phases. The process involved in controlling of cost of projects should be active all the time and operational as well and not with series of records of cost only but the propensity of subsequent committees involved in cost control of the project as affirmed by Bahaudin et al., (2012).

Table 4.4: Strategies to improve cost management

Strategies	Mean	Std. Err.	Sig (1-tailed)	Rank
Adopt the use of scientific cost management tools	3.76	0.171	0.07	7 TH
Regularize the process of design change orders	3.74	0.135	0.04	8 TH
Decrease the dependency on financial institutions for funds	3.43	0.192	0.35	9 TH
Attain accurate cost information	4.11	0.162	0.00	5 TH
Usage of qualified and experienced project team	4.31	0.139	0.00	1 ST
Clear definition of project scope	4.31	0.139	0.00	1 ST
Cost management practices added as contractual requirement	3.80	0.172	0.05	6 TH
Adoption of suitable procurement system for specific contracts	4.13	0.150	0.00	3 RD
Usage of appropriate cost management tool	4.13	0.137	0.00	4 TH

Source: Author's construct, (2019)

Finally, the fifth ranked factor was the attainment of accurate cost information. The accuracy of cost information used for cost planning has a high effect on the accuracy of the cost plan. According to Toor & Ogunlana (2008), the accuracy of historical cost information determines the accuracy of the final estimate. Furthermore, all the cost planning methods available relies of historical data. Therefore, the accuracy of cost information is very key in improving the effectiveness of cost planning practices.

4.4 CHAPTER SUMMARY

This chapter analyzed and discussed data with the aid of mathematical tools for analysis and tables for displaying results. The data collected were analyzed using percentages and one-sample t-test. Fifty-four (54) questionnaires were used for the analysis. The first part of the analysis concentrated on the background of the respondents where percentages were used in the data analysis. The subsequent part of the analysis concentrated on the objectives of the study. The respondents background was satisfactory to continue further analysis on their responses on the objectives on the study. With the cost management practices, the superficial area method was the frequently used cost planning tool among real estate project managers. Also, with cost budgeting and estimating, the detailed estimating method was the only the significant tool rated by the respondents. Finally, at the cost control phase, the project managers indicated that, the cash flow method is the most frequently used tool during real estate projects. With the challenges associated with cost management practices in real estate projects, the most frequently occurring challenge was poor reliability of project budget. This was followed by unpractical working drawing budget. The third ranked challenge was unrealistic estimate and finally the fourth ranked challenge was high interest rates on funds from financial institutions. With the strategies to improve cost management, the first ranked factors were the use of qualified and experienced project team and given

a clear definition of scope. The third ranked factor was the adoption of suitable procurement system for specific contracts. The fourth ranked factor was the usage of appropriate management tools. Finally, the fifth ranked factor was the attainment of accurate cost information.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter is the final chapter of the study and it provides a summary of how the objectives were achieved, provides conclusion and give recommendations. The study aimed at exploring the challenges of cost management by project managers in the Ghanaian real estate industry. With this aim, three (3) objectives were established which were to identify the significant cost management practices used by project managers in real estate projects in Ghana, to identify the challenges faced by project managers in cost management in real estate projects in Ghana and to identify the significant strategies that can be adopted by project managers to improve cost management in real estate projects in Ghana. Literature review was conducted on the objectives to identify relating variables to aid in the development of an instrument for the study. The study adopted a quantitative research method informed the use of a structured questionnaire in the collection of data. After the development and distribution of the questionnaire, fifty-four (54) questionnaires were retrieved for the analysis. The data collected were analyzed using percentages and one-sample t-test. The analysis presentation was done with the aid of tables. The summary of findings is discussed in the next section.

5.2 SUMMARY OF FINDINGS

This section discusses the summary of findings by indicating how each objective was achieved and the outcome of the objective.

5.2.1 Objective one: to identify the significant cost management practices used by project managers in real estate projects in Ghana

In achieving this objective, an extensive literature review was conducted on the various cost management practices. From the review, it was realized that, cost management can be grouped into three (3) categories namely; cost planning, cost budgeting and cost control. Also, from the review, a number of tools were identified for each group. From the outcome of the review, a structured questionnaire was developed in which the respondents were asked to indicate the cost management practice that is used often by firms when executing real estate projects. Their responses were analyzed with one-sample t-test using the SPSS software package. From the analysis, it was realized that, the superficial area method was the frequently used cost planning tool among real estate project managers. Also, with cost budgeting and estimating, the detailed estimating method was the only the significant tool rated by the respondents. Finally, at the cost control phase, the project managers indicated that, the cash flow method is the most frequently used tool during real estate projects.

5.2.2 Objective two: to identify the challenges faced by project managers in cost management in real estate projects in Ghana

In achieving this objective, an extensive literature review was conducted on the various cost management practices challenges. From the review, twelve (12) challenges were identified. From the outcome of the review, a structured questionnaire was developed in which the respondents were asked to rate the challenge that occurred often in the use of cost management during real estate projects. Their responses were analyzed with one-sample t-test using the SPSS software package. From the analysis, it was realized that, the most frequently occurring challenge was poor reliability of project budget. This was followed by unpractical working drawing budget. The third ranked challenge was

unrealistic estimate and finally the fourth ranked challenge was high interest rates on funds from financial institutions.

5.2.3 Objective three: to identify the significant strategies that can be adopted by project managers to improve cost management in real estate projects in Ghana.

In achieving this objective, an extensive literature review was conducted on the strategies to improve cost management practices. From the review, nine (9) strategies were identified. From the outcome of the review, a structured questionnaire was developed in which the respondents were asked to rate the applicability of the strategies in the improvement of cost management when executing real estate projects. Their responses were analyzed with one-sample t-test using the SPSS software package. From the analysis, it was realized that, first ranked factors were the use of qualified and experienced project team and given a clear definition of scope. The third ranked factor was the adoption of suitable procurement system for specific contracts. The fourth ranked factor was the usage of appropriate management tools. Finally, the fifth ranked factor was the attainment of accurate cost information.

5.3 CONCLUSION

Based on the findings, it can be realized that, cost management is a significant process among project management in real estate projects. This improves the cost performance that is realized on the project. With the achievement of the aim and objectives, the study showed that, superficial area method, detailed estimating and cash flow are among the most used cost management practices when performing cost planning, cost estimating and cost control respectively. Furthermore, the study showed that, the most frequently faced challenge in the use of cost management practice in real estate project is poor reliability of project budget. Other significant challenges identified from the study were unpractical working drawing budget and unrealistic estimate. Lastly, from this study, it

was realized that, clear definition of scope and usage of qualified and experienced project team was the most applicable strategies to the improvement of cost management in real estate projects.

5.4 LIMITATIONS AND FURTHER STUDIES

This study had a number of limitations and this created avenue for further studies:

1. The study was limited to only project managers in the Accra metropolis, hence further studies can expand on the scope of the study by including other regions. Also, further studies can do a comparative study on cost management practices among various regions.
2. The study was limited to only quantitative data. There are some data limitations associated with quantitative data, so qualitative data can be used to support the quantitative data used in a form of mixed method.

5.5 RECOMMENDATIONS

Based on the findings of the study, the following recommendations were made;

1. Project managers must explore various options with regards to the tools used for cost management so as to adopt the most suitable approach for every specific project.
2. Project managers must endeavor to continuously keep accurate data on cost in order to enhance their cost planning processes.
3. Project managers must be clear on the scope of the project and also use qualified and experienced personnel on cost management.

REFERENCES

- Ademola, W. O. (2012), Examining a new approach to cost control methods and mechanisms for SMMEs in construction projects, MSc Thesis, University of Johannesburg, South Africa.
- Adjei, K. O., Aigbavboa, C. O. and Thwala, W. D. (2015), Contractors management team roles for project cost control in Ghana In: Mojekwu, J. N., Nani G., Atepor, L., Thwala, W. D., Ogunsumi, L., Awere E., Ocran, S. P., and Bamfo-Agyei, E. (Eds) Procs 4th Applied Research Conference in Africa (ARCA) Conference, 27-29 August 2015, Ibadan, Nigeria.
- Aggarwal-Gupta M., Deepti B. Vohra N. and Khokle P. (2011), Perceived organizational support and organizational commitment: the meditational influence of psychological well-being, "*Journal of Business and Management*", Vol. 20, No.2, pp. 67-96.
- Agyakwa-Baah A., (2007), Stakeholders' perceptions of the causes of delay on construction projects, Vol. 1, pp.1-27.
- Ahuja, H.N., Dozzi, S.P. and AbouRizk, S.M., 1994. Project management: techniques in planning and controlling construction projects. John Wiley & Sons.
- Alnuaimi, A., Taha, R., Mohsin, M. And Alharthi, A. (2010), „Causes, Effects, Benefits, and Remedies of Change Order on Public Construction Projects in Oman', *Journal of Construction Engineering and Management*, 136(5), 615–622.
- 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%20150702.pdf>.

Anim-Odame, W.K., (2010), April. The nascent real estate investment market in Ghana. In Shaping the Change. FIG Congress 2010 Sydney, 11-16 April.

Appau W. M., (2015), Country Brief: The real estate sector in Ghana, its problems and way forward, Department of Real Estate and Land Management, University for Development Studies-Ghana.

Arain, F.M. and Pheng, L.S. (2005), „The Potential Effects of Variation Orders on Institutional Building Projects’. Emerald Group Publishing Limited 0263-2772, 23(11/12), 496 – 510.

Ashwin, M. (2011), The Proceedings of the 10th European Conference on Research Methodology for Business and Management Studies. Academic Conferences Limited. pp. 14-16.

Ashworth A. (2004), Cost studies of buildings, 4TH edition, Longman Publishing.

Ashworth, A. (1994), Cost Studies of Building. Second edition, Longman Scientific and Technical.

Ashworth, A. (1994). “Cost Studies of Building”, Longman Scientific and Technical.

Avots I. (1983), Cost-relevance analysis for overrun control, “*International Journal of Project Management*”, Vol. 1, pp.142-148.

Bahaudin, A. Y., Elias, E. M., Dahalan, H. and Jamaluddin, R. (2012), Construction cost control: A review of practices in Malaysia, the 3rd International Conference on Technology and Operations Management, Sustaining Competitiveness through Green Technology Management, Bandung – Indonesia, July 4-6, 2012.

Bank of Ghana, (2007), The Housing Market in Ghana.

- Barrett, F. Powley, E. and Pearce B. (2011), *Hermeneutic Philosophy and Organisational Theory. Philosophy and Organisation Theory (Research in the Sociology of Organisations)*. 32. Emerald Group Publishing Limited. pp. 181–213.
- Barrie, D. S., and Paulson, B. C. (1992), *Professional construction management*, McGraw-Hill, Inc.
- Benjamin C. (2000), “A Brief History of Housing in Ghana.”
- Berthouex, P. M. (1972), Evaluating Economy of Scale. *Journal of the Water Pollution Control Federation*, Vol. 44(11), pp. 2111-2118.
- Bradbury-Huang, H., (2010), What is good action research? Why the resurgent interest? *Action Research*, 8(1), pp.93-109.
- Bramble, B. B., D’Onofrio, M., and Stetson, J. (1990), *Avoiding and resolving construction claims*, Rs Meams Company, Inc.
- Brent W. A and Kenneth L. (2008), *Overview of the Commercial Real Estate Industry*, National Association of Real Estate Investment Trust (NAREIT), assessed at [<https://www.researchgate.net/publication/253968046>].
- Brook, M. (1998), *Estimating and Tendering for Construction Work*. Second edition, Butterworth-Heinemann.
- Bryman A., (2004), *The Disneyization of society*. Sage.
- 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%2520DEDUC>]

[TIVE%2520RESEARCH%2520APPROACH%252006032008.pdf&usg=AOvVaw2U1eqAyiH3qyXfcVuZRfys\]](#) on 24th November, 2017.

Cantarelli, C.C., (2009), Cost overruns in Dutch transportation infrastructure projects.

In *Delft University of Technology. Conference Presentation* (pp. 19-20).

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

Chritamara, S., Ogunlana, S.O. and Bach, N.L., (2002), System dynamics modeling of design and build construction projects. *Construction Innovation*, 2(4), pp.269-295.

Cindrela A. D., and Ananthanarayanan K. (2017), “Factors Influencing Cost Over-run in Indian Construction Projects”*MATEC Web of Conferences* pp. 120.

Corbett, P. and Rowley, R., (1999), The use of BCIS elemental cost data by quantity surveyors as part of cost planning techniques: the practitioners’ perspective. In *Proceedings of the 15th Annual ARCOM Conference* (pp. 465-72).

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

Crosby, N. and Keogh G. (1990), *The Relationship between Shop Values and Rates: Final*

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

Fisher, M.A., (2007), Replacing" who is the client?" with a different ethical question. *Professional Psychology: Research and Practice*, 40(1), p.1.

- 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.
- Gao Q. (2009), Research on cost control and management of Real Estate Project,
“International Journal of Business and Management” Vol 4, No. 12, pp. 142-145.
- Gao Q., (2009), Research on cost control and management of Real Estate Project,
“International Journal of Business and Management” Vol. 4, No.12, pp. 142-145.
- Georgy, M.E., Chang, L.M. and Zhang, L. (2005), Prediction of engineering performance: A Neurofuzzy approach. *Journal of Construction Engineering and Management* 131 (5): 548–557.
- Georgy, M.E., Chang, L.M. and Zhang, L. (2005), Prediction of engineering performance: A Neurofuzzy approach. *Journal of Construction Engineering and Management* 131 (5): 548–557.
- Glaeser, E.L., Gyourko, J. and Saks, R.E., (2005), Why have housing prices gone up?.
American Economic Review, 95(2), pp.329-333.
- Godey J, (1994), Six Steps to Effective Cost Management (CPA in Industry)”, *The CPA Journal Online*.
- Godey, J. (1994), “Six Steps to Effective Cost Management (CPA in Industry)”, *The CPA Journal Online*.

- Gyadu-Asiedu, W., Danso, H. and Asubonteng, J.A., (2013), Assessment of the Performance of Local and Foreign Road Construction Firms in Ghana. *International Journal of Construction Management*, 13(4), pp.53-73.
- Gyadu-Asiedu, W., Danso, H. and Asubonteng, J.A., (2013), Assessment of the Performance of Local and Foreign Road Construction Firms in Ghana. *International Journal of Construction Management*, 13(4), pp.53-73.
- Haig, B.D. and Evers, C.W., (2015), *Realist inquiry in social science*. Sage.
- Harrison, F.L., (1992), *Advanced Project Management*. England: Gower Publishing Company Limited.
- Jha, K.N., (2011), *Construction project management: Theory and practice*. Pearson Education India.
- Jha, K.N., (2011), *Construction project management: Theory and practice*. Pearson Education India.
- Kirkham R., (2007), *Ferry and Brandon's cost planning of Buildings*, 8TH edition, WileyBlackwell, Oxford.
- Kooy, B. (2008), *Noesis: Philosophical Research Online*. Reference Reviews. 22(6). pp. 18–19.
- Kraemer, K. L. (1991), *Introduction*. Paper presented at The Information Systems Research Challenge: Survey Research Methods.
- Kwak, Y.H. and Ibbs, C.W., (2002), Project management process maturity (PM) 2 model. *Journal of management in engineering*, 18(3), pp.150-155.
- Leedy, P. and Ormrod, J. (2001), *Practical research: Planning and design* (7th ed.). Upper Saddle River, NJ: Merrill Prentice Hall. Thousand Oaks: SAGE Publications.

- Liang, Y. and Gordon, N.M., (2003), A bird's eye view of global real estate markets. Prudential Real Estate Investors research paper.
- Martin, L. (2010), Transfer mechanisms of knowledge and skills in co-operations between emerging and established civil engineering contractors, PhD Thesis, University of Cape Town, South Africa.
- McNeil, S. and Hendrickson, C. (1982), A Statistical Model of Pavement Maintenance Expenditure. *Transportation Research Record*, Vol. 846, pp. 71-76.
- Oberlender, G. (1993), *Project management for engineering and construction*, McGraw-Hill.
- Odusami, K.T. and Onukwube, H.N., (2008), Factors affecting the accuracy of a pre-tender cost estimate in Nigeria. *Cost engineering*, 50(9), p.32.
- Oladokun, M.G., Oladokun, A. A. and Odesola, I. A. (2011), "Accuracy of Pre-Tender Cost Estimates of Consultant Quantity Surveyors in Nigeria". *Journal of International Real Estate and Construction Studies*. Vol.1 No.1. ISSN:2153-6813, Nova Science Publishers. pp 39-51.
- Olaoluwa P. (2013), Factors affecting cost of construction Projects in Nigeria (A Case study of roads and building firms in Akure). A Research project submitted to the department of Project Management Technology, Federal University of Technology, Akure, Nigeria.
- Osman, Z., Omran, A. and Foo, C.K. (2009), 'The potential effects of variation orders in Construction Projects'. *Journal of Engineering*, 2, 141–152.
- Ostrowski, S.D. (2013), *Estimating and Cost Planning Using the New Rules of Measurement*, John Wiley & Sons, USA.

- Owens, J., Burke, S., Krynovich, M. & Mance, D. J. (2007), Project Cost control tools and techniques. [Online] URL:
http://www.jasonowens.com/wpcontent/uploads/2009/12/ProjectCostControlTools_and_Techniques.pdf.
- Phillips, D.C., (1987), *Philosophy, science and social inquiry: Contemporary methodological controversies in social science and related applied fields of research*. Pergamon Press.
- Pilcher, R., (1992), Deconstructing local government performance and infrastructure measurement. *Asian Review of Accounting*, 17(2), pp.163-176.
- PMBOK (1996), A Guide to the project management Body of knowledge. Project Management Institute, PA, USA.
- Project Management Institute, (2000), A Guide to the Project Management Body of Knowledge, PMBOK Guide 2000 edition, Project Management Institute, Pennsylvania.
- 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”*, 21(6), pp.573-580.
- Salter, A. and Torbett, R., (2003), Innovation and performance in engineering design. *“Construction Management and Economics”*, 21(6), pp.573-580.
- Saunders, M., Lewis, P., & Thornhill, A. (2007), Research Methods for Business Students, (6th ed.) London: Pearson.

- Smith, C.W. and Warner, J.B. (1981), “Bankruptcy, secured debt, and optimal capital structure: comment”, *Journal of Finance*, Vol. 34 No. 1, pp. 247-51.
- Song, L. (2014), Cost control for small and medium-sized enterprises (SMEs), “*Journal of Chemical and Pharmaceutical Research*”, Vol. 6, No. 5, pp. 409-412.
- 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.
- Stewart, R. D. (1991). Cost estimating, John Wiley & Sons, Inc.
- Toor, S.U.R. and Ogunlana, S.O., (2008). Problems causing delays in major construction projects in Thailand. *Construction management and economics*, 26(4), pp.395-408.
- Wilkens, T. T. (1999), Earned value, clear and simple, Los Angeles County Metropolitan Transportation Authority, [online] . Available at: www.acq.osd.mil/pm/paperpres/papepres/html

APPENDIX

QUESTIONNAIRE

To whom it may concern

Dear Sir/Madam,

Invitation to participate in a research into exploring the challenges of cost management in the Ghanaian Real Estate industry

I write to request your assistance as an experienced practitioner with substantial knowledge in construction project cost management and Real Estate to complete the attached questionnaire. Currently, I am undertaking a Master of Science (Msc) in the Department of Construction Technology and Management of the Kwame Nkrumah University of Science and Technology under the supervision of Dr. Ernest Kissi. This research is entitled “**Exploring the challenges of cost management in the Ghanaian Real Estate industry**”.

The questionnaire will take 10 to 15 minutes. All your responses will be treated with strict confidentiality and used only for academic purpose. Your views are valuable for the success of this research. After the research, we are willing to share a summary of the outcomes with practitioners in Ghana and anyone who shows interest. For any enquiries, please contact Edward Dery {Tel.:0245728220 ; & email: edwarddery31@yahoo.com }.

Sincerely,

ED

Edward Dery, Msc Student

Dr. Ernest Kissi, Supervisor

Department of Construction Technology and Management

The Kwame Nkrumah University of Science and Technology, Ghana

Exploring the challenges of cost management in the Ghanaian Real Estate industry

Questionnaire Survey

Important Instructions:

1. Please answer the questions by ticking {such as “✓”} or checking {such as “☒”}.
2. If you wish to have a copy of the report on research findings, please provide your email address: [Click or tap here to enter text.](#)

Section A: Background of respondent

Q1. Please indicate your profession.

Quantity surveyor ☐; Contractor ☐; Civil Engineer ☐; Architect ☐;

Other; Please indicate.....

Q2. Please indicate your academic qualifications.

HND ☐; BSc ☐; Postgraduate ☐

Q3. Please indicate your years of practical experience in the construction industry.

1-5yrs☐; 6-10yrs☐; 11-15yrs☐; 16-20yrs☐; Over
20yrs☐

Q4. Please rate your knowledge on contractor prequalification proceedings?

No knowledge ☐; Medium ☐; High ☐

SECTION B

OBJECTIVE ONE: COST MANAGEMENT PRACTICES IN REAL ESTATE PROJECTS

4. Please indicate the cost management practice that is used **OFTEN** by firm when executing real estate projects.

Please use the response scale below:

1 = Not often 2 = Slightly often 3 = Moderate 4 = Often 5 = Very often

No.	Cost management practices	Frequency Level
A	Cost planning	
1	Elemental	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
2	Comparative	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
3	Functional	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
4	Life cycle cost	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
5	Unit cost	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
6	Superficial area	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
B	Cost estimating and cost budgeting	
1	Analogous estimating	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
2	Parametric estimating	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
3	Detailed estimating	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
4	Cash flow/S-curve	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
C	Cost control	
1	Variance	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
2	Earned value	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
3	Cash flow/S-curve	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
	Please indicate other (if any)	
1		<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
2		<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
3		<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5

SECTION C

OBJECTIVE TWO: CHALLENGES ASSOCIATED WITH COST MANAGEMENT

PRACTICES IN REAL ESTATE PROJECTS

5. Please indicate the challenges that occurs **OFTEN** in the use of cost management practices in your firm when executing real estate projects.

Please use the response scale below:

1 = Not often 2 = Slightly often 3 = Moderate 4 = Often 5 = Very often

No.	Challenges	Frequency Level
1	Unrealistic estimate	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
2	Poor reliability of project budget	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
3	Unpractical working drawing budget	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
4	Complex contractual terms	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
5	Poor management of subcontractors and other external workers	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
6	Numerous change orders	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
7	High interest rates on funds from financial institutions	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
8	Unscientific cost management process	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
9	Inexperienced project manager	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
10	Frequent changes in prices	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
11	Unsuitable procurement system	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
12	Frequent tax rate changes	
	Please indicate other (if any)	
1		<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
2		<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
3		<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5

SECTION D

OBJECTIVE THREE: STRATEGIES TO IMPROVE THE EFFECTIVENESS OF COST MANAGEMENT PRACTICES FOR REAL ESTATE PROJECTS

6. Please indicate the **APPLICABILITY** of the following strategies in the improvement of cost management when executing real estate projects.

Please use the response scale below:

1 = Not applicable 2 = Slightly applicable 3 = Moderate 4 = Applicable 5 = Very applicable

No.	Strategies	Frequency Level
1	Adopt the use of scientific cost management tools	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
2	Regularize the process of design change orders	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
3	Decrease the dependency on financial institutions for funds	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
4	Attain accurate cost information	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
5	Usage of qualified and experienced project team	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
6	Clear definition of project scope	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
7	Cost management practices added as contractual requirement	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
8	Adoption of suitable procurement system for specific contracts	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
9	Usage of appropriate cost management tool	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
Please indicate other (if any)		
1		<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
2		<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5
3		<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5

--This is the end of the survey---Thank you for your time