# AN ASSESSMENT OF COST CONTROL PRACTICES FOR CONSTRUCTION PROJECTS BY MMDAS IN GHANA



**By**

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## DECLARATION

''I hereby declare that this submission is of my own work ad that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which to 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''

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## ABSTRACT

Metropolitan, Municipal and District Assemblies (MMDAs) form an essential part of the development process in Ghana under the Local Government Services since as they serve a division of the general population at the Lower Government Decentralization Policy. Development and infrastructure projects play significant roles of the function of the MMDAs who have to depend on the governmental, donors and internal generated funding for their project activities. As a fact, such funding is not unlimited, it is always important to ensure that there is always the need for cost control practices of construction projects undertaken by the MMDAs. Thus, this study assessed MMDAs in Ghana regarding their efficiency in cost control practices for construction projects. The study used purposive sampling to target the Works Department of the MMDAs in the Central Region of Ghana. Respondents were presented with the structured questionnaire for collecting primary data. A total of 100 questionnaires were distributed. 88 questionnaires were received, giving a success rate of 88%. The data was analysed using descriptive statistics and mean score ranking. In achieving the first objective which was to determine what are the practices for cost control of construction projects, works programme and consistent works inspection as the most significant and ranked detailed estimation as the most tool identifiable. With the second objective, which was to determine the effectiveness of the cost control practices in delivering projects to set performance standards, respondents ranked detailed works programme as the most effective. With the challenges associated with the use of the cost control practices as the third objective, respondents ranked control project changes as very negative.

The study also recommended MMDAs to invest in training of staff in the most current practices in cost control for delivery of their construction projects.



**Key words:** Cost control, construction projects, MMDAs

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## DEDICATION

I dedicate this work to God for his abundant grace upon my life, my wife Veronica Abekah Amakye and lovely kids, Stella Nana Ama Amakye, Prince Kobina Essilfie Amakye and Emmanuel Fiifi Amakye.

## LIST OF ABBREVIATIONS

| | |
|---|---|
| AEDA | Ada East District Assembly |
| BD | Budget Determination |
| CE | Cost Estimation |
| DACF | District Assembly Common Fund |
| HND | Higher National Diploma |
| IGF | Internally Generated Fund |
| KPI | Key Performance Indicators |
| MMDAs | Metropolitan, Municipal and District Assemblies |
| PCC | Project Cost Control |
| PCE | Project Cost Estimation |
| PCM | Project Cost Management |
| PMBOK | Project Management Book of Knowledge |
| PMI | Project Management Institute |
| PMIS | Project Management Information System |
| PVA | Project Variance Analysis |
| SC | Spending Control |
| SPSS | Statistical Package for Social Sciences |
| UDG | Urban Development Grant |
| WBS | Work Breakdown Structure |

# CHAPTER ONE

# INTRODUCTION

## 1.1 BACKGROUND TO THE RESEARCH

Ghana maintains a presidential representative democratic republic form of governance, with power shared across arms of government made up of the executive, legislature and the judiciary. The executive has oversight of national development, through its representative who work as ministers of the various regions (Williams, 2010). Below the regional level of development are the second tier administrative divisions, known as the districts. This second level of governance was formed as a result of reforms in the 1980s in Ghana to decentralize development, so that local governance systems could be in charge of lower level development. As at 2018 there were 275 districts in Ghana, with the district assemblies maintaining administrative control while undertaking development projects (Ghana News Agency, 2018).

Districts in Ghana come in different forms, often defined by the population size in those areas. There are three basic types of districts in Ghana, namely the Ordinary Districts which have a minimum population of seventy-five thousand, the Municipalities with a minimum population of ninety-five thousand and the Metropolises with a minimum population of two-hundred and fifty thousand people. These collectively form the Municipal, Metropolitan and District Assemblies (MMDAs) (Ghana Districts, 2018). The MMDAs as a subset of local administration are generally tasked with economic development, and this is done through the formulation and execution of plans and strategies to mobilize resources, promote productive activity, fill manpower needs of the districts and initiate programmes for the provision of infrastructure, as well as provide municipal works and services in

the districts. The MMDAs are also responsible for the development, improvement and the management of human settlements in the districts. The MMDAs undertake their functions through various officials and departments that fall under it (Agboklu, 2015).



As already identified, one of the key roles of the MMDAs is development, and though this may take different forms, one such area of development is infrastructural. The works department under the district assemblies is often tasked with undertaking such infrastructural projects, and its divisions include road works, estate management, development control and water section (Ada East District Assembly, 2018). These divisions work with other internal and external bodies to ensure that projects undertaken are of the highest quality and bring value for money. Ensuring this often requires effective cost controls, which is often undertaken by the development control division at the works department (Ada East District Assembly, 2018).

Project cost control or management is seen as a core function of project management, and it is a part of the triple constraint, where there is interdependency with time, scope and quality. One of the earliest definitions of project cost management was given in1986 by Georgas and Vallance who noted then that cost management is a requirement throughout the project lifecycle and as such makes it one of the most important factors to take into consideration in this field study. In the years afterwards however, more definitions have been proffered, in line with what Georgas and Vallance (1986) introduced as one of the earliest definitions. Bouvrie (2018) notes that project cost management encompasses many different aspects such as resource

planning, cost estimating, cost budgeting, cost control and change control. However, cost management is not without its challenges, though it has numerous benefits for the project quality and timely delivery.

Project cost control, has a broader view of life-cycle costing, and incorporates the effect of project decisions on the cost of using, maintaining and supporting the project. However, it is primarily concerned with the cost of resources needed to complete scheduled activities during the execution stage (PMBOK, 2013). Project cost control is all about controlling cost of the resources needed to complete project activities (Kumar, 2015). Integrated cost control involves the main elements of planning, estimating and tendering, budgeting or the distribution of estimated cost and expected revenue, and controlling costs by comparing actual costs with the estimate. Construction cost planning covers engineering practices that integrate estimating, planning judgment, costing techniques and accounting discipline for developing standard costs (Chitkara, 2014).

There are certain principles which govern project cost control within the execution framework of any project, and these may include the following;

I. It is important to ensure that within the cost control framework the project team is not only looking at cutting costs, but doing so in the most effective way possible. This is a strategic decision that must be taken with the mind-set that all the resources and processes needed for achieving the highest level of quality on the project are made available. The project team must also ensure that the final delivered project meets high reliability standards and the lowest reasonable cost (Kirun and Varghese,

2015). Performance is key to all this, and the actions to achieve this are as much strategic as operational.

II. Cost control is not a one-time action of cutting costs through staff reduction, cutting initial capital costs or rationalization of processes alone. It is important to note that cost control is a continuous process that must begin with a clear plan and concise expectations of cost control, so that on a daily basis the project managers can implement a strict cost control regime that guarantees a successful project delivery at the lowest cost (Kirun and Varghese, 2015). The managers can identify the inefficient and unproductive activities on the project and eliminate them, while justifying the need for implementing a more efficient control system.

III. Knowledge and tools are a significant component of a cost control strategy, and it is therefore important that project managers have the requisite knowledge and tools to implement a successful strategy. Leadership within the organization or on the project, which in this case would be the project managers, need to be at the forefront of knowledge generation and application towards successful cost control. There should be a regular assessment of the level of knowledge possessed by the project team members on cost control so that capacity building can be undertaken (Kirun and Varghese, 2015).

IV. Undertaking successful project cost control requires that principles of standard costing be properly followed, since they form the basic principle for project costing and estimating. Where the standard costing principles are not followed in budget preparation and pricing for a project, it can lead to an overstating of the overall

project cost, which can then unduly impact the ability to undertake proper cost control (Kirun and Varghese, 2015).

V. The standard for continuous improvement for most organizations has often been the practice of comparing present performance with the past to determine whether there has been any progress or retrogression, and appropriate remedial measures taken. However, the bar is set higher in the present day, where companies need to assure customers of excellence to remain competitive (Kirun and Varghese, 2015). Cost control should therefore be undertaken with the bar set at achieving excellence.

## 1.2 PROBLEM STATEMENT

The significance of cost control in development programmes is essential for ensuring not only accountability and transparency in spending, but it provides a valuable reference point to ensure that projects meet the set specifications and requirements within the set cost framework, and the cost performance can also impact on decision making (Otieno, 2017). Considering the significant budgets that most MMDAs have to work with, both from the District Assemblies Common Fund (DACF), District Development Facility (DDF), Urban Development Grant (UDG) and the internally generated funds (IGF), it is important that there be relevant systems in place to check conformance of the projects to cost expectations.

The construction industry in the developing world, and more specifically Ghana, has been known for cost overruns, project time delays, quality challenges and a myriad of issues that have rendered the industry less efficient (Laryea, 2016). Many researchers have documented many instances of projects delivered not to cost

expectations, particularly within the government sector, and little actually is done to prevent it, or avoid similar situations in future projects. It is often common for audit reports to detail wastefulness in the delivery of projects by public institutions, even where cost control measures are supposed to exist. The impact of weak cost controls in the management function of infrastructure development projects affects policy makers, programme sponsors, managers/staff and programme stakeholders (Wilkins et al, 2008). The cost control principles are also expected to act as tell-tale or offer early warning system, notifications of possible budget difficulties at predetermined periods for corrective measures to be decided to solve the cost variances. The project quantity surveyor or the cost engineer needs to apply the cost control methods to develop a series of options for the other project members to consider and select one of the best options that fit within the approved budget limit (Adjei et al., 2017). This therefore begs the questions of the efficiency of cost control tools that are in use by the MMDAs in Ghana, particularly for construction project.

## 1.3 RESEARCH QUESTIONS

The questions that arise out of the research aim and objectives stated are;

1. What are the practices for cost control of construction projects at the MMDAs in Ghana?
2. What is the effectiveness of the cost control practices in delivering projects to set performance standards?
3. What are the challenges associated with the use of the cost control practices?

## 1.4 AIM OF THE STUDY

The aim of this study is to assess the efficiency of the cost control practices for construction projects used by the MMDAs in Ghana.

## 1.5 OBJECTIVES OF THE STUDY

The study has the following objectives;

1. To identify the cost control practices used on construction projects by the MMDAs in Ghana;
2. To assess the effectiveness of the cost control practices in delivering projects to set performance standards;
3. To determine the challenges associated with the use of the cost control practices

## 1.6 SIGNIFICANCE OF THE STUDY

Metropolitan, Municipal and District Assemblies (MMDAs) form a significant part of the governance system in Ghana, and are often responsible for development projects below the national level. These MMDAs have significant budgets and undertake several developmental projects annually, and it is expected that there be accountability with whatever amount is spent on such projects. Ensuring accountability requires there to be relevant cost controls of such projects to ensure that they meet the specifications and requirements set out. Therefore, the findings from this study should ensure that the MMDAs have in place the most effective tools for cost control of construction projects at all stages of the projects to deliver value. They can also equip themselves with the necessary resources and personnel, where shortfalls are identified, so that they can undertake this role more efficiently. The government can as well rely on the findings from this study to develop standard project requirements and performance measures that can be used for all projects by the MMDAs. The findings will also add to existing knowledge on cost controls of construction projects by MMDAs.

## 1.7 SCOPE OF THE STUDY

The scope of the research was largely set by the aim and objectives of the study, in seeking to assess the efficiency and accuracy of the cost control tools used for construction projects by MMDAs. The research identified the various tools used by the MMDAs and measure their effectiveness based on existing research on other cost control tools. The research then determined shortfalls and challenges existent with the cost control practices tools of the MMDAs and then proffer corrective measures. Geographically, the research targeted one Metropolitan, two Municipal and Five District Assemblies in the Central Region of Ghana.

## 1.8 RESEARCH METHODOLOGY

The research applied a quantitative approach towards drawing of conclusions for the research. Quantitative data was collected through questionnaires, it was handed over to the staff of the Works Department at the selected MMDAs, who were sampled using a purposive technique to get those who oversee these projects at the Assembly levels and who are in charge of the project cost control. The overall design of the research was descriptive, as it allowed for an observation of how construction project cost control were use from start of the project till completion. The quantitative data was analysed and presented using mean score ranking and descriptive statistics.

## 1.9 ORGANIZATION OF THE RESEARCH

The research is divided into five (5) chapters from one (1) to five (5). The first chapter, Introduction, is about the background of the study, its problem statement, objectives, scope and significance.

The second chapter, Literature Review, delves into earlier works and explores relationships with this research.

Chapter three is about the methodology of the research which explained scientific approach or style to this study and position it within its context. Discussions on data collection and analysis tools employed.

The next chapter offered or shows the analysis of data collected and discussions within appropriate context of the research objectives and questions.

The last chapter, Five, is the Conclusion and Recommendations to wrap up the whole study by revising or reviewing its main contributions to information, policy recommendations and limits.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.1 INTRODUCTION

Hart (2018) defines the literature review, or narrative review as a scholarly paper which reviews existing and current knowledge on a particular subject matter, including substantive findings, theoretical contributions and form the foundation for the current research. Literature review covers secondary data, reporting on existent findings and conclusions and linking them to new research pathways. This literature review therefore provided definitions of key terms, overviews of project cost control principles and practices, as well as identifying the existent challenges and made recommendations for best practices.

## 2.2 DEFINITION OF TERMS

### 2.2.1 Project

The Project Management Book of Knowledge (PMBOK, 2017) defines a project as a temporary endeavour which often has a beginning and an end, and is required for the development of a product, service or result. In elaborating on this definition it can be deduced that when undertaking a project, it is important to note that the activities which are involved have a definite time duration and cannot go on indefinitely.

The PMBOK (2017) further adds that activities in a project differ from routine activities because those of a project have definite timelines and are temporary, and lead to the development of a product, service or result. Routine activities on the other hand may be indefinite with respect to their timelines. The definite timelines, or

temporary nature of projects does not mean also that their results, products or services are also temporary, but rather the activities that lead to their development.

The Project Management Institute (PMI, 2016) also adds that a project is temporary in its nature, with a clearly defined beginning and end, often denoted by the scope and resources required. A project is also unique in that it often involves people who do not permanently work together, often from across different organizations and multiple geographies. Yeoung (2015) notes that a project involves all the inputs and output that are required towards the development of a product, service or result. It is an individual or collaborative enterprise that is carefully planned to achieve a particular aim

### 2.2.2 Project Cost

This is defined as the total funds required to complete a project or work that consists of a direct and indirect cost. The project cost represents the expenditures made or which are estimated to be made, or the monetary obligations incurred to complete the project which are listed in the project baseline (PMBOK, 2013). Bubashit and Almohawis (2004) defined cost as the budget estimate that can ensure the successful delivery of a project. Cost does not only arise at the beginning of the project but remains throughout till completion, and at every stage of the project, there is a specific cost element that can be attached. This therefore highlights the importance that the various project management functions carried out on the project from inception to handover. In another opinion expressed by Chan and Chan (2004), they noted that with respect to the tendering process for a project, the cost limitation cannot be placed there alone, and that the agreed cost for delivering a project may

vary along the way when variations arise. Therefore it is worthy for the project team to take note that even when the project cost is set out from the beginning, there are certain changes and actions that may take place that will alter the cost performance of the project over its delivery period.



### 2.2.3 Project Cost Control

Project Cost Control, also referred to as Project Cost Management (PCM) is a series of activities for estimating, allocating, and controlling costs within the project. It allows determining and approving budget for the project and controlling spending. For example, in construction project cost management it is vital to estimate cost of materials, equipment, salary of workers, etc. Effective project cost management allows each project to be specific and unique because that project entails costs and requires specific funding (Afetornun 2011). The process of managing project costs is an activity for estimating costs, developing project budget and controlling spending. The project cost management process includes the following key steps:

#### 2.2.3.1 Cost Estimation (CE):

This is one of the initial steps in the cost management process and it often occurs when the project has been conceived and firm plans made, and it is required that the cost of delivering it be determined. The project cost estimators / quantity surveyors often have the duty to develop the cost estimates with other project team members. All activities and resourced needed for delivering the project are captured at this stage (Amer, 2014). Project Cost Estimation (PCE) can be undertaken either through

manual calculation of the various cost elements or through computer software to arrive at final estimates.

#### 2.2.3.2 Budget Determination (BD):

Once the cost estimates are completed for the project the actual budget needs to be completed. This stage involves the costing of indirect activities as well which may be required for the successful delivery of the project. The budget framework informs the project team of what cost elements will arise for the completion of the project, taking into consideration the direct and indirect costs, and as well, the identification of the sources of funding and how it will be paid towards the project (Baldwin and Bordorli, 2014).

#### 2.2.3.3 Spending Control (SC):

This final step in project cost management involves the actions and decisions that the project team takes to achieve spending targets set. This involves a regular review of the budget as against the actual spending to determine if the project is within budget or outside of this. Based on the results of the review various control measures can be undertaken to ensure that spending limits in the budget are maintained and adhered to (Caputo and Pelagagge, 2014).

## 2.3 RELATED RESEARCH ON PROJECT COST CONTROL

Georgas & Vallance observed that cost management is a requirement throughout the project lifecycle and as such makes it one of the most important factors to take into consideration. It affects all other aspects of project execution. Bouvrie (2018) notes that project cost management encompasses many different aspects such as resource

planning, cost estimating, cost budgeting, cost control and change control. However, cost management is not without its challenges, though it has numerous benefits for the project quality and timely delivery.

Construction and the development of infrastructure are fundamental to economic growth and societal advances. Unfortunately project cost overrun and scope creep are common on infrastructure and construction projects. This applies to both developed countries with highly developed systems in project delivery and developing countries that may have more rudimentary approaches to project delivery. A global survey of the sector spanning twenty countries and five continents found that substantial cost escalation on construction and infrastructure projects is the rule rather than the exception (Flyvbjerg et al., 2003). The survey found average cost escalations of 45% for rail projects, 34% for tunnels and bridges and 20% for roads. Flyberg et al. (2003) found that 90% of construction projects had under-estimated costs and that cost overruns of 50-100% were common.

In a major report for the World Bank, Kenny (2010) argues that this is a major global problem with construction being a US$1.7 trillion industry worldwide with a significant proportion involving publicly financed projects. Kenny states that government investment in road transport alone can account for 2-3.5% of a country's GDP. He cites the example of India where approximately half of all road projects have cost overruns greater than 25% and time blowouts exceeding 50%. Flyvbjerg (2005) provides a litany of global examples of major project cost overruns. The following are some of these examples. Boston's Central Artery/Tunnel Project went 275% over budget equating to US$11 billion over budget. The Channel tunnel between the UK and France was 80% over budget for construction and 140% over

for financing. The Pentagon spy satellite program had a $4 billion cost overrun and the International Space Station had a $5 billion overrun. And the problem is not new. The Suez Canal cost 20 times the original budget and the Sydney Opera House cost 15 times the original estimate.

A systematic review of factors influencing the cost performance of building projects is done by Odediran & Wndapo (2014), where the authors have focused and presented the literature review on the issue of cost overruns and its various incidents and also tabulated the top rated factors that are influencing cost over runs on construction projects ranging during the period of 1997-2013.Research on cost performance for building construction projects in Klang Valley, Malaysia is done by Ali & Kamaruzzaman (2010). The study between time-cost relationships in Australian Building Construction Projects is done by Love et al., (2005), where it is shown that Gross Floor Area and number of stories in a building are key determinants of time performance and cost performance.

## 2.4 PROJECT COST CONTROL PRACTICES

There are various cost control practices that are employed within the construction industry towards the efficient management of project costs and successful project delivery. These practices are not limited in nature to either large scale or small scale projects, and it is dependent on the project team to determine the best course of application for each. Some cost control practices in the construction industry include:

### 2.4.1 Detailed works programme

The works programme outlines all the activities that are required to be undertaken on a construction project, and is often a requirement to be submitted by the contractor to

the consultants for the client and receive approval. This programme gives the start and finish dates as well as all activities and their durations, and its complexity is often determined by the size of the project (Chen et. al., 2016). The works programme is an important tool for ensuring that there is total awareness among the entire project team of all activities, therefore ensuring that each member of the project team undertakes their activities to aid the successful completion of the project to time schedule. Adhering to the works programme, which was designed with the proposed budget and cost plan in mind is an effective tool for controlling project costs (Chen et. al., 2016).

### 2.4.2 Consistent works inspections

The project team needs to consistently inspect works, not just for the purposes of valuations and payments, but also to ensure that works are being carried out to the agreed programme, and to the required standard of quality. These consistent inspections will ensure that the works are being carried out according to the programme, and that cost elements are being followed stringently (Chua and Godinot, 2016). Inspections also help in identifying any potential challenges with the works being executed so that corrective measures can be instituted before it becomes an altogether larger problem. Inspections are an essential part of the cost control process because they can easily reveal project expenditure, either within plan or outside of it, so that the project team are properly informed and take necessary action.

### 2.4.3 Responsible project budgeting

Responsible project budgeting is a collective responsibility of every member of a project team, and it is to ensure that the budgeting stage is as accurate as possible,

and devoid of any unnecessary or excessive cost elements which will inflate the budget. Responsible project budgeting also means that the project team makes it a priority to ensure that costs are kept as reasonably low as possible, and then effective monitoring measures are put in place to ensure that the project team is able to stick to the budget (De Souza, 2015). Staying within budget is often a challenge for the construction industry in Ghana, as many projects, particularly within the governmental sector, have been known to end up with cost overruns. It is therefore important that things are done right from the budgeting stage.

### 2.4.4 Project Management Information System for project data access

Project data is an important element of cost control since the project team requires data to be processed for decision-making. When a project is small in nature, with a relatively small team in place to manage it, the volume of data that is generated is often not too large to be easily shared and managed by different members of the project team. However, on a much larger scale project, where different teams need to work on different sections of the project, it is important that there be a Project Management Information System (PMIS) in place that will be a central point for collecting and distributing all data to the project team members. Access to relevant data when it is needed means that decisions related to cost can be as accurate and relevant as possible, and the project team will not have to rely of guesswork or assumptions to control project costs.

### 2.4.5 Project cost records-keeping / reporting

As stated above, project data is an essential element of the cost management process, and this can be aided also with an efficient project cost records-keeping and

reporting system that reports accurate cost data for the project team to make cost control decisions. Accurate records on cost expenditure at any point on the project can help in measuring cost performance and evaluating it against expectations to determine whether the team is working according to cost or outside of it. The project team must utilize its cost recording tools towards collection of accurate data from all sources on the project and then accurately analyse it towards cost control decisions.

### 2.4.6 Key Performance Indicators on cost

Key Performance Indicators (KPIs) are important tools for measuring performance of a factor against expectations which are often standardized. These KPIs are applicable in different scenarios in the delivery of a construction project, but an important consideration to make is that they allow the project team to determine whether the project is going as expected, and more importantly how that is related to industry standards. Key Performance Indicators on cost may include a comparison of actual cost against budgeted and deviation of actual cost from budgeted cost. The information that these KPIs will provide will guide the project team to put in measure that will either be corrective or enhance the existing cost performance on the project.

### 2.4.7 Evaluation of works carried out

The project manager, along with his team must carry out regular evaluations of works done, not just its cost value as against the budgeted, but also the quality and pace of works being carried out, to ensure that the schedule is being maintained, along with the cost expectations for the project. The project team must carry out daily evaluations of works and prepare detailed reports which will provide a clear

picture on the progress of works, and the cost expenditure to date. Regular evaluations will also inform the entire project team on what is being done right and what is being done wrong and how they affect the cost performance, so that this historical data can go towards future decisions to be made on the project.

### 2.4.8 Cost decisions based on forecasting and cost implications

Cost decisions made by any member of the project must be based on adequate and accurate forecasting and determination of the cost implications that the decision will have on cost control. Cost decisions need to be made throughout the life cycle of the project, from planning, through to project execution and handover. Cost decisions needs to be made at the budgeting stage and this is basically a forecasting and estimating function to determine the overall cost of the project, and this needs experience from the project estimator or quantity surveyor(s). At the project execution stage, there need to be cost decisions every single day, as resources are being constantly used and it is important that these decisions be made against the cost forecasts that were made. Following the forecasts and as well evaluating the cost implications of any decision on the project are very important ways of controlling costs on the project.

### 2.4.9 Designing within cost plan

With most construction projects, clients make known their expectations of design and the finished project, but as well, they let the consulting team be aware of how much they are willing to spend on the project, which then informs the development of the initial cost plan. This initial cost plan is a valuable tool for the design team since they can design a project which can be delivered to the expectations of the client and within their budget. However, without the guidance of the cost plan, then

it can often lead to a design which may either cost the client more than anticipated or will require several changes during execution which may invariably add to cost. This therefore highlights the essence of designing to cost as an essential tool for cost control in the construction industry.

### 2.4.10 Regular update and reissue of cost plan

The cost plan gives details on the cost of the entire project, and how the individual costs arise throughout the project, but it also is an important tool for tracking the expenses on the project, and therefore it needs to be constantly updated and reissued to the project team. This update and reissue is important because the project team is kept up to date on the cost expenses that have been made on the project at each stage, so that it can impact cost control decisions. The cost plan must not left static, but rather be a planning and implementation tool which will be beneficial to the entire project team, if it plays a core role in the cost control function.

### 2.4.11 Contingency and risk allowances

An important consideration to make in cost control is that risk elements are certain to arise, due in part to the fact that construction can be unpredictable in its execution, and also for the fact that it is a common-sense approach towards cost control. Contingency and risk allowances must be included when drawing up the project budget and cost plan because they will cater for the unforeseen occurrences on the project. The sources of risks on a construction project are numerous, and various studies have been carried out to determine how best they can be mitigated or eliminated from a project. Mitigation of risks on a construction project comes at a cost to the project, and it is important that mitigation plans be added to the cost plan so that they will ensure successful delivery of the project and efficient cost control.

### 2.4.12 Consistent change management

Changes are bound to occur on a project, often in the form of variations that are raised either by the client or the contractor, or any other representatives or stakeholders on the project. In practice, not all changes or variations are effected, however it is important to note that there must be a consistent change management protocol as part of the cost control plan, since this will ensure that variations will not unduly burden the project in terms of cost. The best change management protocols will ensure that there is a seamless embedding of the changes into the work plan and cost plan so that the project can continue without any significant breaks. Efficient change management however requires an experienced team to undertake, so that it does not disrupt the entire project and lead to greater cost variances.

Over and above the cost, time and risk consequences, changes can also affect stakeholder relationships and team morale. The uncertainties associated with change are often the result of iterative cycles or further changes due to unanticipated side-effects of the current change during the construction process (Lee *et al* 2005). It is thus imperative to understand change, the types of changes, its impact on the project, and how to analyse, manage and control it.

### 2.4.13 Justification for all elements entered into cost plan

The project team must also justify every single element that is entered into the cost plan, since forecasting is not an issue of guesswork, but requires the use of relevant cost planning tools and experience as well. Therefore the estimation team must work with all available resources, as well as rely on the experiences of the project team members to arrive at a cost plan that is reliable and can aid the cost control process.

## 2.5 PROJECT COST CONTROL TOOLS

### 2.5.1 Analogous Estimation

This form of estimation depends on the expert judgement of the estimator. It is used in the preparation of the earliest price estimate that is given to the client. The estimator must have the relevant experience of estimating the cost of similar projects (Ashworth, 1994). Analogous analysis using the actual cost of a previous, similar project is the basis for estimating the cost of the current project. It is frequently used to estimate total project cost when there is a limited amount of detailed information about the project (PMI, 2009). The estimator collects resource information on a similar or analogous task and compares the task to be estimated with the similar or analogous one (Stewart, 2016). The company may retain its own database of historical project costs from which equivalent or similar cost information may be drawn (Loftus, 2015).

### 2.5.2 Parametric Estimation

Conceptual estimates based on parameter costs are most commonly used in building construction. The parameter cost approach relates all costs of a project to just a few physical measures, or “parameters” that reflect the size or scope of the project. For example, the “gross enclosed floor area” would be a typical overall parameter for a structure such as a warehouse. Some costs are expressed as square feet of the component itself (such as masonry) and others in relation to the building floor area as a whole (such as electrical). With good historical records on comparable structures, parameter costing can give reasonable levels of accuracy for preliminary estimates (Barrie and Paulson, 2012). The cost of site work, foundation, floors, roof, doors, etc. are determined separately by the use of estimated parameter cost. The

most widely used estimating relationship is linear. The relation can be depicted by a straight line when plotted on a graph with conventional linear co-ordinates (Stewart, 2011).

### 2.5.3 Detailed Estimation

Unit price estimate can be compiled when quantities of work items may not be precisely determinable but the nature of the work is well defined (Clough, 2016). The unit rate estimate is best suited for works which are relatively simple and repetitive in nature such as building works (Loftus, 2009). This technique involves estimating the cost of individual work items (PMI, 2016). Detailed estimating involves the synthesis of cost estimate from resource estimate made at the lowest possible level of WBS. This type of estimating assumes that skills, labour-hours, and materials can be identified for each work element (Stewart, 2011).

### 2.5.4 Cashflow / S Curve

A cash flow is the transfer of money into or out of the company (Harris and McCaffer, 2015). If the contractor is to determine whether or not a project is financially feasible, he must closely study the estimated cash flow for the project. The inflow represents the payments to the contractor. Out-flow represents payments made to subcontractors, suppliers, and others (Ahuja *et. al.*, 2014). The need for cash flow requirements is important in order to make provision for these difficult times before they arrive (Harris and McCaffer, 2015). The S-curve can be drawn from experience of previous similar operations in the company. The chart is frequently used as a means of control by plotting the actual expenditure curve against the budget curve. The overall shape of the cash flow curve will follow that the project

life-cycle bell curves. Deviation from the anticipated S-Curve should precipitate a review with the contractor to determine the cause of the variation and whether any problems may cause cost and schedule slippage (Bramble *et. al.*, 2010).

### 2.5.5 Project Variance Analysis

Project Variance Analysis (PVA) involves comparing actual project results to planned or expected results. Cost and schedule variances are the most frequently analysed, but variances from plan in the areas of scope, quality are often of equal or greater importance (PMI, 2016). Project performance must be monitored and measured regularly to identify variances from the plan. Variances are fed into the control processes in the several of knowledge areas. Variances occur for one or both of two reasons: first, the price actually paid for a resource is greater or less than that estimated in the standard.

### 2.5.6 Earned Value

Earned value is a measure of progress. It provides a uniform unit of measure for reporting progress (Wilkens, 2009). It integrates cost and schedule on a structured and personalised basis whereby the work is broken down into WBS, cost accounts, work packages. The earned value of the work completed is then based on the budgeted value of these completed segments of work (Harrison, 2012). Earned Value is used to define overall percent complete for the entire project (Oberlender, 2013). The traditional units that are used include work hours and dollars which provide the basis for cost performance (Wilkens, 2009).

## 2.6 CHALLENGES WITH PROJECT COST CONTROL

### 2.6.1 Cost Accounting, Not Cost Analysis

Lee and Kim (2018) identify that one of the biggest challenges for cost control managers on a project is the perception that their work generally involves the review of historical data on projects and reporting on that, as well as ensuring the accuracy of the records. This works within a framework of cost accounting, but cost analysis takes a more broader view since it involves the creation of unique scenarios for achieving cost effectiveness on the project. Cost analysis therefore is not about counting costs on the project but planning and analyzing the cost framework for the project.

### 2.6.2 Budgeting and Forecasting Effectively

Budgeting and cost planning can be carried out in different ways, most especially according to the knowledge and experience level of the one undertaking it, or also through a standard format that a company will set for itself. The challenge this presents is that there is little standardization and therefore it leads to difficulties in interpreting them by different project teams working to deliver a single project. Standardization of the budgeting and forecasting to meet expectations of the entire project team can ensure that there is a greater level of reliability (Aziz, et al., 2013).

### 2.6.3 Getting Progress Data from Multiple Subcontractors

On large scale projects where different project teams work on different aspects, or where subcontractors are engaged to deliver different sections can pose a problem of collecting relevant data for cost analysis and reviews. This is because it can be cumbersome collecting data relevant towards budgetary controls and cost analysis

when they may only be focused on delivering on their contract requirements and may not necessarily collect the data needed by the project team. Subcontractors may also have different formats for collecting and reporting on data, or may not have the resources to collect data in a way that the project team may collect it and thus lead to disparities in the data (Tangeran, 2003).



### 2.6.4 Integrating Schedule and Cost

Reporting on project schedules and cost and aligning the two data formats towards cost analysis and budgetary controls may also prove challenging because project schedulers often work using the Work Breakdown Structure (WBS) while the cost estimators and analysts may also work using projected and actual cost codes, fiscal periods and transactions. This therefore may make it difficult for the project teams to align and integrate their data towards the development of a comprehensive cost management framework for the project (Eldash, 2012).

### 2.6.5 Aligning Data between Multiple Source Systems

Beyond just the challenge of integrating projects schedules and cost, another challenge is aligning data collected from different sources in multiple formats. This problem re-echoes the challenge of different project teams maintaining different methods for collecting data and reporting, and thus making alignment difficult. One typical example is a project team which works with a project management software receiving voluminous data recorded on paper and handed to them. This data has to be transferred to the software before any analysis can take place and this can be time constraining and tedious to complete. (Olawale, 2010).

### 2.6.6 Time and Effort Involved with Reporting

Another associated challenge relates to the time and effort that often has to go into data collection and reporting on cost management for the project. As indicated in the example above, data collected from multiple sources with different formats, and requiring consolidation, will often be tedious and time consuming. This is even where the total number of sources of data have not been taken into consideration, and the multiplicity of systems that will be used to record and report data. (Eldash, 2012).

### 2.6.7 Managing the Client Relationship

Project client in this context go beyond just the owner of the project, but also the various stakeholders, regulatory and funding bodies as well as even the potential users of the project. In ensuring that there is adequate data collections and reporting to meet cost management functions for the project, some of these customers need to be kept in the know with regards to what happens on the project, especially where it is a public one. The project team may need to prepare reports that suit the requirements of each of these customers and that may in itself compound the already existing challenges of collecting and analyzing the data. These client may also invariably apply a certain amount of pressure on the project team to deliver to their expectations (Eldash, 2012).

### 2.6.8 Accuracy of Reports

Even before the project team can be able to properly report on the data collected and make necessary decisions with them it is important that there be a verification system in place to ensure the accuracy of data and reporting thereof. Where data is collected

from multiple sources without any proper verification in place it can lead to dubious data being submitted to the project team for reports to be made, and this can greatly negate any plans for successful cost management (Tangeran, 2003).

### 2.6.9 Insufficient Resources for Controls

Being able to maintain control over cost measures within the project delivery framework, particularly for a large project can be very tasking for the project team, and it is important that there be sufficient resources available to ensure controls at all levels of the project. Having different project teams as well as subcontractors on the project means that there may be different rules of engagement at play and reconciling these in a manner that all the effective controls can be implemented can be challenging.

### 2.6.10 Controlling Changes

This is often identified as one of the greatest challenges for project cost management, regardless of the size of the project. Projects are not static, and in most cases before the final work is delivered to the client there are variations and changes that may be introduced, and these all need to be executed within the framework of an effective cost management plan. Without adequate control of the changes that occur on the project, it can lead to a situation where project costs will get out of hand, and data recording and reporting may be dubious because the team may not have the resources to ensure that accurate data on changes are reported (Tangeran, 2003).

# CHAPTER THREE

# RESEARCH METHODOLOGY

## 3.1 INTRODUCTION

The Merriam-Webster English Dictionary (2019) defines the research methodology as the method, or the collection of methods which are required to be followed in a particular discipline to achieve certain desired results in a research, Wilkinson (2016) defines research methodology as the specific procedure or techniques that are required for proper identification, selection and processing of data regarding a particular topic, and allows the researcher to evaluate the validity and reliability of the research. Two main questions are required to be answered; how was the data collected and how was it analysed. This methodology section detailed the research design and strategy adopted, as well as the types and nature of data collected, the instruments applied, the research population and finally the method of analysing the data.

## 3.2 RESEARCH DESIGN

The Business Dictionary (2018) defined the research design as the detailed outline of how an investigation or study would take place, and it would typically involve how data would be collected, the data collection instrument and how the data collected would be analysed. According to De Vaus (2016), and also affirmed by Mauz (2013) the research design is important to the research process because it ensures that whatever method or procedures are employed can actually lead to the achievement of conclusions for the study. Mauz (2013) found further that there are six main types of research design, which include the explanatory, descriptive, exploratory, correlational, semi-experimental, experimental and meta-analytic. Each of these have

their uses and place within the research sphere, but this study applied the descriptive design. This simply allowed the researcher to observe a phenomenon and obtain data to answer questions that arise about it (Yin, 2011). It is used to present data in frequencies, averages and other statistical calculations.



### 3.3 RESEARCH STRATEGY

Jenny (2014) defined the research strategy as the step-by-step plan of action that gives the direction to the thoughts and efforts, enabling the systematic conduct of the research while also on schedule to produce quality results and a detailed study report. The research strategy ensures focus and reduces frustration in the research, saves time and resources also. According to Kenyon (2015), the research strategy could either be quantitative or qualitative in nature, and a researcher may either use one or both, depending on the type of research being undertaken Baiden, B. K. (2009). This research adopted the mixed method approach, which would take the strengths of each strategy to eliminate their respective weaknesses.

The two main research strategies, quantitative and qualitative, both have inherent weaknesses and strengths. Critics of quantitative methods posit that such methods lack contextual realism whereas qualitative methods have a weakness of not being able to study with a level of accuracy and is criticized for inefficiency in providing accurate study of variable relationship (Sarantakos, 2005). Yin (2009) asserted that quantitative methods were tailored for addressing “what” and “how” questions, whereas qualitative methods were more appropriate for answering questions of “how” and why things occurred.

## 3.4 RESEARCH DATA

The University of Edinburgh (2018) noted that data must be factual in nature, and necessary for validating research findings. There are two broad categories of data identified by Albertson and Hilleman (2014), namely the primary and secondary data, through other sub-types identified include observational, experimental, simulation and derived/compiled data.

Primary data generally refers to that which is collected directly from source by a researcher, and is unprocessed in any way by other researchers, while secondary data often is collected from sources which have already been processed. This research relied on both sources of data, with primary data collected through quantitative and qualitative means from the research participants and secondary data collected from already published works.

## 3.5 RESEARCH INSTRUMENT

Research instruments are essential for collecting of data for a study, and come in two different categorizations, namely the researcher completed and the subject completed. Most research efforts require the use of both instruments, though a research has liberty to determine the best instrument for arriving at the conclusions required. The subject completed tools relied on were the questionnaires, while the researcher completed tools were generally the data analysis tools.

The design of the research questionnaire was as follows;

Section A: Demographic data on respondents

Section B – To identification of the cost control practices used on construction projects by the MMDAs in Ghana

Section C – To assessing the effectiveness of the cost control practices in delivering projects to set performance standards

Section D – To determining the challenges associated with the use of the cost control practices



### 3.6 RESEARCH POPULATION

The research population may be defined as the totality of a well-defined collection of individuals or objects that have a common, binding characteristics or traits. Burns and Grove (1993), added that a population is defined as all elements (individuals, objects and events) that meet the sample criteria for inclusion in a study. The population for the study was made up of staff of the Works Departments of the Metropolitan, Municipal and District Assemblies (MMDAs). The study targeted MMDAs in the Cape Coast Metropolitan Assembly, Agona West Minicipal, Effutu Municipal, Gomoa West District, Ajumako-Enyan-Essiam District, Gomoa Central District, Asikuma Odoben-Brakwa District and Agona East District in the Central Region due to the volume of works ongoing within that area and proximity to the researcher.

## 2 SELECTED METROPOLITAN, MUNICIPAL AND DISTRICT ASSEMBLIES IN CENTRAL REGION

**Table 2.1: Selected MMDAs in Central Region**

| |
|---|
| Cape Coast Metropolitan Assembly |
| Agona West Municipal Assembly |
| Effutu Municipal Assembly |
| Gomoa West District Assembly |
| Ajumako – Enyan – Essiam District Assembly |
| Gomoa Central District Assembly |
| Asikuma – Odoben – Brakwa District Assembly |
| Agona East District Assembly |

Source: Local Government Service, 2018

**Table 2.2: Matrix for MMDAs Staffing norms**

| **DEPARTMENT / SECTION/ GRADE** | **CAPE COAST METROPOLITAN ASSEMBLY** | | |
|---|---|---|---|
| Engineer (Professional) | 7 | 9 | 7 |
| Technician Engineer (Sub-professional) | 4 | 6 | 5 |
| Architect (Professional) | 3 | 4 | 2 |
| Quantity Surveying | 3 | 4 | 4 |
| Technical | 5 | 7 | 5 |
| Rural Housing | 2 | 2 | 3 |
| Technical (Building Inspectorate) | 6 | 8 | 5 |
| **TOTAL** | **30** | **49** | **31** |
| | | | |
| **DEPARTMENT / SECTION/ GRADE** | **AGONA WEST MUNICIPAL ASSEMBLY** | | |
| Engineer (Professional) | 7 | 9 | 7 |
| Technician Engineer (Sub-professional) | 4 | 6 | 5 |
| Architect (Professional) | 3 | 4 | 2 |
| Quantity Surveying | 3 | 4 | 2 |
| Technical | 5 | 7 | 6 |
| Rural Housing | 2 | 2 | 2 |
| Technical (Building Inspectorate) | 6 | 8 | 7 |
| **TOTAL** | **30** | **40** | **21** |

| DEPARTMENT / SECTION/ GRADE | CAPE COAST METROPOLITAN ASSEMBLY | | |
|---|---|---|---|
| | | | |
| **DEPARTMENT / SECTION/ GRADE** | **EFFUTU MUNICIPAL ASSEMBLY** | | |
| Engineer (Professional) | 7 | 9 | 4 |
| Technician Engineer (Sub-professional) | 4 | 6 | 4 |
| Architect (Professional) | 3 | 4 | 2 |
| Quantity Surveying | 3 | 4 | 3 |
| Technical | 5 | 7 | 4 |
| Rural Housing | 2 | 2 | 3 |
| Technical (Building Inspectorate) | 6 | 8 | 4 |
| **TOTAL** | **30** | **40** | **24** |
| | | | |
| **DEPARTMENT / SECTION/ GRADE** | **AGONA WEST DISTRICT ASSEMBLY** | | |
| Engineer (Professional) | 7 | 9 | 2 |
| Technician Engineer (Sub-professional) | 4 | 6 | 6 |
| Architect (Professional) | 3 | 4 | 1 |
| Quantity Surveying | 3 | 4 | 1 |
| Technical | 5 | 7 | 5 |
| Rural Housing | 2 | 2 | 1 |

| DEPARTMENT / SECTION/ GRADE | CAPE COAST METROPOLITAN ASSEMBLY | | |
|---|---|---|---|
| Technical (Building Inspectorate) | 6 | 8 | 4 |
| **TOTAL** | **30** | **40** | **20** |
| | | | |
| **DEPARTMENT / SECTION/ GRADE** | **AGONA WEST MUNICIPAL ASSEMBLY** | | |
| Engineer (Professional) | 7 | 9 | 3 |
| Technician Engineer (Sub-professional) | 4 | 6 | 2 |
| Architect (Professional) | 3 | 4 | 0 |
| Quantity Surveying | 3 | 4 | 3 |
| Technical | 5 | 7 | 3 |
| Rural Housing | 2 | 2 | 3 |
| Technical (Building Inspectorate) | 6 | 8 | 4 |
| **TOTAL** | **30** | **40** | **18** |
| | | | |
| **DEPARTMENT / SECTION/ GRADE** | **AGONA WEST DISTRICT ASSEMBLY** | | |
| Engineer (Professional) | 7 | 9 | 4 |
| Technician Engineer (Sub-professional) | 4 | 6 | 5 |
| Architect (Professional) | 3 | 4 | 1 |
| Quantity Surveying | 3 | 4 | 1 |

| DEPARTMENT / SECTION/ GRADE | CAPE COAST METROPOLITAN ASSEMBLY | | |
|---|---|---|---|
| Technical | 5 | 7 | 4 |
| Rural Housing | 2 | 2 | 3 |
| Technical (Building Inspectorate) | 6 | 8 | 4 |
| **TOTAL** | **30** | **40** | **22** |
| | | | |
| **DEPARTMENT / SECTION/ GRADE** | **AGONA WEST MUNICIPAL ASSEMBLY** | | |
| Engineer (Professional) | 7 | 9 | 6 |
| Technician Engineer (Sub-professional) | 4 | 6 | 6 |
| Architect (Professional) | 3 | 4 | 1 |
| Quantity Surveying | 3 | 4 | 2 |
| Technical | 5 | 7 | 6 |
| Rural Housing | 2 | 2 | 2 |
| Technical (Building Inspectorate) | 6 | 8 | 5 |
| **TOTAL** | **30** | **40** | **28** |
| **SUMMARY** | | | **195** |

Source: Local Government Service, 2018

### 3.7 SAMPLING TECHNIQUE

A sample is a representation of the entire population for the purpose of generalizing of the findings from the sample for the whole study population. The technique adopted for this research was purposive. This was to allow the researcher to target

the members of the population that could provide the responses needed for the research. The researcher identified the sample size needed and targeted members who fell within that determined sample size that were easily reachable. The dispersed nature of some of the MMDAs meant that it would be challenging to reach all of them.



### 3.8 SAMPLE SIZE DETERMINATION

Sample size determination is usually critical because it is practically unrealistic to administer research instrument to the whole population membership. The sample, therefore, is a fraction of the whole target population for the research, with the anticipation that the results from it would be generalized for the whole population. Since it was difficult to determine the total population of all the staff in the MMDAs in the Central Region, an infinite sample size was used.

The sample size from the published tables with the sample sizes calculated in reference to Yamane (1967). **Sample size has precision levels between ±5% and ±10% with the Confidence level ranging from 95% to P=0.5.** Therefore 10% precision was adopted for targeted sample size for this research work for a population size of 100.

### 3.9 DATA COLLECTION INSTRUMENT

Collected data was received from respondents using the research instruments, namely the questionnaire and analysis was carried out to present all the collected data in as accurate a manner as possible. Demographic data from the respondents was presented using descriptive statistics, which allowed for representation through tally tables and graphs. This would allow for easier interpretation and relation to

other sections of the questionnaire. Data collected in relation to the objectives of the research was analysed using the mean score ranking, which was an effective tool for presenting the Likert scale data. The mean score analysis allowed for the determination of a mean value in relation to a predetermined highest mean score value, and a comparison of all mean values calculated in relation to that highest mean score.

# CHAPTER FOUR

# DATA ANALYSIS AND DISCUSSION OF RESULTS

## 4.1 INTRODUCTION

The data collected was analysed under this chapter, out of the research questionnaires and the interpretation and the results also discussed. The chapter is presented in two major parts, with the demographic characteristics of the respondents being in the first and the second part dedicated to the set objectives of the study.

## 4.2 DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

The demographic features of the respondents' shows critical information on their education, qualifications, experience and perceptions in relation to the study objectives so as to determine that their responses are actually credible and reliable enough to draw conclusions from. The demographic characteristics of the respondents will give the confidence that the respondents can provide the necessary responses needed for drawing conclusions for this research. Tables 4.1 to 4.8 summarize the data collected.

### 4.2.1 MMDA Respondent works with

The first requirements of the respondents was to determine that they all actually worked with either a Metropolitan, Municipal of District Assembly office in the Central region, since that was the limitation set for the research. This data would confirm that respondents all worked with the MMDAs and therefore could be counted on for the reliability of their responses. Table 4.1 gives a summary of the responses.

**Table 4.1: Local Government Structure**

| Local Government Structure | Number | Percentage |
|---|---|---|
| Metropolitan Assembly | 23 | 26 |
| Municipal Assembly | 14 | 16 |
| District Assembly | 51 | 58 |
| **TOTAL** | **88** | **100** |

Source: Field Survey, 2019



### 4.2.2 Educational qualification of respondent

The second requirement of the respondents was to indicate their educational qualification, and this information would show that the respondents would be able to understand the questionnaire and also provide relevant answers. The educational qualification would also be a measure of the level of knowledge gathered in relation to their professional work area and would be relevant for the study. Table 4.2 gives a summary of the responses.

**Table 4.2: Educational qualification of respondent**

| Educational Qualifications | Number | Percentage |
|---|---|---|
| PhD | 0 | 0 |
| Post graduate (Masters) | 27 | 31 |
| Undergraduate | 52 | 59 |
| Higher National Diploma | 9 | 10 |
| **TOTAL** | **88** | **100** |

Source: Field Survey, 2019

### 4.2.3 Job designation at MMDAs

The next question on the questionnaire required the respondents to indicate their job designation at the MMDAs, and this information would confirm again that the respondents actually worked within the MMDAs and actually have the necessary experience from working to provide responses to this questionnaire. Table 4.3 gives a summary of the responses.



**Table 4:3: Job designation at MMDAs**

| Job designation | Number | Percentage |
|---|---|---|
| Architect | 3 | 4 |
| Quantity surveyor | 24 | 27 |
| Engineer | 27 | 31 |
| Project Manager | 21 | 24 |
| Technician Engineer | 13 | 14 |
| | **88** | **100** |

Source: Field Survey, 2019

### 4.2.4 Number of years working with the MMDAs

With all respondents actually indicating that they had job designations associated with the MMDAs, the next question was to gauge the level of experience that they had working there. This level of experience would also be a measure of how much knowledge gathered in their line of work, which can guide their responses to the questionnaire. Table 4.4 gives a summary of the responses.

**Table 4.4 Number of years working with the MMDAs**

| Number of years | Number | Percentage |
|---|---|---|
| Less than a year | 0 | 0 |
| 1 – 5 years | 30 | 34 |
| 6 – 10 years | 41 | 46 |
| 11 – 15 years | 11 | 13 |
| 16 – 20 years | 6 | 7 |
| Above 20 years | 0 | 0 |
| | **88** | **100** |

Source: Field Survey, 2019

### 4.2.5 Number of construction projects undertaken with the MMDAs

The next measure of the level of experience of the respondents was to determine from them how many construction projects they had worked with at the MMDAs. Working on different construction projects would give the respondents necessary experiences of how cost control practices are undertaken for each different project, and determine the best practices. Table 4.5 gives a summary of the responses.

**Table 4.5: Number of construction projects undertaken with the MMDAs**

| Number of construction projects | Number | Percentage |
|---|---|---|
| 1 – 5 projects | 6 | 7 |
| 6 – 10 projects | 3 | 4 |
| 11 – 15 projects | 5 | 6 |
| 16 – 20 projects | 29 | 33 |
| 21 – 25 projects | 26 | 29 |
| Over 25 projects | 19 | 21 |
| | **88** | **100** |

Source: Field Survey, 2019

### 4.2.6 Application of cost controls in the delivery of construction projects by MMDAs

With the education, work designation and experience levels determined for the respondents the next step was to determine from them their awareness of the application of cost controls in the delivery of construction projects by the MMDAs. This question was important because it would determine the level of knowledge that the respondents had about the cost control practices at the MMDAs. Table 4.6 gives a summary of the responses.

**Table 4.6: Application of cost controls in the delivery of construction projects by MMDAs**

| Application of cost controls | Number | Percentage |
|---|---|---|
| YES | 69 | 78 |
| NO | 19 | 12 |
| **TOTAL** | **88** | **100** |

Source: Field Survey, 2019

### 4.2.7 Awareness of specific cost control practices applied by the MMDAs

This next question was related to section 4.2.6 above, where respondents were to indicate whether they were aware of the cost control practices that were used by the MMDAs. This section sought to determine from the respondents whether they knew of the specific cost control practices that the MMDAs relied on. Table 4.7 gives a summary of the responses.

**Table 4.7: Awareness of specific cost control practices applied by the MMDAs**

| Awareness | Number | Percentage |
|---|---|---|
| YES | 69 | 78 |
| NO | 19 | 12 |
| **TOTAL** | **88** | **100** |

Source: Field Survey, 2019



### 4.2.8 Belief that cost controls have an impact on the successful delivery of construction projects

The final question under the respondent characteristics was to determine from them whether they believed that the cost control practices would have an impact on the successful delivery of the construction projects by the MMDAs. By this affirmation the general perception of the staff at the MMDAs regarding the impact of the cost control practices on construction projects can be determined. Table 4.8 gives a summary of the responses,

**Table 4.8: Belief that cost controls have an impact on the successful delivery of construction projects**

| Belief | Number | Percentage |
|---|---|---|
| YES | 88 | 100 |
| NO | 0 | 0 |
| **TOTAL** | **88** | **100** |

Source: Field Survey, 2019

## 4.3 SUMMARY OF DEMOGRAPHIC DATA

As indicated above, the purpose of the demographic data, is to provide some understanding into the nature of the respondents participating in the research and their suitability for providing responses in this research. The data begun with the responses to determine if all of the respondents worked with either a metropolitan, municipal or district assembly, and the data showed that all respondents actually worked with them. There were 26% respondents from the metropolitan assembly, 16% from the municipal assembly and 58% from the district assemblies. Next the research determined also that in terms of their educational qualifications, there was a fair representation from the HND (10%), to undergraduate (59%) and postgraduate (31%), and the job designations also indicated that all the respondents had construction related roles at the MMDAs, thus confirming that they actually worked on such projects and had the necessary experience.

In terms of the work experience of the respondents two factors were considered, the length of time working with the MMDAs and secondly the number of projects undertaken there. In terms of the length of time working with the MMDAs the data showed that at least 66% of the respondents had at least five years or more experience working there, and the remaining 34% also had more than a year, up to five years of experience. About 83% of the respondents had worked on more than fifteen projects each, thus confirming the significant level of experience that they had on the construction projects, and the knowledge collected regarding the cost control practices used there.

In terms of the knowledge of whether the MMDAs actually used cost control practices for their construction projects only 78% of the respondents affirmed this, though all 100% indicated their belief that cost controls were important for the

successful delivery of construction projects by the MMDAs. With the demographic characteristics completed it is clear that all respondents can be expected to participate in the subsequent sections of the questionnaire as they have demonstrated their level of knowledge and experience needed for providing credible responses.



## 4.4 OBJECTIVE 1.

### 4.4.1 TO IDENTIFY THE COST CONTROL PRACTICES USED ON CONSTRUCTION PROJECTS BY THE MMDAS IN GHANA

The first objective of the research was to identify which cost control practices were used for construction projects by the MMDAs, and since the respondents had indicated their knowledge of the cost control practices that were used, it was prudent that practices identified in the literature be presented to them to provide some more detailed insights. This objective was divided into two sections, with the first part focusing on the specific cost control practices that were used on construction projects while the second part focused on the cost control tools. The combined analysis of the data from these two aspects of cost control would provide a greater depth of information on the practices used.

The literature review was relied on to identify past research cost control practices and tools and these were presented to the study respondents through the questionnaire, in a 5-point ranking scale to show how identifiable and significant each practice or tool was to the MMDAs. Tables 4.9 and 4.10 give summaries of the analysis and ranking.

**Table 4.9: Mean scores ranking on the cost control practices used on construction projects by the MMDAs**

| FACTOR | MEAN SCORE | STD. DEVIATION | RANKING |
|---|---|---|---|
| Detailed works programme | 4.12 | .729 | 1 |
| Consistent works inspections | 4.09 | .868 | 2 |
| Responsible project budgeting | 3.95 | .865 | 3 |
| Evaluation of works carried out | 3.80 | .779 | 4 |
| Project cost records-keeping / reporting | 3.78 | .800 | 5 |
| Cost decisions based on forecasting and cost implications | 3.68 | .815 | 6 |
| Contingency and risk allowances | 3.47 | 1.090 | 7 |
| Designing within cost plan | 2.78 | .889 | 8 |
| Consistent change management | 2.69 | .847 | 9 |
| Key Performance Indicators on cost | 2.57 | .899 | 10 |
| Reporting actual cost against approved budgeted cost | 2.53 | .992 | 11 |
| Project Management Information System for project data access | 2.33 | .794 | 12 |
| Justification for all elements entered into cost plan | 1.92 | 1.035 | 13 |
| Regular update and reissue of cost plan | 1.66 | .787 | 14 |

Source: Field Survey, 2019

A scale of 5-point seal was used in calculating the mean score and 3.0 scale was also used as the midpoint in the ranking of the mean score. It is the standard which researchers use when it comes to the ranking outcome of the software, SPSS, which analyses the responses for every tool that respondents were given.

Fourteen key project cost management practices were identified in the literature review, aligning with findings of the Project Management Institute (2013), the Project Management Book of Knowledge (2017) and other researchers, and based on the ranking of the data analysed from respondents it can be seen that 7 were considered at significant practices used by the MMDAs. It is worthy to note that since MMDAs are local government structures, they are often plagued by the cost control challenges faced by many governmental institutions, as identified by Mensah (2017). However, the most significant cost control practices to the MMDAs was the use of detailed works programmes, which Netscher (2015) identified as a significant tool overall for cost control. The works programme outlines all the activities that are required to be undertaken on a construction project, and is often a requirement to be submitted by the contractor to the consultants for the client and receive approval. This programme gives the start and finish dates as well as all activities and their durations, and its complexity is often determined by the size of the project. The works programme is an important tool for ensuring that there is total awareness among the entire project team of all activities, therefore ensuring that each member of the project team undertakes their activities to aid the successful completion of the project to time schedule (Netscher, 2015).

The next most significant cost control practice at the MMDAs, according to the respondents is the use of consistent work inspections. Koutsogian (2017) noted in a

publication on the pros and cons of site inspections that it provides valuable information for making cost decisions on a project. The project team needs to consistently inspect works, not just for the purposes of valuations and payments, but also to ensure that works are being carried out to the agreed programme, and to the required standard of quality. These consistent inspections will ensure that the works are being carried out according to the programme, and that cost elements are being followed stringently (Koutsogian, 2017). Inspections also help in identifying any potential challenges with the works being executed so that corrective measures can be instituted before it becomes an altogether larger problem.

Responsible budgeting, as a cost control practice, was the next to be identified as significant to the MMDAs. Responsible project budgeting is a collective responsibility of every member of a project team, and it is to ensure that the budgeting stage is as accurate as possible, and devoid of any unnecessary or excessive cost elements which will inflate the budget (Riddel, 2017). Responsible project budgeting also means that the project team makes it a priority to ensure that costs are kept as reasonably low as possible, and then effective monitoring measures are put in place to ensure that the project team is able to stick to the budget.

As inspections were identified as important towards the gathering of the relevant data for making cost decisions, so must regular, daily evaluations of works be conducted on the project, and this affirms findings by (Koustogian, 2017). The project team must carry out daily evaluations of works and prepare detailed reports which will provide a clear picture on the progress of works, and the cost expenditure to date. Regular evaluations will also inform the entire project team on what is being done

right and what is being done wrong and how they affect the cost performance, so that this historical data can go towards future decisions to be made on the project (Koustogian, 2017).

Wright (2019) conducted a research on the importance of records keeping and the accuracy of such records towards the cost control process in the construction industry. Accurate records on cost expenditure at any point on the project can help in measuring cost performance and evaluating it against expectations to determine whether the team is working according to cost or outside of it. The project team must utilize its cost recording tools towards collection of accurate data from all sources on the project and then accurately analyse it towards cost control decisions. The respondents sided therefore with the findings of Wright (2019) and this is a significant aspect of the cost control process for MMDAs.

Next ranked by the respondents, and further aligning with conventional knowledge on cost controls, as proposed by Kenwigg (2015) was for cost decisions to be informed by accurate forecasting and an understanding of cost implications. Cost decisions made by any member of the project must be based on adequate and accurate forecasting and determination of the cost implications that the decision will have on cost control. Cost decisions need to be made throughout the life cycle of the project, from planning, through to project execution and handover. Cost decisions needs to be made at the budgeting stage and this is basically a forecasting and estimating function to determine the overall cost of the project, and this needs experience from the project estimator or quantity surveyor (Kenwigg, 2015).

The final cost control practice that the MMDAs used, as identified by the respondents was the understanding of the role of risk management to any construction project and making necessary allocations to take care of such risks as may arise on the project (Amos, 2017) An important consideration to make in cost control is that risk elements are certain to arise, due in part to the fact that construction can be unpredictable in its execution, and also for the fact that it is a common-sense approach towards cost control. Contingency and risk allowances must be included when drawing up the project budget and cost plan because they will cater for the unforeseen occurrences on the project. The sources of risks on a construction project are numerous, and various studies have been carried out to determine how best they can be mitigated or eliminated from a project (Amos, 2017).

Though conventional knowledge on cost control practices for the construction industry address the existence of several practices that are used by project managers to achieve the level of control desired, it must be noted however that the particular practice to be adopted is dependent on many different factors, which are either determined by the project team or the project circumstances. In the case of the MMDAs, it can be seen that the category of practices used were proactive at trying to ensure that costs of delivering projects could be controlled as much as possible, ad cost overruns avoided. Three key underlying principles for cost control by the MMDAs are responsible budgeting and forecasting, appropriate inspections and evaluations, and the mitigation of risks which could spin costs out of control.

The next step in achieving the first objective of this research was to identify the specific tools that were relied on for cost control by the MMDAs. The tools aided the

cost control process when used collectively with the practices as well. The literature review identified several different cost control tools for the construction industry and these were also presented to the respondents to show how identifiable they were as tools for the MMDAs. A 5-point Likert scale was used because the assumption was that each respondent could express the degree to which the tools were identifiable to them. Table 4.10 summarizes the analysis and ranking of the data collected.



**Table 4.10: Mean score ranking on the cost control tools used on construction projects by the MMDAs**

| FACTOR | MEAN SCORE | STD. DEVIATION | RANKING |
|---|---|---|---|
| Detailed Estimation | 3.41 | .847 | 1 |
| Analogous Estimation | 3.27 | 1.006 | 2 |
| Cost Performance Review | 2.56 | .935 | 3 |
| Project Cost-Value Reconciliation | 2.48 | .928 | 4 |
| Parametric Estimation | 2.93 | .1.090 | 5 |
| Cashflow / S Curve | 2.33 | 1.035 | 6 |
| To-Complete Performance Index | 2.31 | .587 | 7 |
| Earned Value Management | 2.25 | 1.052 | 8 |
| Variances | 1.98 | .992 | 9 |
| Contract Variance Analysis | 1.87 | .881 | 10 |

Source: Field Survey, 2019

From the ranking table 4.10 it can be seen that out of the 10 conventional cost control tools which were identified in the literature, only two of them were identified as associated with the MMDAs and this shows a poor representation. Though the effectiveness of any specific cost control tool depends on its use case and the level of knowledge or experience of the user, it is however important that project managers show the dexterity of being able to apply multiple tools towards cost control.

The respondents identified the use of detailed estimation strategy as one tool relied on by the MMDAs for cost control on construction projects. Detailed estimating involves the synthesis of cost estimate from resource estimate made at the lowest possible level of WBS. This type of estimating assumes that skills, labour-hours, and materials can be identified for each work element (Stewart, 2011). Unit price estimate can be compiled when quantities of work items may not be precisely determinable but the nature of the work is well defined (Clough, 2016). The unit rate estimate is best suited for works which are relatively simple and repetitive in nature such as building works (Loftus, 2009). This technique involves estimating the cost of individual work items (PMI, 2016).

The next identified cost control tool identified by the respondents was analogous estimation, which is a very common tool used on most construction projects around the world. This form of estimation depends on the expert judgement of the estimator. It is used in the preparation of the earliest price estimate that is given to the client. The estimator must have the relevant experience of estimating the cost of similar projects (Ashworth, 1994). Analogous analysis using the actual cost of a previous, similar project is the basis for estimating the cost of the current project. It is frequently used to estimate total project cost when there is a limited amount of

detailed information about the project (PMI, 2009). The estimator collects resource information on a similar or analogous task and compares the task to be estimated with the similar or analogous one (Stewart, 2016). The company may retain its own database of historical project costs from which equivalent or similar cost information may be drawn (Loftus, 2015).



The lack of multiple cost control tools, though not discounting the existing tools being used by the MMDAs means that it leaves room for the recommendation of the adoption of other tools, which research has proven to be very effective, particularly at determining the level of control being rendered on a project. The tools used by the MMDAs are mostly significant towards effective estimation but play a limited role in assessing or analysing the cost outlay of the project at any particular stage. Tools such as Earned Value Management and Variances allow for clearer analysis of expenses to date as against the budgeted, thereby painting a clearer picture of cost controls. It is therefore imperative that the MMDAs adopt more effective tools to achieve better results in cost control.

## 4.5 OBJECTIVE 2.

### 4.5.1 TO ASSESS THE EFFECTIVENESS OF THE COST CONTROL PRACTICES IN DELIVERING PROJECTS TO SET PERFORMANCE STANDARDS

The second objective of this research was to assess the effectiveness of the cost control practices that the MMDAs apply towards the delivery of construction project. The first objective had thrown some light on the specific cost control tools and practices that the MMDAs applied towards construction project delivery, and this

next objective would give the respondents the opportunity to rank the practices on a 5-point effectiveness scale. This objective would not only consider the cost practices which were identifiable to the MMDAs but also which the respondents would consider as relevant for adoption to the MMDAs. Table 4.11 summarises the analysis and ranking of the results.

**Table 4.11: Mean scores ranking on the effectiveness of cost control practices for delivering projects to set performance standards**

| FACTOR | MEAN SCORE | STD. DEVIATION | RANKING |
|---|---|---|---|
| Detailed works programme | 4.12 | .856 | 1 |
| Consistent works inspections | 4.08 | .928 | 2 |
| Reporting actual cost against approved budgeted cost | 4.08 | .838 | 3 |
| Contingency and risk allowances | 4.01 | .582 | 4 |
| Responsible project budgeting | 3.96 | .085 | 5 |
| Key Performance Indicators on cost | 3.96 | 1.029 | 6 |
| Justification for all elements entered into cost plan | 3.87 | .479 | 7 |
| Cost decisions based on forecasting and cost implications | 3.84 | .979 | 8 |
| Project cost records-keeping / reporting | 3.84 | 1.023 | 9 |
| Regular update and reissue of cost plan | 3.78 | 1.038 | 10 |
| Designing within cost plan | 3.69 | .479 | 11 |
| Evaluation of works carried out | 3.57 | .582 | 12 |
| Consistent change management | 2.78 | .979 | 13 |
| Project Management Information System for project data access | 2.55 | .861 | 14 |

Source: Field Survey, 2019

The ranking of the cost practices identified shows the inclination of the respondents to align with conventional knowledge on application of cost practices in the construction industry, and the expectation that these practices all be adopted into project delivery. From the summary table it can be seen that four of the practices

scored mean values between 4.00 and 5.00, which put them in the range of effective to very effective. It is worthy to note three out of the top highest ranked practices were those that were already being applied by the MMDAs. Detailed works programme, as already identified, played a significant role in determining the overall work that needed to be completed, along with the cost outlay for each so that the plan could be followed stringently to promote efficient cost control. The works programme is an important tool for ensuring that there is total awareness among the entire project team of all activities, therefore ensuring that each member of the project team undertakes their activities to aid the successful completion of the project to time schedule. Adhering to the works programme, which was designed with the proposed budget and cost plan in mind is an effective tool for controlling project costs.

The next ranked most effective cost control practice was the consistent works inspections, and that was also explained extensively in the first objective. However the important point to note is that inspections are an essential part of the cost control process because they can easily reveal project expenditure, either within plan or outside of it, so that the project team are properly informed and take necessary action.

Respondents next identified reporting of actual costs against budgeted costs as the next most effective cost control practice for construction projects undertaken by the MMDAs. Wright (2019) noted that this process allows for a more consistent and detailed analysis of the ongoing costs of the project as against the budgeted cost. The project managers would be able to determine at each stage whether the project was

going according to the cost plan or outside of it. However, as noted in the identified cost control practices this is not a regularly used practice for the MMDAs, though it is quite efficient. This acclamation of its effectiveness by the respondents indicates the need for it to be adopted by the MMDAs.

Next ranked as effective by the respondents was the use of contingency and risk allowances. Contingency and risk allowances must be included when drawing up the project budget and cost plan because they will cater for the unforeseen occurrences on the project. The sources of risks on a construction project are numerous, and various studies have been carried out to determine how best they can be mitigated or eliminated from a project (Amos, 2017)

Responsible budgeting was initially identified by the respondents as a practice for cost control by the MMDAs and it has been highly ranked here also as very effective. As already noted, responsible project budgeting is a collective responsibility of every member of a project team, and it is to ensure that the budgeting stage is as accurate as possible, and devoid of any unnecessary or excessive cost elements which will inflate the budget.

Key Performance Indicators (KPIs), though very effective tools for cost planning and cost control for construction projects were not initially identified as applied by the MMDAs, but have also been highly ranked as effective by the respondents. KPIs on cost may include a comparison of actual cost against budgeted and deviation of actual cost from budgeted cost. The information that these KPIs will provide will

guide the project team to put in measure that will either be corrective or enhance the existing cost performance on the project.

The respondents next ranked the need for the project team justification of every element that ends up in the cost plan, with appropriate forecasting done. The project team must seek to justify every single element, since forecasting is not an issue of guesswork, but requires the use of relevant cost planning tools and experience as well. Therefore the estimation team must work with all available resources, as well as rely on the experiences of the project team members to arrive at a cost plan that is reliable and can aid the cost control process.

In line with the above cost control practice, is this next ranked practice, which seeks decisions on cost to be based on a determination of how it will impact overall management of the project. Cost decisions made by any member of the project must be based on adequate and accurate forecasting and determination of the cost implications that the decision will have on cost control. Cost decisions needs to be made at the budgeting stage and this is basically a forecasting and estimating function to determine the overall cost of the project, and this needs experience from the project estimator or quantity surveyor (Kenwigg, 2015).

Next, accurate records on cost expenditure at any point on the project can help in measuring cost performance and evaluating it against expectations to determine whether the team is working according to cost or outside of it. The project team must utilize its cost recording tools towards collection of accurate data from all sources on the project and then accurately analyse it towards cost control decisions.

Another practice that was not identified as present among the MMDAs was the consistent update and reissue of the cost plan by the project team. This update and reissue is important because the project team is kept up to date on the cost expenses that have been made on the project at each stage, so that it can impact cost control decisions. The cost plan must not left static, but rather be a planning and implementation tool which will be beneficial to the entire project team, if it plays a core role in the cost control function.

This initial cost plan is a valuable tool for the design team since they can design a project which can be delivered to the expectations of the client and within their budget. However, without the guidance of the cost plan, then it can often lead to a design which may either cost the client more than anticipated or will require several changes during execution which may invariably add to cost. This therefore highlights the essence of designing to cost as an essential tool for cost control in the construction industry.

Finally, it is very important for the project team must carry out daily evaluations of works and prepare detailed reports which will provide a clear picture on the progress of works, and the cost expenditure to date. Regular evaluations will also inform the entire project team on what is being done right and what is being done wrong and how they affect the cost performance, so that this historical data can go towards future decisions to be made on the project (Koustogian, 2017).

## 4.6 OBJECTIVE 3.

### 4.6.1 TO DETERMINE THE CHALLENGES ASSOCIATED WITH THE USE OF THE COST CONTROL PRACTICES

The final objective of this research was to determine the challenges that arose out of the implementation of the cost control practices by the MMDAs in delivering construction projects. This research had been able to identify the cost control practices and tools adopted by the MMDAs and as well had ranked the effectiveness of each of the practices, so this objective was to determine, if any challenges mitigated the application of these cost control practices in any way. The literature was again relied on to identify conventional challenges identified in previous related research and these were presented to the respondents to rank on a 5-point negativity scale, and tables 4.12 summarises the analysis and rankings.

**Table 4.12: Mean scores ranking on the challenges associated with the use of the cost control practices by the MMDAs**

| FACTOR | MEAN SCORE | STD. DEVIATION | RANKING |
|---|---|---|---|
| Controlling project changes | 3.91 | .573 | 1 |
| Excessive wastage of materials on site | 3.82 | .973 | 2 |
| Poor cost leadership in project delivery | 3.77 | .862 | 3 |
| Significant variations during project delivery | 3.76 | .634 | 4 |
| Integrating project schedule and cost | 3.70 | .861 | 5 |
| Validity of data from multiple subcontractors | 3.68 | .634 | 6 |
| Resource mismanagement on project site | 3.60 | .861 | 7 |
| Accuracy of reporting | 3.58 | 1.029 | 8 |
| Unrealistic project estimates | 2.89 | 0.861 | 9 |
| Sufficiency of resources for cost management | 2.59 | .901 | 10 |
| Incomplete / Inconsistent project brief | 2.55 | .634 | 11 |
| Ineffective deployment of project resources | 2.41 | 1.037 | 12 |
| Uncoordinated project design | 2.39 | 1.048 | 13 |
| Efficiency of systems and processes | 2.37 | .961 | 14 |
| Budgeting and forecasting | 2.33 | .593 | 15 |
| Under-pricing during project tendering | 2.11 | 1.054 | 16 |
| Complex payment mechanisms for project delivery | 1.97 | .961 | 17 |

Source: Field Survey, 2019

The responses from the 5-point scale were calculated into mean scores and with the midpoint of the scale being 3.00, any challenges with mean score below this mean point were considered not significant for the study, while practices with a mean score above this midpoint were considered significant for the study. The analysis software, SPSS 24 considered all responses for each of the tools as were given by the respondents, and calculated the mean (average) score given for each factor in consideration for all 88 respondents. In calculating the mean values, the analysis also developed the standard deviation, which gives an indication of the level of similarity or differences in the responses given. The principle is that the closer the standard deviation is to 0, the greater the similarity in the responses given, thus showing a greater understanding and alignment to a particular response in the questionnaire. Where mean values are calculated to be similar, then the standard deviation is used to determine which one has a closer range of responses so it is ranked higher.

The ranking table 4.16 shows the challenges that affect the MMDAs in their quest to implement cost control measures for construction projects. Out of a total of 17 significant challenges that were identified in the literature review as potentially affecting the implementation of cost controls in the delivery of construction projects by the MMDAs, only 8 were identified as having significant negative impact. It is worthy to take note that since the respondents were largely made up of staff of the MMDAs, an element of bias may exist with regards to identifying existing or potential challenges faced. This is because of either the unwillingness to point out challenges or failing of their workplaces due to their own oaths or contractual agreements, or having no willingness to proverbially “wash their dirty linen outside”.

The challenge which was deemed to have the most negative impact on the implementation of cost controls on controls for MMDAs was the issue of controlling project changes along with the costs. According to Tangeran (2013) projects are not static, and in most cases before the final work is delivered to the client there are variations and changes that may be introduced, and these all need to be executed within the framework of an effective cost control plan. Without adequate control of the changes that occur on the project, it can lead to a situation where project costs will get out of hand, and data recording and reporting may be dubious because the team may not have the resources to ensure that accurate data on changes are reported (Tangeran, 2013).

The next identified challenge for cost control on projects was the excessive wastage of materials on project sites, which impacted the process negatively. Many researchers have identified wastage on construction sites in the developing world as a major challenge that affects cost management and controls, thereby leading to cost overruns (Ayarkwa, 2011). On construction projects in Ghana this is an ever-present challenge, particularly in the government sector, where cost overruns are very common. This invariably leads to major problems with cost controls for projects undertaken by the MMDAs.

Cost leadership involves aggressive and concerted action taken by project managers to ensure that their projects can be delivered at the lowest cost possible, without compromising the quality. This is a strategy that ensures the competitiveness of the projects delivered in terms of cost (Abonda and Machuki, 2018). However, for the MMDAs this is a challenge since the relevant tools and skill sets are not available for

aggressively pursuing cost leadership, which therefore leaves most project ending up with cost overruns. Without a conscious effort by project managers to achieve cost leadership on construction projects by MMDAs then cost controls can be harder to implement.

Variations remain a constant part of the construction process, and in most cases project managers make adequate allocation towards mitigating the effects of variations on the final cost. This forms a significant part of the cost control process for construction projects, but it requires relevant skill and experience from the project managers to be able to execute it. Where variations become too many on the project it can lead to a major challenge in cost control, since records need to be constantly updated to meet variations, and the cost plan needs to be constantly changed.

Reporting on project schedules and cost and aligning the two data formats towards cost analysis and budgetary controls may also prove challenging because project schedulers often work using the Work Breakdown Structure (WBS) while the cost estimators and analysts may also work using projected and actual cost codes, fiscal periods and transactions. This therefore may make it difficult for the project teams to align and integrate their data towards the development of a comprehensive cost management framework for the project (Eldash, 2012).

Even before the project team can be able to properly report on the data collected and make necessary decisions with them it is important that there be a verification system in place to ensure the accuracy of data and reporting thereof. Where data is collected

from multiple sources without any proper verification in place it can lead to dubious data being submitted to the project team for reports to be made, and this can greatly negate any plans for successful cost management (Tangeran, 2003).

# CHAPTER FIVE

# SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

## 5.1 INTRODUCTION

The final chapter in this research provides a summary of the findings made based on the objectives which were set out in the study, and then proceeds to draw conclusions from them and them make necessary recommendations for industry and practice.

## 5.2 SUMMARY OF FINDINGS

The findings which were made in the research were as follows:

### 5.2.1 To identify the cost control practices used on construction projects by the MMDAs in Ghana

The first objective that was set in this research was to identify the cost control practices which the MMDAs used for the delivery of their construction projects and to achieve this, this research relied on past and related studies carried out to determine conventional cost control practices in the construction industry and these were presented to study respondents made up of staff members at the MMDAs. The objective was divided into two parts, with the first part focused on identifying the cost control practices which were used while the second part focused on identifying the specific cost control tools that were used. Based on an analysis of the data collected it was found that though there existed an extensive number of cost control practices that existed for construction projects, the MMDAs only applied practices such as the detailed works programme in works execution, carrying out consistent works inspections, responsible project budgeting and evaluations of works carried out. Other practices which were consistent with the MMDAs included evaluations of works carried out, efficient project cost records-keeping, making cost decisions

based on forecasting and cost implications, and finally using contingency and risk allowances to control costs.

In terms of the cost control tools in use by the MMDAs the research only found that they used a limited selection of these tools, which included detailed estimations and analogous estimation. These were found not to be especially efficient at cost control rather than being tools for efficient estimation, an aspect of the cost control process.

### 5.2.2 To assess the effectiveness of the cost control practices in delivering projects to set performance standards

With the cost control practices and tools associated with the MMDAs identified the next objective was to assess the effectiveness of these cost control practices in delivering projects to the set performance standards within the cost control framework. This assessment was taken from the point of view of the staff of the MMDAs and was not limited to those that they identified as in use there, but as well those that could potentially be adopted by the MMDAs, From the research it was found that some of the familiar practices to the MMDAs were highly ranked as effective, such as the detailed works programme, consistent works inspections and contingency and risk allowances. Others which were not associated with the MMDAs were also highly ranked as efficient, such as reporting actual cost against approved budgeted cost, key performance indicators and justification of all elements entered into the cost plan. Other practices which were ranked as effective also included responsible budgeting, application of forecasting and cost implications in decision making, adequate project cost records keeping, designing within cost plan and evaluations of works carried out.

### 5.2.3 To determine the challenges associated with the use of the cost control practices

The final objective of this research was to determine the challenges associated with the use of cost control practices by the MMDAs, and this objective also relied on past related research to identify the potential challenges faced in cost control on project sites. The challenges identified were also presented to the study respondents to rank on a scale of how negative the impact was to cost control and the study found that the most significant of these challenges included controlling project changes, excessive wastage of materials on site, poor cost leadership in project delivery and significant variations during project delivery. The other challenges included integrating project schedule and cost, validity of data from multiple contractors, poor resource management on project site and the accuracy of reporting.

## 5.3 CONCLUSION

Based on the findings made it can be concluded that cost control is a significant aspect of the project delivery framework of MMDAs, though implementation of practices and tools remain deficient, as evidenced by the selection of practices and tools which were associated with the MMDAs. However, it must be noted that though the MMDAs lacked more sophisticated practices and tools for cost control on their construction projects, they however still adopted some significant practices such as detailed works programme in works execution, carrying out consistent works inspections, responsible project budgeting and evaluations of works carried out. Other practices which were consistent with the MMDAs included evaluations of works carried out, efficient project cost records-keeping, making cost decisions based on forecasting and cost implications, and finally using contingency and risk

allowances to control costs. However, the research also concluded that the tools that the MMDAs mostly used for cost control, though efficient, were also limited in their application.

From the perspective of the staff of the MMDAs, it was concluded that the practices that were being applied towards cost control were efficient, aligning with conventional knowledge on these cost control practices for the construction sector. The research concluded that for the MMDAs, the efficient cost control practices included the detailed works programme, consistent works inspections and contingency and risk allowances. Others which were not associated with the MMDAs were also highly ranked as efficient, such as reporting actual cost against approved budgeted cost, key performance indicators and justification of all elements entered into the cost plan.

On the point of the challenges that were faced by the MMDAs in implementing their cost control practices it was important to note that since the respondents for the research were staff of the same MMDAs, there could be an element of bias in the nature of the responses that were given. However, the research was able to draw conclusions on the significant challenges which were faced by the MMDAs, and these included controlling project changes, excessive wastage of materials on site, poor cost leadership in project delivery and significant variations during project delivery. The other challenges included integrating project schedule and cost, validity of data from multiple contractors, poor resource management on project site and the accuracy of reporting.

## 5.4 RECOMMENDATIONS

Though the research was able to draw conclusions on all the objectives that were set forth, the following recommendations can be adopted by the MMDAs to improve on their cost control practices;

I. MMDAs must explore more efficient cost control practices and tools that can assure of greater and better results. The mind-set behind the adoption of these cost controls practices is to make the cost leadership can be achieved.

II. MMDAs must invest in training of staff in the most current practices in cost control for delivery of their construction practices, and this is to ensure that there is wider understanding and application of these practices. Capacity building is an essential aspect of development and it is therefore important that cost control takes an essential role in the MMDAs.

III. Efficient planning is an important foundation for cost control over the long term, and MMDAs must put a lot of focus on that, from the project determination and design, to development of cost estimates and implementation.

## 5.5 SUGGESTIONS FOR FUTURE RESEARCH

This researcher recommended that future research be conducted on assessing the efficiency of cost control practices in the construction sector, and also delve deeper into the challenges faced in implementing cost control practices in MMDAs.

## REFERENCES


Abonda, F. and Machuki, V. N. (2018) Competitive strategies and performance of construction companies in Kisumu County, Kenya. Journal of Management and Strategy, ISSN 1923-3965.

Ada East District Assembly (2018) Works Department. [Online] Available from https://www/aeda.gov.gh/departments/works-department/ [Accessed on 21/07/19]

Adjei, K. O., Aigbavboa, C. O. and Thwala, W. D. (2017). Corrective measures for construction project cost control, International Conference on Construction and Real Estate Management (ICCREM 2017), Nov. 10th – 12th, 2017, Guangzhou, China, Publishers: American Society of Civil Engineers (ASCE), Accepted paper

Afetornu, C., (2011). The influence of estimator attitude on project cost reliability. PhD Thesis, Loughborough University.

Agboklu, G. (2015) Functions of District Assemblies you should know. [Online] Available fromhttps://www.laboneexpress.com/2015/08/functions-district-assemblies/[Accessed on 29/04/19]

Ahuja, H.A., Dozzi, S. P., and Abourizk, S. M. (2014). *Project management techniques in planning and controlling construction projects,* 2nd ed., John Wiley & Sons, Inc., New York.

Albertson, A. and Hilleman, B. (2014) What is research data. LibGuides. Macalester College.

Ali, A. S. & Kamaruzzaman, S. N. (2010). Cost of Performance for building construction projects in Klang Valley. Journal of Building Performance, 1(1), 110-118.

Amer, F., (2014). A dynamic scheduling model for construction enterprises. PhD Thesis, Loughborough University

Amos, A. (2017). Project Management, Planning and Control: Managing Engineering, Construction and Manufacturing Projects to PMI, APM and BSI Standards, Sixth Edition, Butterworth- Heinemann Imprint, 592 Pages.

Ashworth, R., (1994) "Project management: cost, time and quality, two best guesses and a phenomenon, it‘s time to accept other success criteria" *International Journal of Project Management* 17 337–342.

Ayarkwa, J. (2011) Monitoring Customer Perceived Quality and Satisfaction during the construction process. Construction Economics and Building, 15(1), 19-42.

Ayash El Sawalhi1 and Adnan Enshassi2, 2014, “Cost Management Practices by Public Owners and Contractors in the Gaza Strip”, International Journal of Construction Management, 17 – 28.

Aziz, E., Knight, L. and Gordon, H. (2013) Budgeting and Forecasting. [Online] Available from https://www.strategiccfo.com/ Accessed on 15/12/18

Baiden, B. K. (2009) Framework for the Integration of the Project Delivery Team. Unpublished Thesis (PhD), Loughborough University, United Kingdom

Baldwin, A., and Bordoli, D., (2014). Handbook for construction planning and scheduling. Willey Blackwell.

Barrie, D. S., and Paulson, B. C. (2012). *Professional construction management*, McGraw-Hill, Inc.

Bouvrie, C. (2018) Cost management explained in 4 steps, Blog article; [Online] Available from https://www.costmanagement.eu/blog_article/ [Accessed 08/07/18]

Bramble, B. B., D’Onofrio, M., and Stetson, J. (2010). *Avoiding and resolving construction claims,* Rs Meams Company, Inc.

Bubashit, A. and Almohawis, S. (2004). Evaluating the general conditions of a construction contract. *International Journal of Project Management,* 12 (3), 133-5.

Burns, N. and Grove, S.K. (1993) The Practice of Research: Conduct, Critique & Utilization. 4th ed. Philadelphia, WB Saunders

Business Dictionary (2019) Definition of research design. [Online] Available from https://www.businessdictionary.com/ Accessed on 10/08/19

Caputo, A. C. & Pelagagge, P. M., (2018). Parametric and neural methods for cost estimation of process vessels. International Journal of Production Economics. **112**(2), p 934-954.

Chan, P. and Chan, L. (2004). Key Performance Indicators for Measuring Construction Success. *Benchmarking: An International Journal,* 11 (2), 203 - 221.

Chen, Q., Xia, B., Jin, Z., Wu, P. & Hu, Y., (2016). Choosing appropriate contract methods for design-build projects. *Journal of Management in Engineering*, **32**(1), p 7.

Chitkara, K. K. (2014) "Construction Project Management: Planning, Scheduling and Controlling", McGraw Hill Education (India) Pvt Ltd, 3rd edition.

Chua, D. K. H. & Godinot, M., (2016). Use of a WBS matrix to improve interface management in projects. (work breakdown structure). *Journal of Construction Engineering and Management.* **132**(1), p 67(13).

Clough, R. H. (2016). *Construction contracting*, John Wiley & Sons, Inc.

De Souza, A. D. (2015). A Proposal for the Improvement of Project's Cost Predictability Using Earned Value Management and Historical Data of Cost - An Empirical Study. *International Journal of Software Engineering and Knowledge Engineering*, **25**(01), p 27.

De Vaus, D. A. (2016) Resign Design in Social Research: London, SAGE, Trochim

Doloi, H. K., (2011_. Understanding stakeholders' perspective of cost estimation in project management. *International Journal of Project Management.* **29**(5), p 622-636.

Donald E. Parker, 2014. *Parametric Cost Modelling for Buildings.* 1st ed. Routledge.

Eldash, K. (2012) "Construction Cost Management". Fundamental Concepts for Owners, Engineers, Architects and Builders", Pittsburgh, PA l52l3, Version 2.2.

Enshassi, A., and Ayyash, A., 2014. Factors affecting cost contingency in the construction industry – contractors' perspective. *International Journal of Construction Management.* **14**(3), p 191-208.

Fang, J. & Shu C., 2011. A Cross-platform integration design of the construction cost information resources in projects. *International Conference on Electric Technology and Civil Engineering.* IEEE Conference Publications. Lushan, China, p 5689-5693.

Fayard, D., Lee, L. S., Leitch, R. A. and Kettinger, W. J., 2012. Effect of internal cost management, information systems integration, and absorptive capacity on inter-organizational cost management in supply chains. *Accounting, Organizations and Society.* **37**(3), p 168-187.

Flyvbjerg, B., Bruzelius, B., & Rotthengatter, W. (2005). *Megaprojects and risk: An anatomy of ambition.* Cambridge, England: Cambridge University Press. http://dx.doi.org/10.1017/CBO9781107050891

Flyvbjerg, B., Holm, M. and Buhl, S. (2003) How common and how large are cost overruns in transport infrastructure projects? Transport Reviews 23(1):71-88

Garg, A., Ghosh, D., Hudick, J. and Nowacki, C., 2013. Roles and Practices in Management Accounting Today. *Strategic Finance.* **85**, p 30-35.

Georgas, P. G. & Vallance, G. V. (1986) Cost Management, Project Management Journal, 17 (3), 47 - 54

Ghana Districts (2018) Districts of Ghana. [Online] Available from https://www.ghanadistricts.com/home/alldistricts/ [Accessed on 29/04/19]

Ghana News Agency (2018) Governance under the Fourth Republic: Government of Ghana. [Online] Available from https://www.ghana.gov.gh/ [Accessed on 29/04/19]

Gillet, M., 2015. Effective Cost Estimating Strategy in Construction Project Management, In: Blog, Available: http://www.aproplan.com/blog/news/effective-cost-estimating-strategy-inconstruction- project-management.

Griffith A., 2006. Scheduling Practices and Project Success, *Cost Engineering*, **48** (9), p 24.

Gu, X., Geng, Z. Xu, Wenxing Z. and Qunxiong, 2011. Hierarchy probability cost analysis model incorporate MAIMS principle for EPC project cost estimation. *Expert Systems With Applications*. **38**(7), p 8087-8098.

Hanid M., Koskela L., Siriwardena M., 2011. *Traditional Cost Management vs. Lean Cost Management*. School of the Built Environment, University of Salford. Available from: https://www.academia.edu

Harris, F., and McCaffer, R. (2015). *Modern construction management,* Blackwell Science LTD, UK.

Harrison, F. L. (2012). *Advanced project management,* 3rd ed., Metropolitan Book Co., India.

Hart, T. D. (2018). Project Cost management for Project Managers based on PMBOK. A commentary. PM World Journal, IV (IV), 1-13.

Hegazy, T. and Moselhi, O., 2015. Elements of cost estimation: A survey in Canada and the United States. *Cost Engineering*. **37** (5), p 27-31.

Jenny, D. (2014) Clearly define your research strategy [Online] Available from https://www.mackenziecorp.com/phase-2-clearly-define-research-strategy/

Kamaruzzaman, S. N. (2010). Cost of Performance for building construction project inKlang Vally. Journal of Building Performance, 1(1), 110-118.

Kenny, C. (2010), Publishing Construction Contracts and Outcome Details, Policy Research Working Paper 5247, The World Bank, Sustainable Development Department, Finance, Economics and Urban Division

Kenwigg, R. (2015). Project management: cost, time and quality two best guesses and a phenomenon, it's time to accept other success criteria. International Journal of Project Management, 19 (6), 337-342.

Kenyon College (2015) Overview of research strategy. [Online] Available from https://www.kenyon.edu/ Accessed on 08/08/19

Kirun, S. S. and Varghese, S. (2015) A study on cost using delphi techniques in construction projects, International Journal of Science Technology & Engineering, 2 (5), 44-51

Koutsogian, K. (2017) Cost modelling, e-Library. E & FN Spon: Taylor & Francis Group

Kumar, N. J. (2015) "Construction Project Management: theory and practice" Pearson India Pvt Ltd, 2nd edition

Laryea, S. (2016) Challenges and Opportunities facing contractors in Ghana. University of Witwatersand, South Africa

Lee, G. and Kim, D. (2018) A critical literature review on improving project cost management practice and profitability of domestic contractors. International Journal of Engineering Technologies and Management Research, Vol 5 (1)

Loftus, H. (2009) Project Cost management for Project Managers based on PMBOK. A commentary. PM World Journal, IV (IV), 1-13.

Loftus, J. (2015). *Project management of multiple projects and contracts,* Thomas Telford Ltd.

Love, P. E. E., Tse, R. Y. C., & Edwards, D. J. (2005). Time-cost relationships in Australian Building Construction Projects. Journal of Construction Engineering and Management, 131(2), 187-194.

Mensah, W. O. (2017). Examining a new approach to cost control methods and mechanisms for SMMEs in construction projects, MSc Thesis, University of Johannesburg, South Africa

Merriam-Webster English Dictionary (2019) Definition of research methodology. [Online] Available from https://www.merriamwebster.com/ Accessed on 10/08/19

Muaz, J. M. (2013) Practical guidelines for conducting research. Summarizing good research practice in line with DCED Standards, Available from https://ssrn.com/abstract=2591803/ Accessed on 20/07/19

Netscher, P. (2015) The true cost of poor quality construction. [Online] Available from https://www.linkedin.com/ Accessed on 08/08/19

Oberlender, G. (2013). *Project management for engineering and construction*, McGraw-Hill.

Odediran, S. J. & Windapo, A. O. (2014). A systematic review of factors influencing the cost performance of building projects. In S. Laryea, & E. Ibem (Eds). Proceedings of 8th Construction Industry Development Board (CIDB) Prost Graduate Conference at University of the Witwaters and, Johannesburg, South Africa, Vol. III

Olawale, Y. (2010) Construction project control in the UK: Current practice, existing problems and recommendations for future improvement. *International Journal of Project Management.* **33**(3). P 623-637.

Otieno, F. A. O. (2016) The Roles of Monitoring and Evaluation in Projects. Engineering Programme Group, Technikon South Africa.

Project Management Book of Knowledge - PMBOK (2017) Definition of Project Cost Management, PMBOK Guide Sixth Edition

Project Management Book of Knowledge - PMBOK (2017) Definition of Project Time Management, PMBOK Guide Sixth Edition

Project Management Institute (2013) *A Guide to the Project Management Body of Knowledge (PMBOK Guide)* (4 Edition) Newton Square, PA: Project Management Institute.

Project Management Institutes (PMI) (2016). *A guide to the project management body of knowledge,* PMBOK Guide.

Riddel, L. (2017). Transfer mechanisms of knowledge and skills in co-operations between emerging and established civil engineering contractors, PhD Thesis, University of Cape Town, South Africa

Sarantakos, S. (2005). *Social research.* 3rd ed. Basingstoke: Palgrave Macmillan. Satsangi. Tashakkori, A. and Teddlie, C. (2003). *Handbook of Mixed Methods in Social & Behavioral Research.* Thousand Oaks: Sage Publication.

Stewart, R. D. (2011). *Cost estimating,* John Wiley & Sons, Inc.

Tangerang, S. (2003), "Pricing Strategy in the Indonesian Construction Industry" Krishna Mochtar Indonesia Institute of Technology, Department of Civil Engineering, 15320.

University of Edinburgh (2018) Types of Research Data. [Online] Available from https://www.ed.ac.uk/research_data/ Accessed on 08/08/19

Wilkens, T. T. (2009). *Earned value, clear and simple,* Los Angeles Country Metropolitan Transportation Authority, [online]. Available at: www.acq.osd.mil/pm/paperpres/papepres/html/ Accessed on 18/08/19

Wilkins K., Nsubuga P, Mendlein J, Mercer, D. & Pappaioanou M. (2008): Data for Decision Making Project: Assessment of Surveillance Systems in Developing

countries to Improve Access to Public Health Information. Public Health, 2008. Sep; 122 (9):914-22.

Wilkinson, D. (2016) The Researcher's toolkit: The complete guide to practitioner research. Routledge Falmer, New York.

Williams, D. (2010) Making a Liberal State: Good governance in Ghana. Review of African Political Economy, Vol 37 (126), pp. 403 – 419

Wright, P. (2019), The Global Project Cost Management Profession, 8th ICEC World Congress, Durban, South Africa

Yamane, T. (1967) Statistics, An Introductory Analysis. 2nd Edition, New York, Harper and Row

Yeong, H. K. (2015), The Ascent of the Chinese Contractors, http://www.whoswholegal.com/news/features/article/28352/the-ascent-chinesecontractors,

Yin, R. K. (2009). *Case study research design and methods; Applied social research methods series*. 4th ed. London: SAGE Publications.

Yin, R. K. (2011). *Applications of case study research*. London: Sage Publications.

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## APPENDIX

## KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

RESEARCH QUESTIONNAIRE

## AN ASSESSMENT OF COST CONTROL PRACTICES FOR CONSTRUCTION PROJECTS BY MMDAS IN GHANA – A CASE OF THE CENTRAL REGION OF GHANA

Dear Sir / Madam,

This questionnaire forms part of a Master of Science thesis to assess the cost control practices for construction projects by MMDAs in Ghana, with a focus on the Central Region. I will be grateful if you can provide responses for this questionnaire to aid me in drawing relevant conclusions for this study.

All responses provided by you in this questionnaire will be treated as confidential, and if you require any further information with regards to the conclusion of the study, please provide your email address / phone number below. However you can also contact the researcher for further information. Thank you.

Yours faithfully,

……..

**SECTION A – DEMOGRAPHIC DATA**

**Please tick where appropriate**

1. Please state which MMDA you work with

   A. Metropolitan Assembly

   B. Municipal Assembly

   C. District Assembly

   D. Other……

2. Educational qualification of respondent

   A. PhD

   B. Post Graduate (Masters)

   C. Undergraduate

   D. Higher National Diploma

   E. Other…….

3. Job designation at the MMDA

   A. Architect

   B. Quantity surveyor

   C. Engineer

   D. Project Manager

   E. Supervisor

4. Number of years working with the MMDA

A. Less than a year

B. 1 – 5 years

C. 6 – 10 years

D. 11 – 15 years

E. 16 – 20 years

F. Over 20 years



5. Number of years working within the construction industry.

A. Less than a year

B. 1 – 5 years

C. 6 – 10 years

D. 11 – 15 years

E. 16 – 20 years

F. Over 20 years

6. How many construction projects have you worked on with the MMDA?

A. 1 – 5 projects

B. 6 – 10 projects

C. 11 – 15 projects

D. 15 – 20 projects

E. 21 – 25 projects

F. Over 25 projects

7. Do the MMDAs apply cost controls in the delivery of construction projects?

A. YES

B. NO

8. Are you aware of the specific cost control practices that are applied towards construction projects by the MMDAs?

A. YES

B. NO

9. Do you believe that cost controls have an impact on the successful delivery of construction projects?

A. YES

B. NO

**SECTION B – TO IDENTIFY THE COST CONTROL PRACTICES USED ON CONSTRUCTION PROJECTS BY THE MMDAS IN GHANA**

This section of the questionnaire requires you to indicate the cost control practices that are used by the MMDAs in the Central Region. Please indicate which of these cost control practices are most significant for construction project delivery. Please tick where appropriate, using the scale 1 – Not Significant, 2 – Less Significant, 3 – Neutral, 4 – Significant and 5 – Very Significant.

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Detailed works programme | | | | | |
| Consistent works inspections | | | | | |
| Responsible project budgeting | | | | | |
| Project Management Information System for project data access | | | | | |
| Project cost records-keeping / reporting | | | | | |
| Key Performance Indicators on cost | | | | | |
| Evaluation of works carried out | | | | | |
| Cost decisions based on forecasting and cost implications | | | | | |
| Designing within cost plan | | | | | |
| Regular update and reissue of cost plan | | | | | |
| Contingency and risk allowances | | | | | |
| Consistent change management | | | | | |
| Justification for all elements entered into cost plan | | | | | |
| Reporting actual cost against approved budgeted cost | | | | | |

Please indicate which of the following cost control tools are most recognisable as used by the MMDAs in the delivery of construction projects. Please tick where appropriate, using the scale 1 – Not Identifiable, 2 – Less Identifiable, 3 – Neutral, 4 – Identifiable and 5 – Very Identifiable

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Earned Value Management | | | | | |
| Project Cost-Value Reconciliation | | | | | |
| To-Complete Performance Index | | | | | |
| Contract Variance Analysis | | | | | |
| Cost Performance Review | | | | | |
| Analogous Estimation | | | | | |
| Parametric Estimation | | | | | |
| Detailed Estimation | | | | | |
| Cashflow / S Curve | | | | | |
| Variances | | | | | |

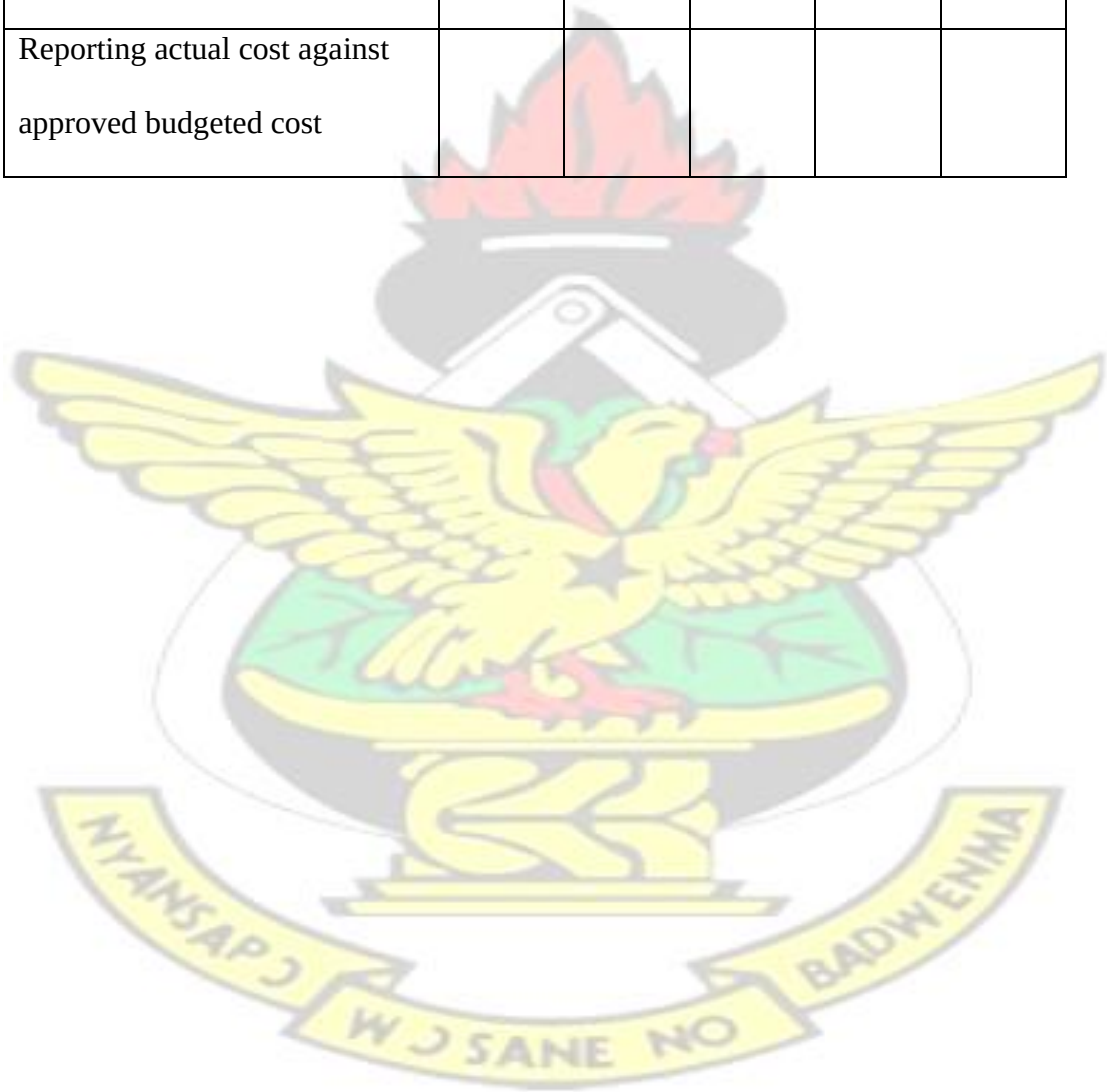
**SECTION C – TO ASSESS THE EFFECTIVENESS OF THE COST CONTROL PRACTICES IN DELIVERING PROJECTS TO SET PERFORMANCE STANDARDS**

This section of the questionnaire requires you to assess the effectiveness of the cost control practices identified in section B above in the delivery of construction projects by the MMDAs. Please tick where appropriate using the scale 1 – Not Effective, 2 – Less Effective, 3 – Neutral, 4 – Effective and 5 – Very Effective.

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Detailed works programme | | | | | |
| Consistent works inspections | | | | | |
| Responsible project budgeting | | | | | |
| Project Management Information System for project data access | | | | | |
| Project cost records-keeping / reporting | | | | | |
| Key Performance Indicators on cost | | | | | |
| Evaluation of works carried out | | | | | |
| Cost decisions based on forecasting and cost implications | | | | | |
| Designing within cost plan | | | | | |
| Regular update and reissue of | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| cost plan | | | | | |
| Contingency and risk allowances | | | | | |
| Consistent change management | | | | | |
| Justification for all elements entered into cost plan | | | | | |
| Reporting actual cost against approved budgeted cost | | | | | |





**SECTION D – TO DETERMINE THE CHALLENGES ASSOCIATED WITH THE USE OF THE COST CONTROL PRACTICES**

This section of the questionnaire requires you to determine the challenges that are associated with the cost control practices that are used in the delivery of construction projects by the MMDAs. Please tick where appropriate using the scale 1 – Not Negative, 2 – Less Negative, 3 – Neutral, 4 – Negative and 5 – Very Negative.

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Poor cost leadership in project delivery | | | | | |
| Budgeting and forecasting | | | | | |
| Validity of data from multiple subcontractors | | | | | |
| Integrating project schedule and cost | | | | | |
| Sufficiency of resources for cost management | | | | | |
| Controlling project changes | | | | | |
| Accuracy of reporting | | | | | |
| Efficiency of systems and processes | | | | | |
| Ineffective deployment of project resources | | | | | |
| Excessive wastage of materials on site | | | | | |
| Complex payment | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| mechanisms for project delivery | | | | | |
| Significant variations during project delivery | | | | | |
| Resource mismanagement on project site | | | | | |
| Under-pricing during project tendering | | | | | |
| Uncoordinated project design | | | | | |
| Incomplete / Inconsistent project brief | | | | | |
| Unrealistic project estimates | | | | | |