

**COST PLANNING AS A TOOL IN MONITORING CONSTRUCTION
PROJECTS IN THE GOVERNMENT SECTOR**

By

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DECLARATION

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

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ABSTRACT

The aim of this research was to investigate cost planning as a tool in monitoring construction projects in the government sector in the Ghana Armed Forces. The specific objectives of the study include; to identify the cost planning practices being adopted by the Ghana Armed Forces (GAF), to identify the implementation challenges of cost planning methods as a tool for monitoring GAF projects as well as to establish modern cost planning techniques to enhance project delivery on GAF projects. Overall quantitative research approach was adopted with mainly descriptive designs adopted to describe the distinctive and the rating of responses obtained from respondents. The survey instrument used was structured questionnaire adapted from previous literature. The data instrument was administered among 66 respondents of the GAF. The data was presented both in charts and tables and interpretation for each data information was stated. The analysis was obtained with the help of SPSS (version 23.0). The results of the study showed that Cost control of the construction stage, Cost planning and monitoring of the design process must correspond with the funds availability for the projects are highly ranked, cost planning practices being adopted by GAF on projects. The study further revealed that project management information system, Elemental cost planning and Cost estimating were identified as the highly ranked effective modern cost planning techniques that enhances project delivery. The study also concluded that there are significant implementation challenges of cost planning method as a tool for monitoring GAF projects. It is recommended that more cost planning practices should be adopted and used effectively since very little (cost planning practices) works beyond moderate effectiveness.

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LIST OF ABBREVIATIONS

BCIS	Building Cost Information Service
BoQ	Bills of Quantities
DES	Directorate of Engineer Services
EVM	Earned value management
GAF	Ghana Armed Forces
GHQ	General Headquarters
IS	Information Systems
MOD	Ministry of Defense
OECD	Organisation for Economic Co-operation and Development
PDO	Planning and Design Office
PM	Project Manager
PMBOK	Project Management Body of Knowledge
PMIS	Project Management Information System
SPSS	Package for Social Science' software
TPM	Traditional Project Management
QS	Quantity Surveyor

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DEDICATION

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CHAPTER ONE

GENERAL INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Cost planning is a process of allocating budget for a project and must go through proper monitoring and controlling to achieve successful completion and within the budgeted figure. Cost planning is a team work amongst professionals for planning stage, initiating stage, be part of the execution stage and supposed to monitor and control project cost effectively through tracking within the lifecycle of the project. According to Smith and Jagger (2006), expatiate cost planning as a group lead and its efforts to extend the restricted view of conversion price management by contemplating such matters as importance, use and efficiency of the construction building.

It is appropriate to plan and procure works in a manner to meet the allocated planned budget and for quality of work, estimated duration and to achieve value for money. Most projects are executed in the construction industry does not pass the value for money test when subjected. According to Anvuur and Kumaraswamy (2006), there has been a successive review in project execution which has shown that, substantial inefficiencies and then concluded that, value for money is not being achieved in both government and for donor-financed construction projects.

Some projects are abandoned at different levels of construction. Some other projects are completed successfully but with cost running over the budgeted figure. According to Kirkham (2014), the Wembley stadium in London and the Scottish parliament building in Edinburg was thrown in to controversy with questions on inadequate cost planning and budget management for both projects causing cost overruns, resulting in to public enquiry. These could have been caused by factors of inflations of material prices and increased

wages of labour. The other aspect will be the delay in payment certificates to contractors and which may call for interest charged on delay payment by the contractors. Projects are initiated for particular reasons to meet a specific benefit set by the promoter or the requester. Some of these benefits is to mitigate deficit of accommodations and also for social interventions. Every project is unique and will have to be managed as such from the initiating stage, planning stage, execution stage, monitoring and control stage and finally close of project. These phenomena can be controlled effectively by cost planning and monitoring. There is the need for effective cost planning has become increasingly important (Matipa et al., 2013).

An effective modern cost planning and monitoring and strategies put in place can successfully improve the performance of a construction projects and to make a prudence decision for better budget. As stated, cost effective advice will place the client and the client's team in a strategic stance to make a good decision when budgeting is based on expert knowledge coming from all influences (Knipe et al., 2002).

Effective project delivery can be based on good feasibility report from site for the construction and what is required to be done as specified on the working drawings. The feasibility report will help the design team to design to fit the outcome of the report and the project scope writing for the execution of the work. Adhering to project scope produce successful result in project execution.

As stated in the PMBOK (2017), "project scope management includes the processes require to ensure that the project includes all the works required and only the work required to complete the project successfully". Its further state that, managing the project scope is primarily concerned with defining and controlling what is and is not included in the project.

Kirkham (2014) discussed some importance of cost planning in the construction industry as, “cost planning aims at ascertaining costs before many of the decisions are made relating to the design of a building. It provides a statement of the main issues, identifies the various courses of action, determines the cost implications of each course and provides a comprehensive economic picture of the whole”. In furtherance, Kirkham (2014) stated that, a direct benefit of good cost planning is to reduce project risk. Other benefits of cost planning are, it reduces total expenditure, cost is certain, it accelerates tendering processes, it helps in saving time and money and it help for early cost checks to ensure preliminary estimate is more accurate.

The importance of this research topic, cost planning as a tool in monitoring construction projects in the government sector and the construction industry, as a tool in project management is to control cost within budget and purposely to help improve cost planning practices use in the Directorate of Engineer Services to manage construction projects effectively through critical monitoring for the Ghana Armed Forces to develop positively.

However, a comprehensive review of relevant literature will be carried out through journals, related books, internet, interviews will be conducted by the researcher for data collection on related information on cost management and monitoring issues in the Ghana Armed Forces construction projects. A review of literature from the directorate of engineer services that relate to managing construction projects, will establish a huge information base for the purposes of understanding the subject matter. Related documented minutes will also be used as a source of literature review.

Construction Projects in the Ghana Armed Forces (GAF) is being managed by the General Headquarters (GHQ), Directorate of Engineer Services (DES), under the auspices of the Ministry of Defense (MOD) in Burma Camp, Accra. DES was established to work in a

capacity as a consultant for the GAF and responsible for initiating, planning, assist in execution and to monitor and control the execution to successfully closure of the project. The directorate is made up of the following sections; Planning and Design Office (PDO), the Quantity Surveying section, Civil/Structural Engineering section and Mechanical and Electrical Engineering (M&E) section. The Directorate human resource are made up of military and civilian officers.

Duties and Responsibilities

The Planning and Design Office are responsible for the production of project drawings to fit the military standards.

The Civil/Structural Engineering section are responsible for the production of structural drawings.

The Mechanical and Electrical Engineering (M&E) section are responsible for the production of mechanical and electrical drawings.

The Quantity Surveying section is responsible for the following; preparation of approximate estimates, preparation of Bills of Quantities for tender and contract control documents.

The Directorate advises the MOD on all matters associated with construction projects for the Ghana Armed Forces.

1.2 STATEMENT OF THE PROBLEM

Cost overruns and contract stoppage are often issues encountered in public sector and the GAF is no exception. According to Avots (1983), cost overrun is simply defined as when the final project cost exceeds the original estimates. Cost overrun is a huge problem in every projects execution and will have to be understudied more to improve in the future (Angelo and Reina, 2002). Inefficiency in cost planning can be characterized

in poor scheduling amounting to overrun, and this was agreed by Mubarak (2015), as in real projects, it may lead to huge budget overruns, schedule delays, different parties' dissatisfaction, and a potential loss of business. This does occur because the various team members are not able to collaborate properly and work together as expected to deliver projects effectively.

The cost planning practices mostly engaged in project delivery in the government sector and the construction industry is not helping for project success (Cleland, 2004). In addition, it was also discussed that, inappropriate organization of design, lack of well-defined and delegated authority and clear responsibility, limited team member participation in the making and execution of decisions on the project, inadequate management information system and finally concluded with ineffective planning (Cleland, 2004). This was reflected by (Schriver, 2004) and that, these have been the effect of project cost planning in successful delivery of projects. On the other hand, project scope management seems to be one of the most being neglected in project management (Moustafaev, 2015).

Cost Planning in project delivery has been touted as a very powerful Project Management tool for ensuring Construction Project success (Kerzner, H. 2003). This view is echoed by (OECD, 2012) and have been practiced by several developing countries with positive results. Despite this, no developing country in the sub-Saharan African country has been able to implement Cost Planning concept to achieve project success (Kumaraswamy and Chan, 1998). This is very disturbing as Cost Planning have been known to ensure faster project delivery with minimum cost. The other aspect is the implementation of sound procurement performance measurements which would be imperative in the bid to curb corruption practices, in furtherance Osei-Tutu *et al.*, (2010) It has shown that knowledge

and debating issues with corruption is just as important for modern public procurement to establish and logically create monitoring processes in designing, implementing and finalizing projects. This phenomenon ends up affecting cost planning efficiency in project delivery.

An effective cost planning for successful project from inception to completion is based on the implementation of techniques put in place such as scheduling, monitoring project activities and managing which has proven success in formidable team performance as expected (Kidston, 2014). To enhance good cost planning and techniques in project delivery, the adherence to effective project management in monitoring construction projects are handled well enough to achieve successful project completion. According to Brech, (1975), defines management as a full social responsibility for effective economic planning in fulfillment of a given purposes or task, such responsibility involving, judgment and decision in determining plans and in using data to control performance and progress against plans.

This research was therefore aimed at answering the objectives set to meet the intended purpose to help the Directorate of Engineer Services manage construction projects cost effectively through critical monitoring for completion on expected duration for the Ghana Armed Forces to develop positively.

1.3 AIM AND OBJECTIVES

This study is to explore the impact of cost planning practices as a tool in Monitoring construction projects in the Ghana Armed Forces. To achieve this aim, three specific objectives were set for the study:

1. To identify the Cost Planning practices being adopted by the Ghana Armed Forces on projects.

2. To identify the implementation challenges of Cost Planning method as a tool for monitoring Ghana Armed Forces Projects.
3. To establish modern Cost Planning techniques to enhance project delivery on Ghana Armed Forces Projects.

1.4 RESEARCH QUESTIONS

For us to be guided and to gain insight of the above objectives, the study seeks to answer questions as follows:

1. What are the Cost Planning practices being adopted currently by the Ghana Armed Forces on projects?
2. What factors debilitates against implementation of Cost Planning method as a tool on Ghana Armed Forces projects?
3. What are the modern Cost Planning techniques to enhance Ghana Armed Forces Projects delivery?

1.5 SCOPE OF THE STUDY

The study was carried out exclusively on Ghana Armed Forces Construction Projects. The data to be used for the study would be collected from the professionals of the Directorate of Engineer Services at Burma camp in Accra and contractors working on the Ghana Armed Forces construction projects.

There would be an information gathering questionnaire to solicit for adequate data to be analyzed. A desk research would also be used to gather secondary data for the purpose of the research.

1.6 RESEARCH METHODOLOGY

To achieve the aim and the objectives of this research, the methodology be used would consist of extensive relevant literature review to cost planning for construction projects. To be able to collect data for the research study, related books, journals, minutes and the internet will be used for the collection of data, interviews and personal observations will also be carried out as well as questionnaires distribution. Questionnaires will be collected by the researcher and would be analyzed. A simple random sampling technique will be adopted. The target population of this research would be professionals from the directorate and contractors for the Ghana Armed Forces. The data analysis for this study would be analyzed based on descriptive and inferential analysis through 'Statistical Package for Social Science' software or SPSS version 23.0. For the Interpretation of the findings and to generate outputs from the questionnaire appropriately. The SPSS automatically structures the results as expected and into ranking. SPSS has proven to be one of the best data analysis tools over the years.

1.7 SIGNIFICANT OF THE STUDY

The researcher is of the view that cost planning as a tool for monitoring construction projects and it is very important in project execution for successful completion for better development of GAF and the construction industry. Cost planning as discussed by Kirkham (2014), specifies that, the development and response to the constantly changing requirements of today's customers is constant within building, like any other practice.

Cost planning as a benefit in construction projects do eliminate constraints in project delivery such as scope, cost, time and then quality. In the aspect of scope, PMBOK (2017) stated that, “project scope management includes the processes require to ensure that the project includes all the works required and only the work required to complete the project

successfully”. And in addition, PMBOK (2017) advance that, managing the project scope is primarily concerned with defining and controlling what is and is not included in the project. In furtherance, Moustafaev (2015) also stated that, scope definition remains the key ingredient in the success of any project, “If one does not understand completely what he or she is going to build, what is the point of engaging in scheduling or budgeting?” and then concluded that, the scope of the project is the design and construction.

Every project is unique and have to be managed as such. If effective planning and expert knowledge are put in place, it will help ensure efficiency in the government sector system of managing construction project and to facilitate a quick project delivery and effective development of the country. According to Badu *et al.*, (2011), observed that financing of construction projects will always be different from projects to projects.

It is time to take a critical look and identify the causes and the needs to address the issues and to help implement the modern techniques and practices to improve the issue of project delivery in the future. However, the outcome of the research study will be useful to the Directorate of Engineer Services and the construction industry as a whole and by strengthening Ministry of Defense and Ghana Armed Forces in construction projects in the future.

1.8 ORGANISATION OF THE THESIS

This research structure consists of five (5) chapters which are as follows:

1. Chapter One: The first chapter is the introduction of the thesis; giving a brief background to the study, statement of the problem, aims and objectives, and research questions. It also states the significance of the study, research methodology, scope of the study and structure of the study.

2. Chapter Two: In this section, literature review is created on the basis of study goals.

This section examines the results and conclusions of the research.

3. Chapter Three: This section outlines the research methodology describing the techniques for collection, the sample size requirement, the sampling scheme used and the statistical instruments used in the evaluation.

4. Chapter Four: In this chapter, a summary of statistical analysis is recorded on the field information gathered. To illustrate statements in the analysis.

5. Chapter Five: This chapter is the final overview of the results and conclusions of the research as well as suggested recommendations.

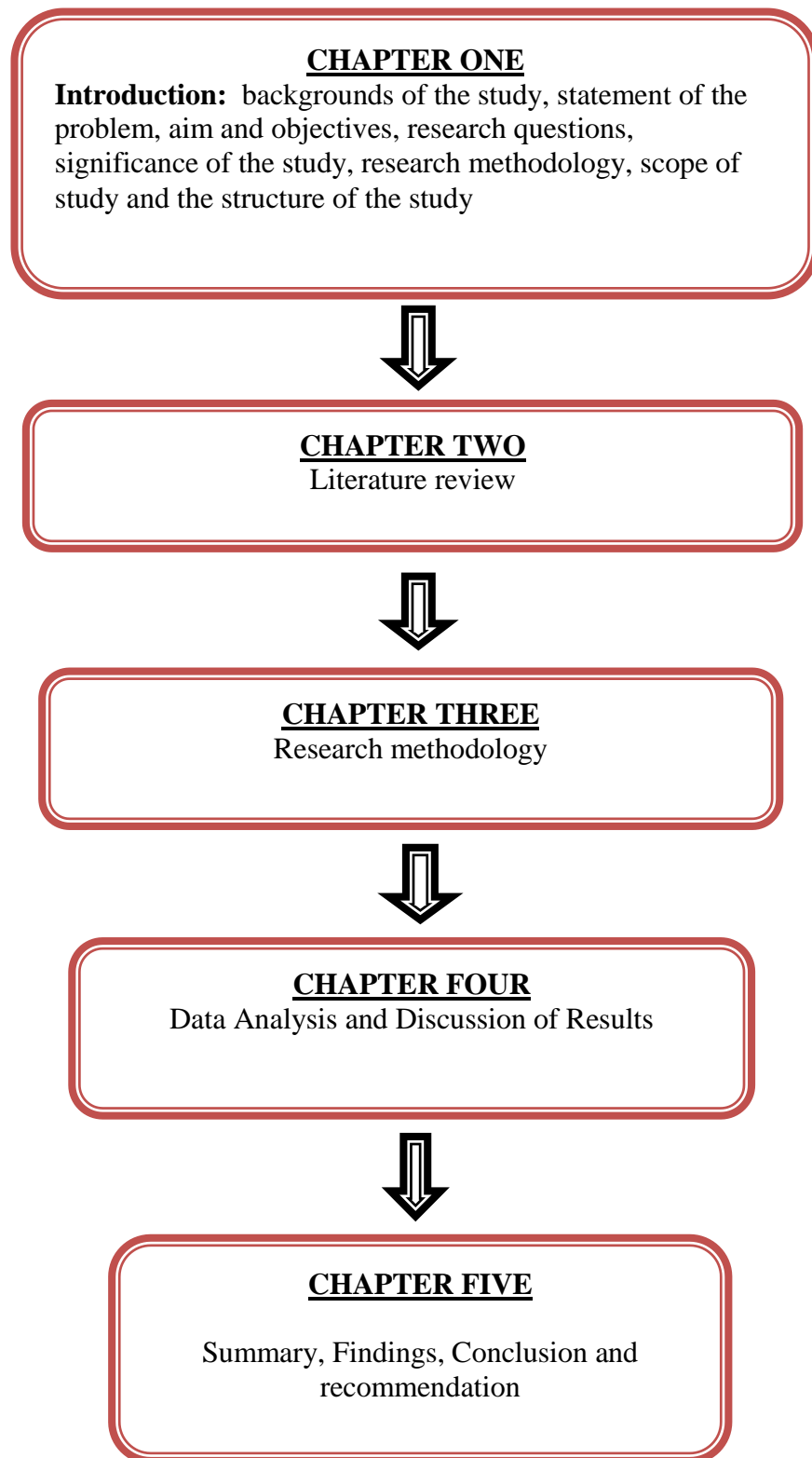


Figure 1.1: Workflow of organization of thesis

1.9 CHAPTER SUMMARY

This chapter is the research introduction and gives the background to the study, the issue statement for the study title selected, the study goal and the research-based goal, the research questions on the objectives. Furthermore, the chapter covers the significance of the research, why cost planning to be undertaking for properly managing of construction projects for cost effectiveness for the Ghana Armed Forces. The methodology of how the research will be carried out for the fulfilment of the aim and the objectives set by the researcher. Even though the research was for the government sector, the scope of the research is limited to the Ghana Armed Forces so that the researcher will not go through too much challenges for the data collections. I am of the view that after this research thoroughly done, cost planning as a tool in monitoring construction projects would be encouraged for managing of projects on cost based in the Ghana Armed Forces.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter presents the literature review for the research. Relevant literature on cost planning as a tool in monitoring construction projects in the government sector is discussed. The chapter will explore the problems and the benefits of cost planning in construction projects. According to Hart (1998), define literature review as consistency, clarity and brevity, and effective analysis and synthesis; in other words, the use of ideas in the literature to justify the particular approach to the topic, the selection of methods, and demonstrating that this research contributes something new. This is to forecast on the rigorous decision making on against budget in the designing stage, monitoring and evaluating habit as well as the consideration of modern techniques to enhance project delivery for GAF.

However, procurement of works also plays a major in cost planning of construction projects. Essentially, all procurement operations had to be notified, organized and implemented in a way intended to satisfy the budget for the venture that was authorized. According to Ramabodu (2014), all procurement operations should therefore be linked with the strategic result needed for the Project, ranging from assessment of economic circumstances that have implications of shipment until effective use.

2.2 AN OVERVIEW OF COST PLANNING

Cost planning is a procedure with the involvement of professionals that develop an efficient cost estimate for construction projects to be executed with budget in mind. According to Smith and Jaggar (2006), Cost scheduling is a system of procedures and techniques used by quantity surveyors. The goal is to guarantee that customers receive

value-for-money on their initiatives; make sure customers and developers know the price implications of their suggestions; to enable customers to plan for their initiatives if they so choose; and to provide developers with guidance that allows them to come up with practical and consistent plans within a budgetary framework.

Construction is an essential part of infrastructural development of every country worldwide. However, building as one of the important infrastructure development facility at all time. According Kirkham (2014), buildings provides shelter, we work in them; they provide the very means by which civilizations function and it is because of this that we tend to take our built environment for granted.

According to Smith and Jagger (2006), buildings as an infrastructure are the enablers accommodation, hospitals, schools and an essential element of civilization. Dealing with infrastructure, a critical care must be employed for project delivery from planning to successful completion and as well as budget of the building taken in to consideration. In continuation, Smith and Jagger, (2006) stated that, cost planning, as part of project cost management, requires that full commitment is invested from inception to completion of project. This call for a procedure to be managed for achieving the overall cost of the project to meet the budgeted figure allocated (Smith and Jagger, 2006). Cost planning implies a framework of procedures and demands a commitment from the design team to work closely with the cost planner to achieve the project's cost and other time and quality objectives; cost management is a project and design team responsibility focused on delivering to the client the best value for money (Smith and Jagger, 2006) Cost planning for project is very important and it is aimed at ascertaining project cost control and with monitoring technique.

2.3 PROJECT PLANNING IN COST PLANNING

In project execution, project planning is the first critical stage in project lifecycle after initiating, that is a good planning makes an evidence for good cost planning in successful project delivery. At this stage, cost planning process activities for construction projects are heavily dependent for cost, performance and the resources required for planning are discussed, as stated by Wysocki and MaGary (2003), the scheduling activity consists of choosing the kinds of human resources required to fulfill the department's duties. That means identifying the types of skills needed and the number of people possessing those skills. In addition, Wysocki and MaGary (2003), agree that project plan is indispensable in traditional project management (TPM). It is not only a road-map to job but also a decision-making instrument. The scheme proposes additional methods, time plans and resources that can be used to pick the greatest option by design managers. According to Benator and Thumann (2003), on the other side, scheduling needs a more contemplative approach, the project's long-term view and planning may include the events "over the horizon" when they will occur. It needs more than thinking and often lacks attention because it is not practical or immediate. However, good planning is a key to a good project. However, project planning as indispensable said above, has three benefits in planning discussed by Wysocki and MaGary (2003) as follow;

- Planning reduces uncertainty: while we would never expect the project work to take place exactly as planned, planning the work allows us to consider the likely results and to put the necessary corrective measures.
- Planning raises understanding: The mere planning act provides us a better knowledge of the project goals and goal. We would still profit from having done the workout even we were to discard the plan.

- Planning improves efficiency: Once the project plan and the resources needed to implement the plan to be defined, we can schedule the work to take advantage availability of resource.

In furtherance, Benator and Thumann (2003) is of the opinion that careful Planning, together with good implementation, is always leads to a successful project, and poor planning on the other hand can lead to a successful project, even with good implementation, but often a project fraught with crises, stress and loss of opportunity because the PM and its team rescued the project instead of looking ahead for other possibilities.

In addition, planning of project is reliance on some deliverables for successful project planning and for producing of realistic costing by the QS. Some of these deliverables includes specifications, drawings, cost estimates, project schedule and equipment. Benator and Thumann (2003) stated that, in the When it is due and with primary responsibility for each deliverable(s), it is important to identify these deliverables at a project planning stage (PM has overall responsibility for each deliverable). See the example of this deliverable in Table 2.1.

Table 2.1 Examples of deliverables for successful project planning

<i>Deliverable</i>	<i>Prime Responsibility</i>	<i>Date Due to PM/ Customer</i>
List of Deliverables	Project Manager	
Project Schedule	Project Manager	
Bore Samples Report	ABC Soils Firm	
10% Drawings	Cognizant Engineers/Architects	
60% Specification	Cognizant Engineers/Architects	
60% Cost Estimate	ABC Cost Estimating Firm	
90% Specification	Cognizant Engineers/Architects	
90% Cost Estimate	ABC Cost Estimating Firm	
100% Drawings	Cognizant Engineers/Architects	
100% Cost Estimate	ABC Cost Estimating Firm	
Complete Bid Package	Project Manager	
Announce Procurement	Project Manager/Customer	

Source: Benator and Thumann (2003, pg. 6-7)

For a good cost planning to be achieved in project planning, the listed deliverables needed to be taken in to consideration. Cost of project is being relied on the delivery of each deliverable. Decision making in terms of budget allocation and discussion made is based on the input and the output against budget in design stage. As stated by Smith and Jaggar (2006), designing for value for money in clients budget allocation. According to Benator and Thumann, (2003), each stage of design, cost estimate should be produced for checking against budget allocation for good cost planning practices.

2.4 COST PLANNING PRACTICES ON GHANA ARMED FORCES PROJECTS

Cost planning is a process to conducted in prediction of cost for projects execution to meet the budget allocation. Therefore, works associated with cost prediction is difficult and yet to be executed professionally but with budget being optimum. Sadly, cost planning in

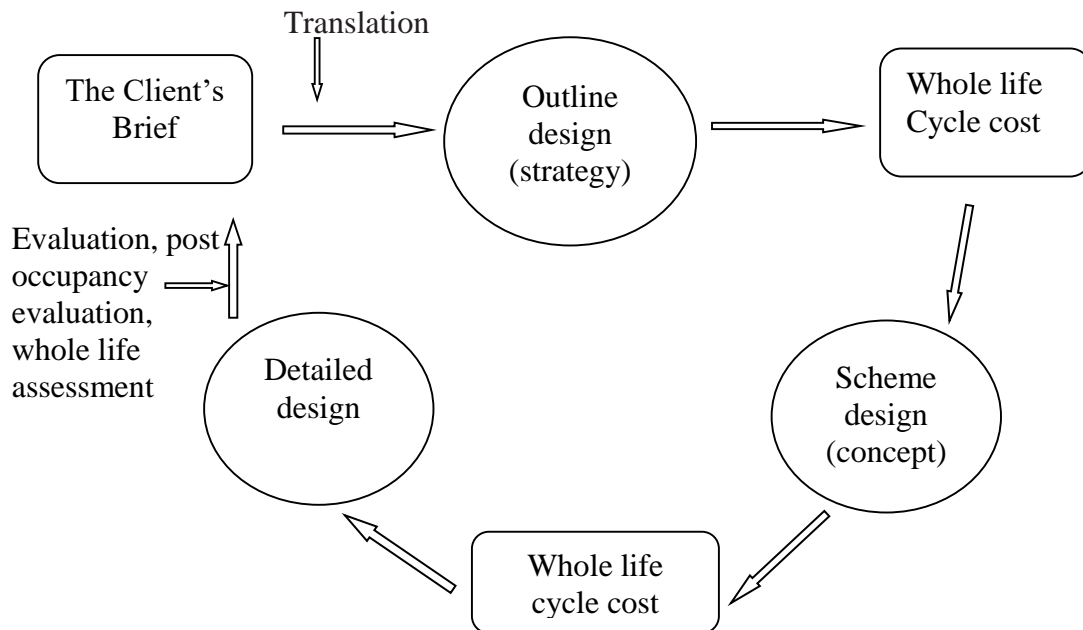
construction projects have been plagued with problems over programme and budget with public sector construction projects and the industry as a whole, there by not meeting the budget (Kirkham, 2014). Failure to understand and manage this costing complexity can result in extensive cost variations and a much greater risk of failure in delivering value for money (Boussabaine, 2006).

According to Kirkham (2014), As a process, cost planning is difficult to define concisely because it involves a number of procedures and technique which the QS or Building Economist uses concurrently. The traditional design-design-detailed design process is generally followed by traditional cost planning. The cost planning process begins in a practical sense with the development of a figure in the ball park (or a cost bracket), so that the customer can decide whether the project is feasible. Therefore, according to Kirkham, (2014), a good cost planning system should ensure the following.

1. Encourage a tender figure to be as close to the first estimate as possible, or to anticipate any probable difference between the two and within an acceptable range.
2. Ensure the resources accessible for the initiatives are distributed to different components and sub-elements efficiently and economically.
3. Always involves the measurement and pricing of approximate quantities at some stage of the process.
4. Aim to achieve good value at the desired level of expenditure.

In continuation, Kirkham (2014) proceeded that, a direct benefit of good cost planning is to reduce project risk. Steps ought to be taken to ensure that the project development budget opportunities and threats are fully appraised are identified and assessed accordingly, then describe the cost planning process in three phases as follows:

- Phase 1: Defining the brief and setting the budget. In disciplines out of construction project management, this is commonly referred to as scoping or framing.



Source: Kirkham (2014, pg. 8)

Figure 2.1: The conventional stages of the cost planning process including whole life cycle costing.

According to Kirkham (2014), to achieve effective cost planning, the process must go through stages including the life cycle cost of a project. These stages outline the checks to control cost within budget through briefing of the design team in respect to designing strategically to cost and whole cost of the project. This was further explained by Seeley (1996) as that, Customer needs have now been created and verified to be sustainable, the location has been monitored and the architect starts to explore different option methods of designing and constructing the construction. Therefore, the design team brief back on cost to design (Kirkham, 2014). However, according to Smith and Jagger (2006), this stage is considered as an important role in guiding project decisions making, characterised with the development of design process and cost estimating.

Seeley (1996) asserted that with regard to the system layout, that significant scheduling issues will be solved at this point, the outlines and the outline drawings will include parts and lifts and that, in relation to the organizational structure, the facilities or finishing will be regarded. To the detailed design, Seeley (1996) stated that, Sketch plans are now being finalised and some work details are being prepared. In other to prevent the likelihood of future changes, it is most desirable that these should be approved by the constructional client. In conclusion, Smith and Jagger (2006) stated that, In the brief except with greater emphasis, corrective action is undertaken to maintain the budget and the requirements for the project brief and the agreed design. Therefore, the diagram explains cost planning relevantness in the processes to ensuring an effective cost control in decision making and to keeping cost of project within allocated budget for project success.

- Phase 2: The layout method is price scheduling and controlled. This stage is critical since development choices affect life-long efficiency directly.
- Phase 3: The cost control of the procurement and construction stages.

With the description given for cost planning above and as stated accordingly, the procurement process has altered and choices are sometimes taken in stage 1 previous to layout. Cost scheduling recommendations should therefore take into account the effect on design and manufacturing price, which procurement choices may have (Kirkham, 2014). The idea is at present to continue cost planning beyond the conventional borders and to take account of the whole of life rather than the period before the completion of the project. Therefore, procurement operations must be thoroughly examined on the basis of price efficiency before, during and after building. (Kissi et al, 2017). In addition, cost planning must comprise cost planning management as a tool to monitor and control all processes during the design stage as well as the construction procurement stage. In the design process, it includes finalising the needed brief and developing the design. Boussabaine,

(2006) stated that, the price scheduling needs cost consultants to employ their knowledge and creative ideas to create cost-benefit alternatives for the whole of their lives that provide customers with significance for cash.

However, every project is unique and will have to be handled or managed as such. According to Seeley (1996), There is no universally applicable cost planning method for any kind of construction project. Buildings have a wide variety of features and functions, as well as serving the building to serve the needed purposes. Hence, it is not surprising that most infrastructure being managed did not experience good cost planning practices for project execution.

2.4.1 Initiating of Project

Initiating of a project is by identifying an infrastructure project needed to be developed for a purpose, and the first activity or stage done in project implementation and must achieve its goals and objectives. According to Kirkham (2014), some of these purposes could be developing of leaving accommodations, offices, schools and also for social facilities. Initiating project effectively will be based on good feasibility studies conducted. However, according to Seeley (1996) stated that, feasibility phase of project it is necessary to establish an efficient cost control system and, in specific, to produce a realistic first estimate for cost scheduling resources.

Effective cost planning efficiency in project initiating without project charter plagued with problems but according to PMBOK (2017), the establishment of project charter guides project delivery. The charter provides full project management control and cost planning effectively.

2.4.2 The Designing Phase

The building design process is a complex interaction of skills, judgement, knowledge, information and time, which has as its objective the satisfaction of the client's brief (Kirkham, 2014). According to Smith and Jagger (2006), for any type of building venture there is no widely applied cost management technique. The design phase establishes the early stage of the need for the project development to the brief and on to tender documentation. This was echoed by Boussabaine, (2006) and stated that, the design stage has been considered a major influencing factor in designing for the idea of the client, to generate the expected value set and the design should simultaneously satisfy the whole life cycle cost aspiration. However, this phase describes the cost planning process in theory and practice, discussing the issues involved from a design team and client perspective of the design to budgeting (Smith and Jagger, 2006).

However, in addition to the above, Kirkham (2014) stated that, for effective cost planning to be achieved in the designing phase in decision making is based on the role of the design economist/cost planner, to provide information with regard to initial and future costs so that the design team can make decisions knowing the cost implications. But in continuation, it is not usually the building economist's responsibility actually to provide 'value' as this must be the province of the design team as a whole – of which, however, the building economist should be a contributing member (Kirkham, 2014).

2.4.3 The Traditional Cost Estimating

According to Kirkham (2014), after the designing phase, the quantity surveyor is responsible of the production of bills of quantities for cost planning practices. In furtherance, Kirkham (2014) stated that, prices are applied to the measured quantities the BoQ becomes a representation (or model) of the cost of the project. Smith and Jagger,

(2006) stated that, the traditional approach is to measure and price BoQ similar to that being adopted by estimators in pricing 'Builder's Quantities' for projects using only specifications and drawings. In the other hand according to Kirkham (2014) which stated that, the impact on the cost of controlling some layout factors could be assessed by altering the amount of the recorded goods or changing the price according to differences in specifications.

However, in traditional cost estimating in cost planning practices, the BoQ the data acquired from the change of quantity or prices would arrive too early, to prevent the abortive development efforts, and at a very early point of the development method (Kirkham, 2014). In conclusion, (Kirkham, 2014) stated that, an estimate that is obtained from a BoQ It would also be too early to indicate the probable price engagement of the customer at the start of the venture or to permit all price controls to be carried out.

2.5 IMPLEMENTATION CHALLENGES OF COST PLANNING ON GAF PROJECTS

According to Matipa et al. (2013), After the worldwide financial crisis in early 2000, the need for efficient price scheduling became progressively crucial. As a key component of effective building projects, price scheduling has become a needed method to achieve importance for cash, as a result of an awareness of project cost effectiveness. price scheduling. Despite these cost planning positive attributes, cost planning implementation in the GAF has been plagued with challenges as well as the whole construction industry, thus affecting project delivery.

2.5.1 Factors Affecting Cost Planning

The phase of cost planning in project is the most critical phase of every construction project (Kirkham, 2014). Cost planning process ensures effective and efficient planning for project success. According to Seeley (1996), at the inception stage of a project, the requirements of the project development, and it is the responsibility of the design team move to the next stage in the plan of work for feasibility stage at which an effective cost control mechanism needed to be established, and, in particular, a realistic first estimate is produced. As stated by Kirkham, (2014), sadly, several high-profile construction projects in the United Kingdom have been plagued with problems over programme and budget with public sector construction projects, of which did not meet the budget; and those project runs into financial difficulties due to poor cost planning practices. Such projects that suffers poor cost planning practices was the new national stadium at Wembley, a project that has been mired in controversy with questions over cost planning and budget management, and the construction of the new Scottish Parliament Building at Holyrood in Edinburgh was also shrouded in controversy, resulting in a full public enquiry (Kirkham, 2014). This poor cost planning practices has duly affected most construction projects of the GAF.

However, according to Smith and Jagger (2006), a good cost planning is concerned with planning with the money available for a project. In explanation, Smith and Love (2000) stated that, based on the money available, critical have cost monitoring activity should be put in place as the working or production of drawings, specification, schedules and other project information needed and execution of the project are taken in to consideration. In conclusion, Smith and Jagger (2006) advanced that, this process is the whole point of cost planning – keeping expenditure within the amount allowed by the client.

2.5.1.1 Cost Planning Stages

According to Kerzner (2001), an effective cost planning cannot be accomplished well enough unless the necessary information needed becomes available in project planning. However, the conceptualisation of cost planning as a two-stage processes are just as valid today, and thus a programme of cost planning and control should comprise the following (Kirkham, 2014):

- Stage 1: The client brief, procurement advice and the budget
- Stage 2: Cost planning and control of the design process

In furtherance, Kirkham, (2014), advance that a brief discussion will be made on the two cost planning stages for effective cost management for successful project delivery.

• The Client brief, Procurement Advice and the Budget

In particular, the reforms that emerges in the Reflecting Construction Report (Kirkham, 2014) have now shown that an effective client brief is important. The most considerable recommendation is the use of more formalized approaches to develop a brief of the customer and to ensure that such information is effectively translated into the design. Thus Kirkham (2014) was agitated that, the traditional informal arrangements, usually between the client and the design team, were seen to be largely ineffective, particularly for larger and more complex projects with multiple stakeholders. As confirmed, it has emphasised this, these developments have been a response to the problems of conceptualising project dynamics along traditional lines of thinking (Kirkham, 2014).

However, it is crucial that the best effort be made to ensure that the best information and decisions are obtained for the client and the design team in this crucial early stage. (Smith and Jagger, 2006).

However, budgeting is concerned much more with the concept of value for money, financing, revenue streams and corporate decision-making (Smith and Jagger, 2006). According to Kirkham (2014), cost planning processes have evolved to be more client oriented and its importance in the overall project life cycle has grown accordingly. This is the case of value management to ensure that the project is budgeted correctly for a desired standard and then to ensure that the approved budget is spent effectively.

Therefore, depending on the type of project and client, a decision may be made about the method of procurement. Traditionally, there is strong evidence linking project cost to procurement route – indeed, consequences of an incorrect procurement route selection decision (Kirkham, 2014). It is then noted that, the involvement of the client in the project will also give useful clues as to which procurement route is most appropriate. In the hand, Smith and Jagger, (2006) listed the very issues confronting the performance of consultants consistently such as:

- Improving the Organisation, management and coordination of members of the design and construction teams.
- A lack of integration between architects, building professionals and the contractors.
- Poor communication between these teams and inadequate client consultation.

In conclusion, Smith and Jagger, (2006) stated that, the response of professions and industry has often been erratic, temporary and often too slow. Consequently, clients have demanded improved service and improved methods of procurement in cost planning methods.

- **The cost planning and control of the design process**

According to Kirkham (2014), it is at this stage of the process that the effectiveness of the work carried out previously is tested. Like any other project, the greater the quality of preparation of work carried out at the pre-design stage, the lesser the likelihood being of major revisions and design variations. Ultimately, the effectiveness of the outline brief comes into sharp focus. The main functions at this point are as follows postulated by Kirkham (2014).

- Development and comprehensive short preparation.
- Design Development.
- Cost control through design creation.

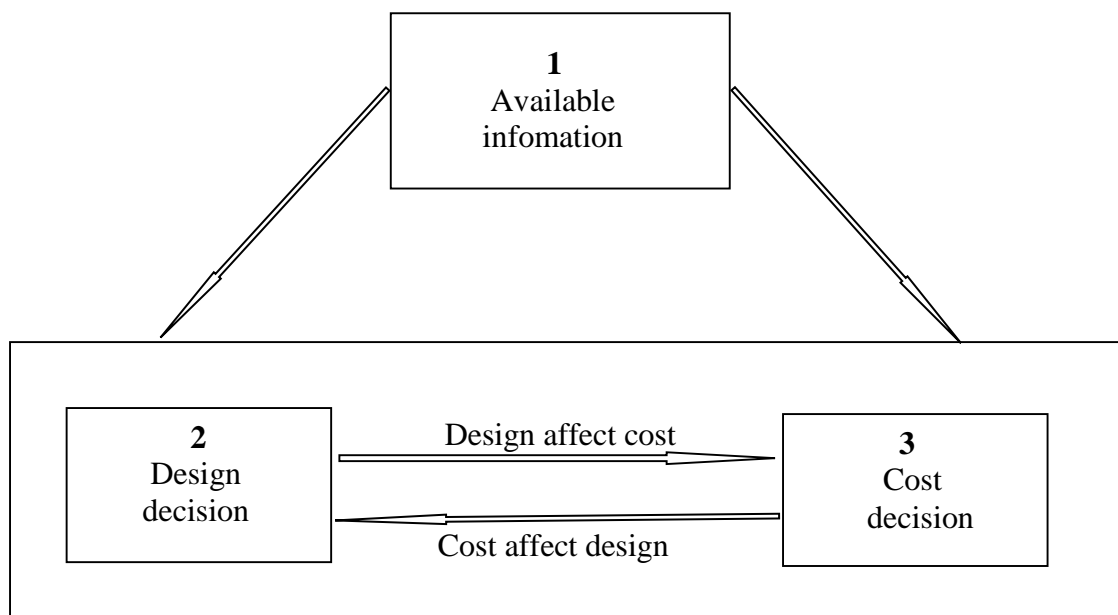
Kirkham, (2014) stated that, it is unfortunate that in many cases, the amount of time and effort spent by the professionals on each of these three aspects listed above is often inversely proportional to their relative importance. Effort are often focused completely on the third dimension, with perhaps a little guidance on the second. Sometimes the excessive effort needed to maintain design development within cost boundaries is due to unwise actually stems from unwise choice taken in the previous phase without adequate cost inquiry (Kirkham, 2014).

The Royal Institute of British Architects (RIBA, 2000) view this stage as being critical in terms of the development of the design. The client has a critical role in the strategic brief by specifying clearly all the key requirements and constraints. According to Smith and Jagger, (2006), the main purpose of cost planning at this stage is to document the strategic requirements of the project and plan future action. The cost advice in relation to this stage is essential as its aim is to provide the client with a project appraisal and recommendation that assesses the project technically, functionally and financially (Smith and Jagger, 2006).

The cost advice based on the basic information available at this stage is to establish an initial budget for client's organisation. The important action the design team have to take, is to consider and confirm that the client's budget or cost limit is feasible for the execution of the project (Smith and Jagger, 2006).

In addition, Smith and Jagger, (2006) emphasized that, the following decision-making criteria should be noted in design process of a project for effective cost planning:

- Cost decisions made during the Strategic Brief stage are based on the client's functional requests, rather than on a particular design solution.
- Decisions made always take account of the limited nature of the information on which they are based.
- Decisions are always made in such a way as to impose minimal restriction on the range of possible design solutions later on.



Source: Smith and Jagger, (2006, pg. 170)

Figure 2.2: Relationship Between Information, Cost and Design Decisions

According to Smith and Jagger, (2006), explains the decision phenomenon base on cost implications on designing as requested. The relationship between information available at the start of a stage and the design and cost decisions made during the stage is probably best described as design affect cost and cost affect design (Smith and Jagger, 2006), thus informing the client of availability of funds and the design team designs accordingly for significant cost planning for project success.

Therefore, the diagram illustrate the fact to be considered as the available information in Box 1 expands and changes, it influences the interrelated aspects of design and cost decisions in Boxes 2 and 3. One aspect should not be considered without understanding the effect it has on the other two aspects (Smith and Jagger, 2006).

2.5.2 Cost Control for Projects

Kirkham (2014) understanding to cost planning in relations to cost control is that, cost control is the process of ensuring that, the production drawings and works measured in the Bills of Quantities (BoQ) matches the scheme, otherwise tender figure probable to be quite distinct from the estimate quantity. Before the contract documentation, including the BoQ, is finalised, and not afterwards, any required modifications must be made. This view is echoed by Seeley (1996) and stated that, it is vital to operate an effective cost control procedure during the design stage of a project to keep the total cost of the scheme within the building budget.

In the other hand, it is therefore necessary that, every construction company operates in an effective way by practicing cost control procedure during the execution stage of the construction project, to main the cost of executing the project within the budgeted cost as prepared and approved for delivery (Adjei et al. 2017). Bahaudin et al. (2012), also explained that, when construction project commences, the budgeted cost of the project

serves as the baseline for the contractor or whoever is undertaking project cost control to use it to check and control the construction costs.

Moreover, a broader understanding of the various aspect of cost control principles are vital to enable project managers or cost engineers to effectively prepare their project cost control and in the development of future cost forecasting techniques for effective project delivery (Skitmore and Marston 2005). However, the main principle of cost control in cost planning as a tool in monitoring construction projects, is expected to give a visual indication or offer an early warning notification to team members, of possible budget difficulties at predetermined periods for corrective measures to be decided for solutions (Adjei et al., 2017). The implementation of efficient cost control processes allows the architect to be fully notified about the cost consequences of all his/her design choices. This requires close cooperation throughout the design phase between the architect, the quantity surveyor and any consultants involved (Seeley, 1996).

In addition, project cost control practice is one of the difficult tasks in the current project cost planning management faced by most consultants, contractors and the construction industry as a whole of which GAF is not left out, and have not enjoyed its benefits. However, the practice of cost control in relation to cost planning is a required task for the survival and growth of every construction organization in every nation. The practice of project cost control is to assists organizations to eliminate or mitigate unnecessary wastage of resources in the execution of construction projects (Adjei et al., 2017). Therefore, ineffective cost control will have negative effect on project success (Kerzner, 2001)

2.5.3 Cost Checking

According to Kirkham (2014), in cost planning, cost checking as the most time-consuming part of the entire process and the more legitimately they can be minimized, is an important element in the cost management procedures. If a thorough price review of the entire layout is essential (perhaps because the price scheme does not provide adequate instruction to the builder), then components should prepare the work designs if the reaction from the costs inspections is to be of genuine use. Therefore, according to Smith and Jagger (2006), the design team will be working on the final and assembly drawings (working drawings) and details that will become part of the contract documents. The extent to which cost checking should be carried out will depend on the following aspects (Kirkham, 2014):

1. QS may be permitted for an extra time. This is different from work to work, but if the absence of moment keeps vital price controls from being performed, the entire price scheduling effort will mainly lose money.
2. *The amount of apparent alteration to the scheme since the cost plan was prepared.* If the cost plan for the same architects and customer was based on a very similar plan and the details of design and specification were thus quite well known, the cost check could be nothing more than a short look at the drawings to show that nothing is substantially different. Even if the conditions are not as ideal as this, a rapid inspection of the QS may still make it possible for the designs to illustrate the costs planning. The documents should still be printed and initialed.
3. *The amount of detail in the cost plan.* If it was possible to take out fairly full approximate quantities, the cost check may simply consist of comparing these quantities with the working drawings and checking that the specification is unaltered. The degree of confidence which exists between cost planner and architect –if the architect is known to be cost conscious, capable of and enthusiastic about cost design,

4. *The familiarity of the type of project.* Most price consultants are relatively convinced that a college is scheduling its costs, while a planetarium is a very distinct proposal. In the latter case, a number of presumptions would likely be included in the price scheme and it should be examined in depth.

5. *The importance of the element.* It would be a very self-confident cost planner who would not bother to check the external walling, or the roof of a single-storey building, even under the most ideal conditions. On the other hand, if time is pressing some of the smaller elements can often be ignored.

A typical example of a cost check form has been illustrated and shown below. As each cost check is carried out, a copy of the cost check form should be sent to the design team so that they have an up-to-date running total of the project (Kirkham, 2014).

Example of cost check form.

COST CHECK

Contract:

Cost check:

Element:

Date:

Gross internal floor area:

Total cost of project forward from
cost check no. 2

£ total £/m2

£125,600.00 52.55

Total cost of element from
updated cost plan

Elemental cost check

(see attached dimensions)

380m3 reinforced concrete in beams
and columns

£90.00 £34,200.00

2950m2 formwork to beams and columns

£16.00 £47,200.00

31 tonnes Reinforcement (as Mr. Smith of
Consulting Engineers 28.06.99)

£1,200 £37,200.00

Sundries

£10,000.00

Revised cost of element
carried forward

£128,600.00 £128,600.00 53.80

Amount of saving/extra

£3,000.00 £1.26

Revised total cost of project
carried from previous to current
cost check to be carried forward
to next cost check

£1,907,222 + £3,000 = £1,910,222

Source: Kirkham (2014, pg. 272)

However, in connection with cost checking, it is as well to remember that, the total cost of the project and also the inherent margin of error in cost planning is accepted. Therefore, a cost planner whose estimates consistently get within plus or minus 5% of the accepted tender as doing well (Kirkham, 2014). However, according to Smith and Jagger, (2006),

the main purpose of this stage is to conduct a detailed cost checks for each element to ensure that, the cost targets and the cost limit have not been exceeded.

2.5.4 Lack of Monitoring and Evaluating

According to Cleland and Ireland (2002), in cost planning management, the process of monitoring, evaluating by comparing planned results with actual results to determine the status of the cost of the project, schedule and technical performance objectives of the project will have to be enforced for the success of project delivery. However, according to Cleland (2004), frequent visit to project site, will help in the possible identification of each area of the project that might have challenges that requires improvement or correction.

Effective monitoring and evaluating control measures in cost planning management needed to ensure changing circumstances which do not occur and assessing works as ordered during execution stage, this was argued by Adjei et al, (2017) that, the method used in the monitoring of construction cost might be seen as the most problematic function to be accomplished. It is the responsibility of the staff who are dealing with the main cost data at the construction site to monitor them in their routine dynamic construction operations. In addition, Adjei et al, (2017) stated that, as the construction work advance, earned value of each work element must be monitored to permit the identification of cost status at any given progress.

2.5.5 Payment Delay to Contractors

The Malaysian construction industry, like other construction industries in developing nations, has had a long history of lengthy payment times, which has caused many contractors to suffer from cash-flow problems and thus delaying projects (AIAC, 2018). This was further advanced by Amoako, (2011) that, when the contract period is delayed,

it means the contract cannot be completed within the stipulated time and payment delay will lead to: time and cost overrun; delay in completion; termination of contract.

According to Nasser, (2013), delay payment to contractors leads to risks that affect the project itself and all stakeholders. This was echoed by Kirkham (2014) that, if the project cash flow will invariably be affected by the timing of payments by the client, the risk in cost overrun will be inevitable. In furtherance, Kirkham (2014) with the view that, any potential problems should be identified as early as possible to allow mitigation strategies to be developed within the cost/risk management plan. This disturbing phenomenon will have a great negative effect on the whole project by slowing or halting works, and invariably have effect on the project budget for successful project delivery.

2.5.6. Poor Project Management

A good project management is probably the most important aspect in controlling and/or managing the costs of a construction project during inception through execution to completion (Kerzner, 2001). It is often true that a good project, if combined with poor project management, will usually experience difficulties in the process of cost planning.

A poor project management will experience the impact difficulties in construction process of a project listed as follows (Cleland, 2004; Schriver, 2004):

1. Lack of planning and coordination;
2. Poor communication between members of the project team and the project sponsor;
3. Failure to identify problems and institute necessary and timely design and programming changes;
4. Lack of control over time and cost inputs;
5. Lack of end user involvement

Good project management skills control costs by scheduling, monitoring and analyzing cost data, and finally implementing measures to correct problems relating to cost of the project for cost planning effectiveness (Kerzner, 2001).

2.6 COST PLANNING TECHNIQUES

According to Smith and Jagger, (2006), building economics certainly requires an understanding of the cost planning techniques to practice cost control in the building design process, but more importantly, it is also necessary to appreciate the economic, industrial, environmental, social and project dynamics and environments in which development takes place. The techniques of cost planning can be readily understood and applied on a project (Smith and Jagger, 2006). Therefore, this technique helps to strategise decision making in the early stage of cost planning and also the execution stage on cost controlling and expenditure against planned allocated budget for successful project delivery. However, limitation of current cost planning techniques is that which reflect the finished product of construction rather than the process of construction (Smith and Jagger, 2006).

In an efficiency of cost planning practices, Smith and Jagger, (2006) concluded that, the use of techniques in project delivery, it is essential for the cost planner to be mindful of the characteristics of the various techniques; be familiar with the stage best suited for the application of the technique; and to appreciate the advantages and drawbacks to their use.

2.6.1 Project Management Information System (PMIS)

According to Son et al, (2015), a Project Management Information System (PMIS) is a main Information System (IS) tool used to complete building projects successfully completion of and then the achieve of organizational objectives. This was echoed by

Raymond and Bergeron, (2008) that, the PMIS has been promoted as a tool which is essential to project delivery and an effective technique for project monitoring process. The effectiveness and the increasing competitiveness aspect of the PMIS is motivating the adoption of the system by consultants, construction organizations as well as the industry (Son et al, 2015). In addition, Son et al, (2015) advance that, the empirical results suggested that all construction professionals' agreed that, it is less effort application and user satisfaction and that these are, in turn affected by software efficiency and quality of PMIS, and many construction organizations have invested heavily in PMIS to enhance project collaboration and communication. PMIS according to PMBOK (2017), provides access to information technology (IT) software tools, such as scheduling software tools, work authorization systems, configuration management systems, information collection and distribution systems, as well as interfaces to other online automated systems such as corporate knowledge base repositories and reporting on key performance indicators.

Therefore, the organisation and professionals have made significant progress in the use of the PMIS for the enhancement of project delivery in relation to cost planning (Son et al, 2015).

Some of the benefits of the PMIS are as follows;

1. It helps to increase productivity in an Organisation.
2. It is used for accessing data needed, very efficient and faster.
3. It helps in structuring for successful completion of projects.
4. It allows for decision making to keep the project on schedule.
5. It helps in tracking cost in terms of cash flow and to control cost to be within budget.

2.6.2 Elemental Cost Planning

According to Seeley, (1996), elemental cost planning is a technique as form of fixed budget used in the design phase for cost control of project. This is briefly described by Seeley, (1996) and stated that, sketch plans are drawn up and the total cost of the work is calculated using some approximate method, such as cost per spot or per square meter of floor space. The building is then divided into different building components or functional component such as walls, floors and roof, and each component is assigned a price based on cost analysis of structures of comparable sort that were earlier constructed (Seeley, 1996). Therefore, according to Smith and Jagger, (2006), elemental cost planning information is derived from the following situations:

- a cost analysis of similar building available from the cost planner's own sources; or
- a cost analysis, or cost analyses, of similar buildings are available from a database such as the BCIS; or
- published data is the only available source.

However, according to Smith and Jagger, (2006), this method relies upon the availability of suitable cost analyses and other cost data together with an elemental breakdown of the estimated project. It also relies upon the use of approximate quantities and a range of ratio and other adjustments for quantity and quality adjustments from the cost databases, analysis (or analyses) to the cost plan (Smith and Jagger, 2006). Smith and Jagger (2006) stated in conclusion, elemental estimating should be used at the earliest stage of the cost planning phase of the project can be reasonably priced.

2.6.3 Comparative Cost Planning

This method of cost planning technique according to Seeley, (1996), it also derives from sketch plans but does not use a set of budgets such as the basic scheme. Instead a cost research shows how the design can be carried out and the price of each alternative strategy (Seeley, 1996). The cost research will show whether the project can be carried out within the price threshold set by the construction customer and the price of each of the building's significant component. Usually the cost analysis is based on estimated amount and represents an estimate analyzed. This cost study provides a decisions guide for design and this enables the design team to select a combination of alternatives which will satisfy the budget allocation, thus becomes the working plan and operates as a basis for the specification and working drawings (Seeley, 1996).

2.6.4 Cost Value Reconciliation

Cost value reconciliation according to Seeley (1996), describe this cost planning technique as the cost and value of variations which must be continually monitored and assessed against budget in project execution phase. This technique allows for assessing the progress achieved by monitoring the value of work carried out against programme. This is best done by constructing an S curve of the forecast valuations against time and then plotting actual value against actual time of the project (Seeley, 1996). Therefore, the effect of this cost planning technique is achieved by accurate recording of the cost of materials, plant, labour, site staff and overheads, and contractors measured works and claims is essential in cost value reconciliation process (Seeley, 1996). Cost value reconciliation as a project technique helps keeping budget and expenditure on track as well as streamlining process of execution and saving time and money. Thus, a crucial tool in enhancing an effective project delivery.

2.6.5 Earned value management (EVM)

According to Kidston, (2014), earned value management (EVM) is a technique in cost planning process which is recognized as best practice around cost control and cost performance within budget as the cost baseline. EVM focuses on tracking the status and trends of project performance and predicts possible project outcomes so that informed control decisions can be made in a timely manner and as cost control tool (Kim and Kim, 2014). According to Kim and Kim, (2014), EVM provides a unique bird's-eye view of the scope, time, and cost performance of a project, regardless of the project type, size, or complexity. Therefore, this enhances the project manager allowed to determine “trouble spots” in the project and taking corrective measures with the variance analysis (‘are we under or over the budget’), therefore, measuring performance for cost control. Even though EVM provides the best practices attributes of project delivery, Kidston, (2014) stated that, EVM is not the universal panacea of project management.

2.7 CHAPTER SUMMARY

This chapter began with introduction, overview and discussion of the working definition of cost planning. The process of cost planning used in the government sector and the construction industry as a whole. The chapter also discussed the factors affecting the implementation of cost planning and finally concluded with techniques that will help to enhance cost planning in project delivery in the GAF and the construction industry as a whole.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter would discuss the research methods with the view of finding the best approach to achieve the research aim and objectives for cost planning in the government sector and the construction industry. The chapter describes the research strategy and research design. The methods and techniques which would be used in the data collection and presentation of analyses. This research would take the form of integrative review and a survey using questionnaire and interviews.

The purpose of the research methodology is to provide direction in the planning and implementation of the study based on steps, procedures and strategies in a way to achieve the intended goal. These refer is the process of following the steps, procedures and strategies for gathering and analyzing data for the research (Polit and Hungler, 1999). This was echoed by Burns and Grove, (2001), stated and describe the method in details that, the methodology which includes design, setting, sample, methodology, data collection and analysis techniques in a study. It is the know-how of the scientific methods and techniques employed to obtain the valid knowledge. According to Christou, et al., (2008), methodology is described as manner by which knowledge is acquired, by trying to discover how one can go about the task of finding out what we believe to be the truth.

3.2 RESEARCH STRATEGY

Research strategy is defined as the way in which the research objectives can be questioned (Naoum, 1998) as cited by Al-Najjar, (2008). There are two different types of research strategies being used for research studies namely, quantitative and qualitative research strategy or approach. With regards to this research, the quantitative approach is used to

gather factual data in relation to the research objectives, but as stated by Fellows and Liu, (1997), the qualitative approach seeks to gain insights and to understand and the perception of individuals or group of people. However, the quantitative approach would be used for data gathering based on the understanding and the perception of construction professionals on cost planning as a tool in monitoring construction projects in the government sector as well as the industry as a whole.

3.2.1 Quantitative and Qualitative Strategy

According to Creswell, (1994), quantitative research is an inquiry into a social or human problem, based on testing a hypothesis or a theory composed of variables, measured with numbers, and analysed with statistical procedures, in order to determine whether the hypothesis or the theory holds is true, (Creswell, 1994). Bouma and Atkinson, (1995) stated that, quantitative data is, therefore, not abstract, but rather they are hard and reliable; they are measurements of tangible, countable, sensate features.

Denzin, and Lincoln, (2000), stated that, qualitative emphasises the process of discovering how the social meaning is constructed and stresses the relationship between the investigator and the topic studied. Berg (2001) added that, qualitative research refers to the meanings, concepts, definitions, characteristics, metaphors, symbols and descriptions of things.

However, for the sake of this study, the research strategy would be based on quantitative as the main data collection technique to be used is the questionnaires. This method allowed the researcher to ask all respondent the same question with predetermined responses, which allowed for objective data to be collected throughout for the study, therefore the only means for the survey as the main data collection approach.

3.3 RESEARCH DESIGN

Research design simply means how the researcher intend to plan or organize; the scientific investigation that that would guide the collection of data based on the research questions (Kumar, 2005). Therefore, this phase of the research involves the design of questionnaire and the distributing of the questionnaire to professional within the directorate of the engineer service and the contractors who take up projects from the GAF. For this reason, a pilot questionnaire study would be conducted to test and to prove the questionnaire questions are clear to be understood to be answered in a way that would help to achieve the target of the study, and to be modified if necessary (Al-Najjar, 2008).

This was further explained by Trochim, (2007) and stated that, research design provides the glue that holds the research project together and a design which is used to structure the research, to show how all of the major parts of the research project – the samples or groups, measures, treatments or programs, and methods of assignment -- work together to try to address the central research questions (Trochim, 2007).

3.4 RESEARCH PROCESS

This is the aspect of the research methods that addresses the sampling method, data collection instruments and the procedures used. It entails explanations to the method employed and how the method that was adopted were used to address the aim, objectives and the research questions.

3.4.1 Data Collection Approach

According to Naoum, (2007), there are two different kinds of approach to data collection namely, the fieldwork (primary data collection) and the desk study (secondary data collection). However, Patton, (2002) stated that, using more than one data collection

approaches, strengthens and gives credibility to the study. The approach for collecting data in this study was divided into two main parts, desk survey and field survey.

Therefore, the desk survey forms an essential aspect of the research since it sets the pace for the development of field survey instruments using questionnaires, and interview (Fadhley, 1991). Secondary sources of information collected in related books, journals, and the internet was used for the collection of data. The field survey is involved with the collection of empirical data. Fieldwork can be associated with three practical approaches; the survey approach, the case study approach and the problem-solving approach (Naoum, 2007).

3.4.2 Population

This is the selection of the respondents which was limited to the professionals; architects, quantity surveyors, engineers, technicians of the directorate of engineer services, Burma Camp and registered contractors of the GAF. The choice of population was based on the limitation described by the researcher on the research topic practices as well as the office location and easy access to the contractors. The professionals who were considered under this study were those who were involved in the managing of construction projects as the consultant for the GAF, thus having the knowledge of the research topic.

3.4.3 Sample and Sampling Technique

According to Trochim, (2007), sampling is the process of selecting units (e.g., people, organizations) from a population of interest so that by studying the sample we may fairly generalize our results back to the population from which they were chosen. Therefore, the selection of the population sample should have knowledge on the topic area for good sample collection. This was highlighted by Burns and Grove, (2001) that, the selected

sample should therefore, have similar characteristics to the population under study to allow generalized ability of the results to represent the population.

However, for a good data to be collected for the research study, the researcher decided on the purposive sampling technique. Therefore, professionals and contractors with the expert knowledge were considered in this research study. This assisted the researcher to determine techniques to improve the factors affecting cost planning practices in the GAF construction projects delivery as well as the industry as a whole.

3.4.4 Sample Size

According to Burns and Grove, (2001) stated that, there are no hard or fast rules about sample size, but a sample should eliminate errors in analysing. However, to counter errors that might exist in respect to quantitative research designs, it is then required that, a large respondent is used to increase just to reduce sampling error. Therefore, to determine the minimum sample size for this research study, the Kish, (1965) statistical formula is used for the for calculating the sample size stated and illustrated below:

$$n = \frac{n^1}{(1+n^1/N)}$$

Where:

$$n^1 = S^2/V^2$$

N = Population Size

S = Maximum standard deviation in the population element

(Total error = 0.1 at a confidence level of 95%)

V = Standard error of sampling distribution = 0.05

P = The proportion of the population elements that belong to the defined class = 0.5

$$S^2 = P(1-P) = 0.5(1-0.5) = 0.25$$

$$n = \frac{n^1}{(1+n^1/N)}.$$

Since $n^1 = S^2 / V^2$

$$= 0.25 / 0.05^2$$

$$n^1 = 100$$

$$N = 200$$

$$\text{Therefore } n = \frac{100}{(1+100/200)}.$$

$$n = 66.66 \sim 67$$

Adding 10% for non-responsiveness;

$$10/100 \times 67$$

$$= 6.7 \sim 7$$

$$\text{Sample size} = 67 + 7 = 74$$

$$\sim \underline{\underline{75}}$$

Therefore, the minimum sample size is seventy-five (75) questionnaires and were administered.

3.5 RESEARCH INSTRUMENT

Research instrument to be used for data collection for the research study is the questionnaire. Therefore, Churchill (1998) stated that, questionnaire is form of a booklet structured in a standardized procedure, containing questions used for collection of information from respondents. This was further discussed by Tustin et al., (2005) and stated also that, questionnaire is used as a data-collection instrument that sets out questions that to be asked in a formal manner and to be answered by respondents in order to produce the desired information required for the research study.

3.5.1 Pilot study

In order to ensure credible questionnaire base on the research topic, were piloted to validate the questions. Therefore, the pre-testing plays an important roll in the design of the questionnaire process, prior to finalizing the questionnaire. This involves in the administrating of the questionnaire to a limited number of potential respondents and knowledgeable individuals in the research topic in order to identify and correct the design flaws

3.5.2 Questionnaire Design

Questionnaire is a designed structured question that seek to draw out answers and opinions from respondent (Tustin et al., 2005). The design of questionnaire may be containing either open-ended, closed-ended questions or both (Frazer, and Lawley, 2000). However, for data collection for this research study, questionnaire employed was well-structured open-ended and closed-ended questions. The questionnaire was then designed according to the objectives of the research study and was structured into two (2) parts. The first part contained questions that sought for the identity or profile of the respondents, and the second part contained questions that sought to ascertain the knowledge of respondents with respect to the project topic: cost planning as a tool in monitoring construction projects.

3.5.3 Content of the Questionnaire

Generally, the questionnaire was designed to collect data from professionals like Architects, Quantity Surveyors, Engineers, Technicians of the Directorate of Engineer Services, Burma Camp and registered contractors of the GAF. These questions were asked by the researcher to collect data on their personal perception and knowledge of on study topic. Five-point ranking system and a five-level scale were to be answered by the respondents. However, Statements tagged with effective were scaled from **not effective**,

less Effective, moderately effective, effective and very effective. Statements tagged with important were scaled from **not significant, less Significant, moderately significant, significant and very Significant.**

3.5.4 Questionnaire Administration

Administering of questionnaires were executed by the researcher by hand delivery to the professionals of the Directorate of Engineer Services and the contractors. However, few interviews were conducted alongside with the administration of the questionnaires. This was done to validate the answers to be given by the respondents. To improve the response rate, a number of follow-up procedures and strategies were considered, such as sending reminder to the respondents for time sake. To overcome art of not responding to the questionnaire and to be within time schedule, the researcher adopted the measure of structuring a shorter questionnaire of four (4) pages with seven (7) questions. A total of 75 questionnaires were administered to the various respondents.

3.6 DATA ANALYSIS

According to Blanche et al. (2006), the objective of analysis is to transform data into a significant form in order to answer the research objectives and questions. However, to decide on which analytical tool is suitable to use, it is essential to consider the type of variables it will be generating (i.e., whether your variables are categorical, ordinal or interval and whether they are normally distributed). Therefore, data being collected will be entered and processed into the Statistical Packages for Social Sciences (SPSS version 23.0) and later processed for analysis. Descriptive statistics will be used for analyzing data on respondents.

3.7 CHAPTER SUMMARY

The purpose of this chapter is to describe the research methodology of this study, explain the sample selection, describe the procedure used in designing the data collection instrument and provide an explanation of the statistical procedures used to analyse the data.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION OF RESULTS

4.1 INTRODUCTION

This chapter focuses on the analysis of the primary data collected from the professionals of the directorate of engineer services, the architects, quantity surveyors, engineers, and technicians as well the registered contractors of the GAF. This chapter will be dealing with data presentation analysis and discussion of results on the objectives; to identify the cost planning practices being adopted, the implementation challenges of cost planning method as a tool for monitoring projects and to establish modern cost planning techniques to enhance project delivery in the GAF as well as the construction industry as a whole.

Therefore, for the researcher to analyses the data collected effectively, the researcher employed the Statistical Packages for Social Sciences (SPSS version 23.0) for analysis as the descriptive statistics to be used for analyzing data on respondents.

4.2 RESPONDENT'S PROFILE

The aim is to provide an understanding to the profile of the respondents. Knowing that, the background of the respondents should help generate confidence and the reliability of the data to be collected.

4.3 RESPONSE ANALYSIS

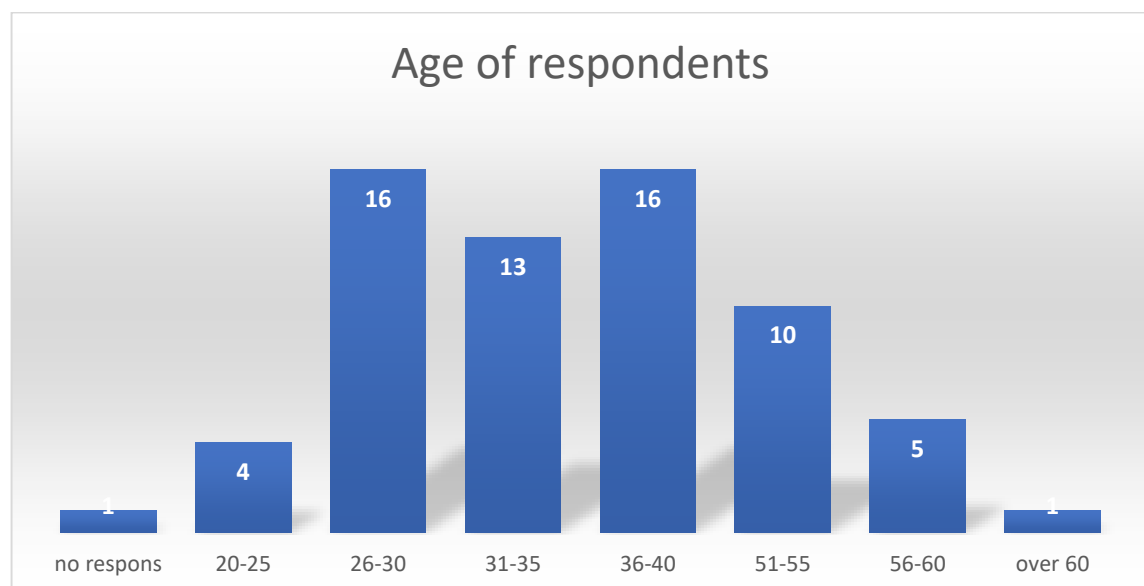
A total of seventy-five (75) questionnaires were administered to respondents, fifteen (15) questionnaires to each of the professionals and the contractors of which sixty-six (66) questionnaires was retrieved representing a response rate of 88%.

4.4 BACKGROUND INFORMATION

This segment presents the background information on the respondents such as the age of the respondents, position of the respondent in the organisation, the number of years in the position and the highest qualification of the respondent.

4.4.1 Age of Respondents

The purpose of this question was to identify age group of the respondents against experience and knowledge on the research topic. Figure 4.1 below demonstrates the age distribution of respondents. From the data gathered it is shown that the most represented age group is 16 respondents who are between the ages of 26-30 years and 36-40 years category represents the highest. Meanwhile, the least represented age group is over 60 years. The second highest age group are 13 respondents between 31-35 years. The views expressed by respondents are dominated by age group of, 31-35 years, 36-40 years and 51-55 years.

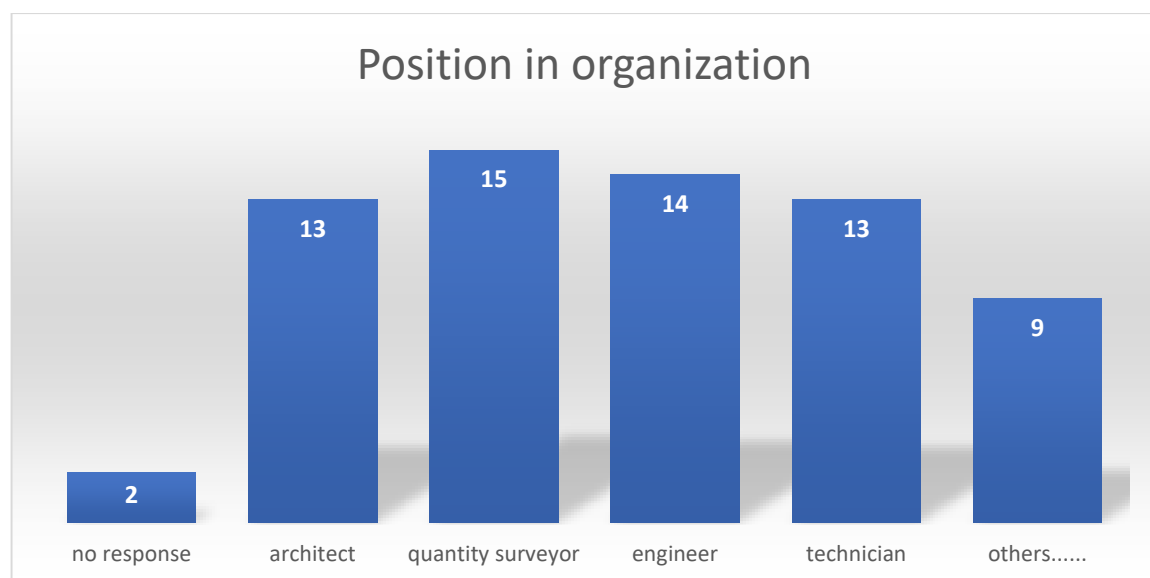


Source: Field Survey, 2019

Figure 4.1: Age of respondents

4.4.2 Position in Organisation

The main intention of this particular question was to ascertain the position held by the respondents in the organisation as well as the specific role of the respondents. Therefore, figure 4.2 below demonstrates the position held by respondents in the organization. Quantity surveyors are the most dominant in the organization while engineers, architects and technicians are part of the dominating group of professionals. Other positions held form the least represented profile of respondents



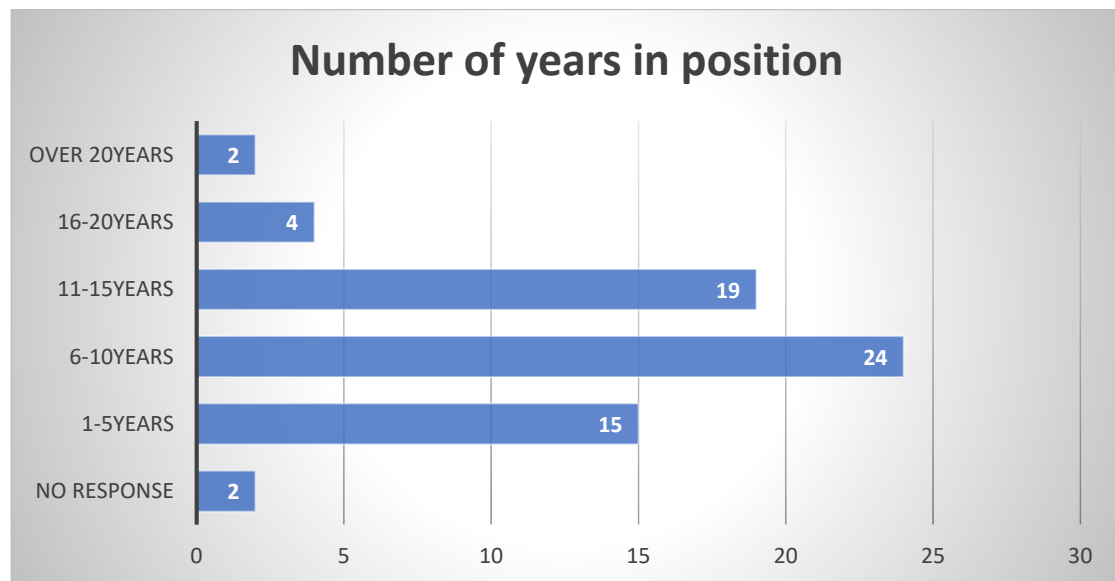
Source: Field Survey, 2019

Figure 4.2: Position in the organisation

4.4.3 Number of Year in Position

The main purpose of this question is to identify the number of years the respondent has been in that specific position and the experience and knowledge on the research topic. Figure 4.3 below represents the number of years respondents had worked in their various positions. Exactly 24 respondents have worked in their distinct positions between 6-10years. Also 19 respondents have held their positions for 11-15years while only 2

respondents have held their positions for over 20years. However, 15 respondents held their positions between 1-5years.

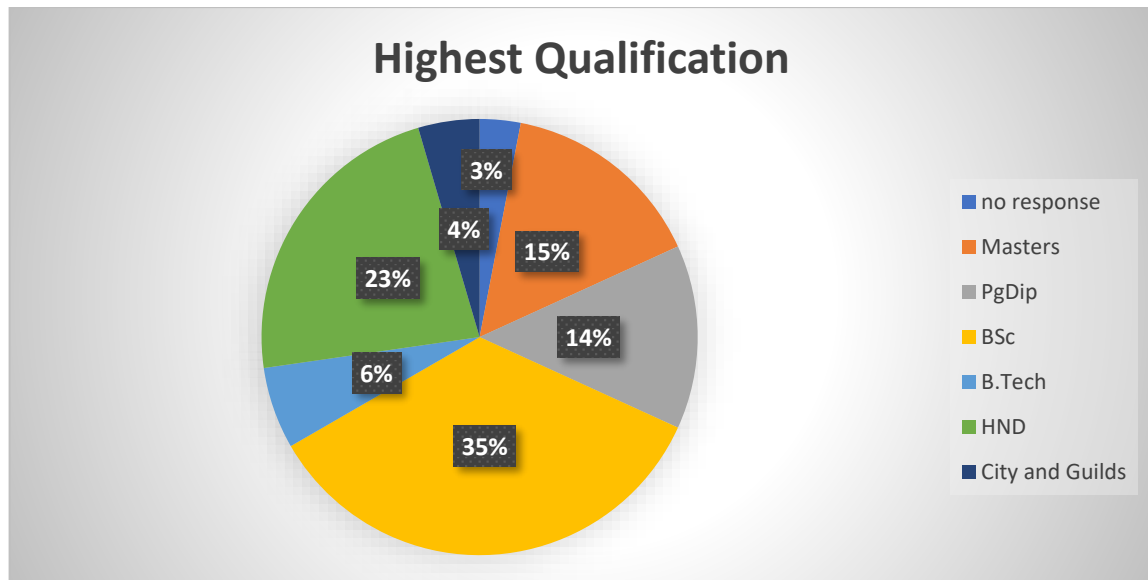


Source: Field Survey, 2019

Figure 4.3: Position in the organisation

4.4.4 Highest Qualification

This question was to identify the qualification of the respondent to indicate the level of knowledge and contributions made in cost planning process. Figure 4.4 below demonstrates the proportion of respondents with respect to their highest level of education attainment. 35% of the respondents have obtained first degrees while 23% of respondents have attained Higher National Diplomas. Also 15% and 14% of respondents have respectively attained Masters and PgDip level education.



Source: Field Survey, 2019

Figure 4.4: Highest Qualification

4.5 PRESENTATION AND ANALYSIS OF DATA

This aspect of the questionnaire sought to give respondents the opportunity to exhibit their knowledge and in cost planning practices. Therefore, ranking of the respondent's response were however done.

4.5.1 Analysis for Objective One (1)

The analysis of this objective is shown in table 4.1. The analysis showed that Cost control on construction stage, Cost planning and control of the design process and funds availability for the projects are highly ranked cost planning practices being adopted by GAF on projects while Pricing of approximate quantities, Ensuring accuracy in cost planning practices and Good method of pricing are poorly ranked though they provide some moderation in their effectiveness.

Table 4.1 below represents a detailed statistic on the cost planning practices being adopted by GAF on projects. The arithmetic mean value of 3.76 showed that cost control on construction stage is effective. The cost control on the construction stage makes the 1st ranked cost planning practice. The mean value of 3.62 indicates that cost planning and control of the design process is effective. This forms the second 2nd ranked cost planning practice. Another effective cost planning practice is the effective allocation of funds available for the project. The mean value of 3.56 showed that respondents indicate Cost control on procurement stage is effective. Also cost estimation, cost planning and briefing on cost for decision making have all been indicated by their mean values as effective. The 8th ranked cost planning practice of 3.50 showed that Designing in respect to budget allocation is also effective. However Briefing and setting the budget, Ensuring tender figure is as close as possible to the first estimate, Aim to achieve good value at the desired level of expenditure, Pricing of approximate quantities, Pricing of approximate quantities, Ensuring accuracy in cost planning practices and Good method of pricing were all poorly ranked though they are found be moderately effective in cost planning practice. The standard deviation values showed that responses are widely spread across the mean.

Table 4.1: The cost planning practices being adopted by the GAF on projects

Items	R	Mean	Std. Deviation
Cost control on construction stage	1 st	3.76	1.151
Cost planning and control of the design process	2 nd	3.62	1.212
Ensure that the funds available for the projects are allocated effectively	3 rd	3.59	1.176
Cost control on procurement stage	4 th	3.56	1.229
Cost estimation	5 th	3.56	1.254
Cost planning	6 th	3.55	1.383
Briefing on cost for decision making	7 th	3.53	1.205
Designing in respect to budget allocation	8 th	3.50	1.256
Briefing and setting the budget	9 th	3.29	1.237
Ensuring tender figure is as close as possible to the first estimate	10 th	3.24	1.229
Aim to achieve good value at the desired level of expenditure	11 th	3.23	1.148
Pricing of approximate quantities	12 th	3.20	1.070
Ensuring accuracy in cost planning practices	13 th	3.17	1.453
Good method of pricing	14 th	2.79	1.463
Valid N (listwise)	66		

Source: Field Survey, 2019

Mean Scale: 1= Not Effective, 2= Less Effective, 3= Moderately Effective, 4= Effective, 5= Very Effective SD scale: SD< 0.5= closely spread

4.5.2 Analysis for Objective Two (2)

Table 4.2 provides some statistics on the implementation challenges of cost planning method as a monitoring tool. From the analysis delay payments to contractors and Bureaucracy in payment to contractors are identified as the highly ranked significant implementation challenges as a monitoring tool for cost planning methods for GAF projects. Meanwhile, Lack of cost planning reporting for effective decision making, Lack of coordination between design team for effective cost planning and Wrong cost planning method are ranked poorly as they have moderately significant challenges.

This table 4.2 below provides information on the implementation challenges of cost planning method as a monitoring tool. The mean value of 3.76 showed that Delay payment to contractors is significant to the implementation challenges of cost planning methods. The mean value of 3.64 showed that Bureaucracy in payment to contractors is significant implementation challenges of cost planning method as a monitoring tool. The mean values presented thereof showed that Lack of cost planning concept to achieve project success, understanding budget as cost baseline, Poor project management, Lack of monitoring and evaluation have moderately significant implementation challenges of cost planning method as a monitoring tool. Furthermore, Lack of integration between architect, building professionals and the contractors, Failure to identify cost variation changes to budget, Lack of cost benefit analysis in project cost and Poor communication between team members have moderately significant implementation challenges of cost planning method as a monitoring tool.

Table 4.2: The implementation challenges of cost planning method as a monitoring tool

Items	R	Mean	Std. Deviation
Delay payment to contractors affecting cost planning efficiency	1 st	3.76	1.359
Bureaucracy in payment to contractors affecting project delivery	2 nd	3.64	1.388
Lack of cost planning concept to achieve project success	3 rd	3.44	1.139
Understanding budget as cost baseline for effective cost planning and project delivery	4 th	3.38	1.237
Poor project management for achieving faster project delivery	5 th	3.35	1.259
Lack of monitoring and evaluating to ensure cost planning effectiveness	6 th	3.33	1.155
Controlling scope to ensure cost planning as a monitoring tool for project success	7 th	3.32	1.230
Lack of integration between architect, building professionals and the contractors	9 th	3.30	1.414
Lack of program control to ensure effective cash flow monitoring process	9 th	3.30	1.123
Client brief on procurement advise on budget for effective planning	11 th	3.27	1.284
Lack of cost checking in affecting cost planning for effective budgeting	11 th	3.27	1.046
Poor effective planning and control to ensure cost planning efficiency in good project delivery	13 th	3.24	1.096
Failure to identify cost variation changes to budget	13 th	3.24	1.253
Lack of value management skills in respect to budget allocation	15 th	3.23	1.134
Lack of cost benefit analysis in project cost	15 th	3.23	1.298
Cost planning and control of the design process for effective decision making	17 th	3.21	1.259
Poor communication between team members and inadequate client consultation to ensure good cost planning process	18 th	3.20	1.255
Inadequate cost control in cost planning processes	18 th	3.20	1.327
Lack of cost planning techniques to keep expenditure within budget	18 th	3.20	1.099
Lack of cost planning reporting for effective decision making	21 st	3.17	1.197
Lack of coordination between design team for effective cost planning	22 nd	3.15	1.361
Wrong cost planning method	23 rd	3.06	1.323
Valid N (listwise)	66		

Source: Field Survey, 2019

Mean Scale: 1= Not Significant, 2= Less Significant, 3= Moderately Significant, 4=

Significant, 5= Very Significant SD scale: SD< 0.5= closely spread

4.5.3 Analysis for Objective Three (3)

The analysis of this objective sought to identify the effectiveness of modern cost planning techniques to enhance project delivery. The responses showed that Project management information system, Elemental cost planning and Cost estimating were identified as the highly ranked effective modern cost planning techniques that enhance project delivery. Meanwhile trend analysis, reserve analysis and Bottom-up estimating were poorly ranked as the moderately effective modern cost planning technique to enhance project delivery.

Table 4.3 below represents information on the statistics regarding the modern cost planning techniques to enhance project delivery. The mean value of 3.56 showed that project management information system is effective and is the 1st ranked modern cost planning technique. The second 2nd ranked modern cost planning technique is the elemental cost planning. The mean value of 3.52 showed the 3rd ranked modern cost planning techniques to enhance project delivery is cost estimating. However, the mean value of 3.35 showed that earned value management was moderately effective modern cost planning technique. Also trend analysis, reserve analysis and bottom-up estimating were poorly ranked as 8th, 9th and 10th moderately effective modern cost planning technique for enhance project delivery.

Table 4.3: Modern cost planning techniques to enhance project delivery

Items	R	Mean	Std. Deviation
Project management information system	1 st	3.56	1.314
Elemental cost planning	2 nd	3.53	1.193
Cost estimating	3 rd	3.52	1.315
Earned value management	4 th	3.35	1.283
Cost value reconciliation	5 th	3.30	1.202
Variance analysis	6 th	3.26	1.154
Comparative cost planning	6 th	3.26	1.194
Trend analysis	8 th	3.03	1.163
Reserve analysis	9 th	2.94	1.357
Bottom-up estimating	10 th	2.91	1.344
Valid N (listwise)	66		

Source: Field Survey, 2019

Mean Scale: 1= Not Effective, 2= Less Effective, 3= Moderately Effective, 4= Effective,

5= Very Effective SD scale: SD< 0.5= closely spread

4.6 DISCUSSION OF RESULTS

This research discussion is followed up with respect to the main objectives of the study.

The analysis provides some fertile ground for comparison of results obtained with extant literature. The discussion is done in line with the specific objectives outlined for this study.

1 Cost planning practices being adopted by the GAF on projects

The analysis performed on this objective showed that there are effective cost planning methods being adopted by the GAF projects. The analysis showed that Cost control on construction stage, Cost planning and control of the design process and funds availability for the projects are highly ranked cost planning practices being adopted by GAF on projects while Pricing of approximate quantities, Ensuring accuracy in cost planning practices and Good method of pricing are poorly ranked though they provide some moderation in their effectiveness. Some scholars have reiterated the points or findings

obtained in this study. According to Kirkham (2014) there are several cost planning practices being adopted by public organizations. Kirkham (2014) asserts that the availability of funds form a crucial part of cost planning practices. Meanwhile Boussabaine (2006) indicated that the most significantly effective cost planning practice is the cost control on the construction stage. From the assertion made by Boussabaine (2006) it is reiterated that cost control on construction stage is the most effective cost planning practices. This assertion by Boussabaine (2006) is significantly stated in this research. More so, Seely (1996) as well as Kissi et al (2017) though they have their studies conducted in different centuries have all indicated that an effective component of cost planning is the availability of cash flow for the beneficiary company.

2 Implementation challenges of cost planning method as a tool for monitoring GAF projects

The analysis for this objective indicates that there are significant implementation challenges of cost planning method as a tool for monitoring GAF projects. From the analysis delay payments to contractors and Bureaucracy in payment to contractors are identified as the highly ranked significant implementation challenges as a monitoring tool for cost planning methods for GAF projects. Meanwhile, Lack of cost planning reporting for effective decision making, Lack of coordination between design team for effective cost planning and Wrong cost planning method are ranked poorly as they have moderately significant challenges. Some studies conducted earlier have indicated some facts outlined in this current study. For instance, it is well grounded in literature that delay in payment of contractors and the lack of coordination between design teams and contractors play a somewhat significant role in the implementation challenges of cost planning method. Furthermore Matipa et al. (2013) opined that financial settlement of the players in the construction sector or project management space suffer a great deal since most of their

finances are not settled on time. Another set of scholars (Adjei et al., 2017) recently opined that contractors in Ghana struggle to settle loans obtained to finance a project because of the poor payment structure of the government of the day. According to (Adjei et al., 2017) the time taken to settle contractors is unfriendly and the bureaucratic road blocks or the gatekeepers ought to be removed from this chain. They are needless and offer no help in any shape or form.

3 Modern cost planning techniques to enhance project delivery

Furthermore, the analysis for this objective showed that there are effective modern cost planning techniques for project delivery success. As shown in the analysis of the study the responses showed that Project management information system, Elemental cost planning and Cost estimating were identified as the highly ranked effective modern cost planning techniques that enhance project delivery. Meanwhile trend analysis, reserve analysis and Bottom-up estimating were poorly ranked as the moderately effective modern cost planning technique to enhance project delivery. As provided, the highly effective modern cost planning techniques found in this study seem to differ from other effective modern cost planning techniques postulated by other scholars. Smith and Jagger (2006) indicates that the most relevant modern cost planning technique is trend analysis and cost estimating. From the opinion of Smith and Jagger (2006) their views are somewhat consistent with this study's findings.

4.7 CHAPTER SUMMARY

This chapter present data analysis and discussions of results are obtained. Seven-five (75) number questionnaire was distributed and sixty-six (66) number was retrieved from the respondents personally. The questionnaire survey was divided into two parts. All data collected was analyzed using the Statistical Packages for Social Sciences (SPSS version

23.0) and later processed for analysis. The descriptive statistics was used for analyzing data on respondents' profile and the actual questions, factor analysis was used for analyzing the perception of the respondents.

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CHAPTER FIVE

SUMMARY, FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

This section of the research project indicates the summary, conclusion, recommendations and suggestions for further studies. The summary of the study provides a logical step regarding how the findings and overall study was achieved. This section also concludes on the research findings and provide recommendations thereof.

5.2 SUMMARY OF FINDINGS

The purpose of this study was to investigate cost planning as a tool in monitoring construction projects in the government sector. This study however considers the Ghana Armed Forces as the target institution to provide the basis for an effective research. The study ought to be conducted because of the poor attention given to this subject area in Ghana.

In order to improve on previous studies and to provide distinctive analysis some objectives have been set out. The specific objectives of the study include; to identify the cost planning practices being adopted by the Ghana Armed Forces (GAF), to identify the implementation challenges of cost planning methods as a tool for monitoring GAF projects as well as to establish modern cost planning techniques to enhance project delivery on GAF projects.

To set the tone for discussion, theoretical literature was explained to ascertain the concepts of cost planning methods. More so, some empirical studies were highlighted to give some empirical underpinnings or evidence to the research topic. In order that these specific objectives may be attained specific and logical research methods were employed. Overall quantitative research approach was adopted with mainly descriptive designs adopted to

describe the distinctive and the rating of responses obtained from respondents. The survey instrument used was structured questionnaire adapted from previous literature. The data instrument was administered among 66 respondents of the GAF. The data was presented both in charts and tables and interpretation for each data information was stated while inferences were drawn from the responses gathered through descriptive statistical tools such as arithmetic mean ranking and standard deviations. The results of the study were stated and discussed vividly in line with previous related studies. Specific findings of the study were addressed and highlighted in each of the respective objectives below.

5.2.1 Objective One

To achieve the objective one, ‘To identify the Cost Planning practices being adopted by the Ghana Armed Forces on projects’. This objective was set to know the kind of cost planning practices used for project delivery in the GAF and which was ranked based on the mean score ranking. The following are the findings for the cost planning practices being adopted by the Ghana Armed Forces on projects by respondents which were effectively practiced as:

1. Cost control on construction stage.
2. Cost planning and control of the design process.
3. Ensuring that the funds available for the projects are allocated effectively.
4. Cost control on procurement stage.
5. Cost estimating.

5.2.2 Objective Two

To achieve the objective two, ‘To identify the implementation challenges of Cost Planning method as a tool for monitoring Ghana Armed Forces Projects’. This objective was set to unravel the implementation challenges affecting cost planning methods in monitoring

project delivery in the GAF and which was ranked based on the mean score ranking. The following are the findings for the implementation challenges of cost planning method as a tool for monitoring Ghana Armed Forces projects by respondents which were significantly affecting project delivery as:

1. Delay payment to contractors affecting cost planning efficiency.
2. Bureaucracy in payment to contractors affecting project delivery.
3. Lack of cost Planning concept to achieve project success.
4. Understanding budget as cost baseline for effective cost planning and project delivery.
5. Poor project management for achieving faster project delivery.

5.2.3 Objective Three

With the objective two, 'To establish modern Cost Planning techniques to enhance project delivery on Ghana Armed Forces Projects'. This objective was set to help solve project delivery is to establish cost planning techniques to enhance project success in the GAF and which was ranked based on the mean score ranking. The following are the findings for the modern cost planning techniques to enhance project delivery on Ghana Armed Forces projects by respondents which were effectively used as:

1. Project management information system.
2. Elemental cost planning.
3. Cost estimating.
4. Earned value management.
5. Cost value reconciliation.

5.3 CONCLUSION ON FINDINGS

The conclusion of this study is based on the findings and specific objectives outlined. The following represent the main highlights of the study; the study concludes that there are

effective cost planning methods being adopted by the GAF projects. The analysis showed that Cost control on construction stage, Cost planning and control of the design process and funds availability for the projects are highly ranked cost planning practices being adopted by GAF on projects while Pricing of approximate quantities, Ensuring accuracy in cost planning practices and Good method of pricing are poorly ranked though they provide some moderation in their effectiveness.

The study also concludes that there are significant implementation challenges of cost planning method as a tool for monitoring GAF projects. From the analysis delay payments to contractors and Bureaucracy in payment to contractors are identified as the highly ranked significant implementation challenges as a monitoring tool for cost planning methods for GAF projects. Meanwhile, Lack of cost planning reporting for effective decision making, Lack of coordination between design team for effective cost planning and Wrong cost planning method are ranked poorly as they have moderately significant challenges.

Furthermore, the study concludes that Project management information system, Elemental cost planning and Cost estimating were identified as the highly ranked effective modern cost planning techniques that enhance project delivery. Meanwhile trend analysis, reserve analysis and Bottom-up estimating were poorly ranked as the moderately effective modern cost planning technique to enhance project delivery.

5.4 RECOMMENDATIONS

The recommendations stated in this study are outlined with respect to the findings obtained from the research/data analysis. The following represent the recommendations;

- It is recommended that more cost planning practices should be adopted and used effectively since very little (cost planning practices) works beyond moderate

effectiveness.

- It is recommended that briefing and setting objectives and cost control on procurement stage are equally important aspects of cost planning practices.
- It is also recommended that modern cost planning techniques should be prioritized to understand, identify and establish the past, present and future movement of cost planning in project delivery.
- It is important that trend analysis, reserve analysis and earned value management are prioritized to improve cost planning technique in the Ghana Armed Forces.

5.5 FUTURE RESEARCH

The current study recommends that further studies should be conducted in project delay causes of military projects in Ghana. This time a larger view should be sampled so that a comprehensive finding on the effects of project delay causes will be known and established.

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APPENDIX

QUESTIONNAIRE

TOPIC: COST PLANNING AS A TOOL IN MONITORING CONSTRUCTION PROJECTS IN THE GOVERNMENT SECTOR

This questionnaire has been designed to solicit your opinion on Cost Planning tool as a method for monitoring Ghana Armed Forces Construction Projects. Any information you provide will be treated with strictest confidence and will be used to improve Project Performance of the Ghana Armed Forces.

**Please, kindly respond to the questions by ticking the appropriate box for each item.
Please note that all information provided will be strictly treated as confidential.**

PART ONE: BACKGROUND INFORMATION ON RESPONDENT

RESPONDENT'S PROFILE

Please tick (✓) *appropriate box(s)*

Name.....(Optional)

Q1. AGE

- ☐ 20-25
- ☐ 26-30
- ☐ 31-35
- ☐ 36-40
- ☐ 41-45
- ☐ 46-50
- ☐ 51-55
- ☐ 56-60
- ☐ Over 60

Q2. POSITION IN ORGANISATION

- ☐ Architect
- ☐ Quantity Surveyor
- ☐ Engineer
- ☐ Technician
- ☐ Contractor
- ☐ Other.....please specify

Q3. No. OF YEARS IN POSITION

- ☐ 1-5 years
- ☐ 6-10 years
- ☐ 11-15 years
- ☐ 16-20 years
- ☐ Over 20 years

Q4. HIGHEST QUALIFICATIONS

- ☐ PhD
- ☐ Masters
- ☐ PgDip
- ☐ BSc
- ☐ B. Tech
- ☐ HND
- ☐ City and Guilds
- ☐ Other.....please specify

PART TWO: THE COST PLANNING PRACTICES IN THE INDUSTRY

Q5. *The following cost planning practices being adopted in project delivery has been identified as very useful for ensuring effective Cost Control of Construction Projects. Please indicate in your opinion the method which you find on a scale of: 1 = Not Effective; 2 = Less Effective; 3 = Moderately Effective; 4 = Effective; 5= Very Effective*

No.	Cost planning practices being adopted	1	2	3	4	5
1	Cost planning					
2	Briefing on cost for decision making					
3	Cost estimating					
4	Designing in respect to budget allocation					
5	Ensuring accuracy in cost planning practices					
6	Good method of pricing					
7	Ensuring tender figure is as close as possible to the first estimate					
8	Ensure that the funds available for the projects are allocated effectively					
9	Pricing of approximate quantities					
10	Aim to achieve good value at the desired level of expenditure					
11	Briefing and setting the budget					
12	Cost planning and control of the design process					
13	Cost control on procurement stage					
14	Cost control on construction stage					

Q6. The following have been identified as challenges in the implementation of cost planning method in the GAF. Please rate your responses on a scale of: **1 = Not Significant; 2 = Less Significant; 3 = Moderately Significant; 4 = Significant; 5 = Very Significant**

No.	Factors that debilitate against implementation	1	2	3	4	5
1	Lack of coordination between design team for effective cost planning					
2	Lack of cost planning reporting for effective decision making					
3	Understanding budget as cost baseline for effective cost planning and project delivery					
4	Inadequate cost control in cost planning processes					
5	Poor project management for achieving faster project delivery					
6	Client brief on procurement advice on budget for effective planning					
7	Cost planning and control of the design process for effective decision making					
8	Lack of cost checking in affecting cost planning for effective budgeting					
9	Lack of monitoring and evaluation to ensure cost planning effectiveness					
10	Controlling scope to ensure cost planning as a monitoring tool for project success					
11	Delay payment to contractors affecting cost planning efficiency					
12	Bureaucracy in payment to contractors affecting project delivery					
13	Failure to identify cost variation changes to budget					
14	Poor effective planning and control to ensure cost planning efficiency in good project delivery					
15	Lack of program control to ensure effective cash flow monitoring process					
16	Wrong cost planning method					
17	Lack of integration between architects, building professionals and the contractors.					
18	Poor communication between team members and inadequate client consultation to ensure good cost planning process					
19	Lack of cost planning techniques to keep expenditure within budget					
20	Lack of cost benefit analysis in project cost					
21	Lack of value management skills in respect to budget allocation					
22	Lack of cost Planning concept to achieve project success					

Q7. The following have been identified as the modern techniques to enhance effective cost planning on project delivery on GAF projects. Please rate your responses on a scale of: **1 = Not Effective; 2 = Less Effective; 3 = Moderately Effective; 4 = Effective; 5= Very Effective**

No.	Modern cost planning techniques	1	2	3	4	5
1	Project management information system					
2	Elemental cost planning					
3	Comparative cost planning					
4	Cost estimating					
5	Bottom-up estimating					
6	Cost value reconciliation					
7	Earned value management					
8	Variance analysis					
9	Trend analysis					
10	Reserve analysis					
	<i>Please, kindly specify other techniques you know that will enhance project delivery on GAF projects and indicate your opinion from scale 1 - 5</i>					
11						
12						
13						
14						
15						