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Assessing the Capacity of Works Department in the Delivery of Value for Money Construction Projects in Selected MMDAS in Ghana

By

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DECLARATION

"I hereby declare that this submission is of 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 acknowledgment is made in the thesis"

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ABSTRACT

Metropolitan, Municipal and District Assemblies (MMDAs) form an essential part of the development process in Ghana under the Local Government Service since they serve as subsets of the general population at the lower Government Decentralization Policy. Development projects form a significant part of the functions of these MMDAs who have to rely on governmental and internally generated funding for their projects and activities. Since such funding is limited it is always important to ensure that there is actual value in any project undertaken by the MMDAs. Thus, this study was to assess the capacity of the Works Departments of MMDAs in Ghana to ensure and deliver Value for Money on construction projects. In achieving the above aim, three objectives; to determine the performance measures for delivery of value for money projects at the Works Department, identify the challenges faced and identify value for money indicators for construction projects at the MMDAs were set. The study used a purposive sampling to target the Works Departments of the MMDAs in the Central Region of Ghana. Respondents were presented with the structured questionnaire for collecting the primary data. A total of 100 questionnaires were distributed. All distributed questionnaires were received; giving a response rate of 100%. The data collected was analyzed using descriptive statistics and mean score ranking. In achieving the first objective, respondents ranked performance measurement and output specifications as the most significant. Respondents ranked unavailability of independent checks and balances and poor funding as the challenges faced. Finally, in determining the VFM indicators to adopt, respondents ranked environmental impact and best use of resources as the topmost indicators. The study also

recommended tools such as Life Cycle Costing as necessary for the MMDAs to adopt to achieve VFM in construction projects.

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DEDICATION

I dedicate this work to God for his abundance grace upon my life, my wife, Rita Egyir and my lovely children; Esi Ewur Enyimnyam, Oheneba Ofori Mensah and Otompon Kobina Ackom.

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LIST OF ABBREVIATIONS

AEDA – Ada East District Assembly

BOQ – Bill of Quantities

BV – Best Value

DACF – District Assembly Common Funds

DFID – Department for International Development

KPI – Key Performance Indicator

LCC – Life Cycle Cost

MMDA – Metropolitan, Municipal and District Assemblies

NBIMS – National BIMS Standard

QALY – Quality Adjusted Life Years

SROI – Social Return on Investment

VFM – Value for Money

VM – Value Management

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND TO THE STUDY

Ghana has a unitary system of government with a central government which oversees all aspects of development, but under this centralized system is the second level administrative sub-division. These administrative subdivisions fall under the ten regions of Ghana and are typically called the districts. The division of the regions into districts was as a result of the reforms of the 1980s, which saw the initial creation of 110 districts. These districts and their local assemblies were put in charge of local administration and development. As at 2018, there are a total of 254 districts in Ghana (Ghana Districts, 2018).

There are three basic types of Assemblies in Ghana, the Metropolises (with a minimum population of two-hundred and fifty thousand people), the Municipalities (with a minimum population of ninety-five thousand) and the Ordinary Districts (which have a minimum population of seventy-five thousand). These collectively form the Metropolitan, Municipal and District Assemblies (MMDAs) (Ghana Districts, 2018).

The MMDAs, as a subset of local administration, are generally tasked with economic development through the formulation and execution of plans and strategies to mobilize resources, promote productive activity, fill manpower needs of the districts and initiate programmes for the provision of infrastructure, as well as provide municipal works and services in the districts. The Metropolitan, Municipal and District Assemblies are also in charge of the development, improvement and the management of human settlements in

the districts. MMDAs undertake their functions through various officials and departments that fall under it (Agboklu, 2015).

The Works Department is one of the core departments of the MMDAs and its function is to provide all basic design, surveys, working and structural drawings as might be needed for the initiation, sourcing and procurement of works, as well as their implementation. The Works department often supervises any project that is procured at the MMDAs, and in some cases of direct labour works, by the staff of the Works Department (AEDA, 2018). The categories of works undertaken by the Works Department fall under roadworks (which is directly handled by the roads unit) estate management, development control (which develops standards to regulate public developments in the Districts), and water section, which collaborates with the Ghana Water Company Ltd to provide pipe borne water to the districts, as well as contracting borehole drillers to provide boreholes to communities (AEDA, 2018).

With the volume of work that the MMDAs undertake, it begs the question of value for money (VFM) that is gotten from all projects they undertake. VFM is defined as a measure of the extent to which a project is able to meet its pre-determined objectives, and this is assessed by the client or the project stakeholders. The client determines that there has been VFM if the project meets or exceeds their expectations for cost, quality, time and other measures put in place before the start of the project. The key element of VFM is that quality is achieved at a very reasonable cost to the client or project stakeholders. VFM cannot be considered in isolation, efficiency must also be factored into the equation. According to the European Investment Bank (EIB), VFM needs to take into consideration the concept of economic efficiency in its definition, though some other

researchers find the term to be vague in its interpretation (Thomson & Goodwin, 2005). HM Treasury (2006) in seeking to define VFM also introduces new concepts; whole life costs combined optimally with quality. HM Treasury also adds that in measuring VFM, one should consider whether the project is fit for its purpose and the user can also confirm that it meets or exceeds their expectations. Cost elements that can be categorized under whole life costs include the initial cost of the product or service, cost of maintaining it, the license cost, transition, cost of upgrades, cost in use and the cost of finally disposing of the product. For the University of Cambridge, defining VFM means that an organization is able to assess the maximum value it is able to get from goods or services they are able to acquire with the resources they have at their disposal. This is measured from the organization's perspective by dividing the benefits accrued by the amount of resource invested in acquiring it (Dallas, 2006).

1.2 PROBLEM STATEMENT

The basic principle of VFM is, the client should feel that they have received real and measurable value of works for the price they paid for. However there are more complex measures for auditing projects to ensure value for money. This determination must however be set before the start of the project so that the client knows what exactly to expect and how to measure it when the project is completed. In Ghana however, the concept of Value for Money is very vague with regards to governmental projects. Even at the central government level, it is difficult to measure VFM on projects with the sitting government, but most VFM audits are carried out when new governments come in. This problem can however be attributed to many challenges, but this does not diminish the importance of VFM for any project (Appiah, 2018). This problem poses a great challenge

even at the district level because most districts are underfunded. The District Assembly Common Fund payments are often delayed or inadequate and this makes it difficult for the Assemblies to undertake all proposed projects, much less to put in place the relevant tools and personnel to ensure value for money. In the case where value for money analysis on projects have to be undertaken, the officers are inadequately trained (Ayisi, 2018). For the benefits of VFM not to be overstated, it is important to make a determination for the MMDAs, which undertake local development projects, on how to ensure VFM on all projects. Questions arose as to whether the MMDAs have a system or mechanism for determining or verifying VFM on projects undertaken and performance measures that help in measuring VFM across all projects undertaken. With these in mind, there is also the question of whether the MMDAs are challenged in any way in the delivery of VFM on projects undertaken.

1.3 AIM OF THE RESEARCH

The aim of this study is to assess the capacity of the Works Departments of MMDAs in Ghana to ensure and deliver Value for Money on construction projects.

1.4 RESEARCH OBJECTIVES

The objectives of the research, in accordance with the above research questions include;

I To determine the performance measures for the delivery of value for money projects at the Works Department of the MMDAs,

II To identify the challenges faced by the Works Department of the MMDAs

III Identify value for money indicators for construction projects of the MMDAs

1.5 RESEARCH QUESTIONS

The research questions that arise out of the stated objectives include the following;

I What are the performance measures for delivery of Value For Money projects at the Works Department of the MMDAs?

II What are the challenges faced by the Works Department of the MMDAs?

III What are the Value for Money indicators for construction projects for the MMDAs?

1.6 SIGNIFICANCE OF THE RESEARCH

The findings of this study are significant because for any project undertaken, whether governmental or private, there needs to be the assurance that there is a measureable and realistic value for money. It is even more critical for the governmental sector where cost overruns for projects are very rampant, with several research carried out on funds misappropriations and bloating of contract figures over the course of a project. The government however, works with limited funds. The findings from this study can be significant for the following;

I the MMDAs can put in place more stringent policies to measure and ensure that there is value for money on each project undertaken, which will ensure that only the most beneficial and cost efficient projects will be undertaken.

II the MMDAs can equip themselves with the necessary resources and personnel that can make adequate evaluation of project proposals to determine the best value for money and as well conduct value-for-money audits on completed projects to ensure that they meet set policy standards.

III the government can base on the findings to develop performance standards for these MMDAs and evaluation models for all projects undertaken to ensure that there is value for money.

IV the findings can also add to existing knowledge on value for money projects for the Works Department of the MMDAs, and form the foundation for future related studies.

1.7 SCOPE OF THE RESEARCH

MMDAs exist in all regions of the country, and they all have under them Works Departments which are tasked with undertaking capital projects. However, this research cannot target all the MMDAs in Ghana so the research will be focused on one Metropolitan, two municipals and five district assemblies in the Central Region of Ghana: that is Cape Coast metro; Mfantiman Municipal, Agona West Municipal; Gomoa West, Gomoa East, Gomoa Central, Agona East and Ekumfi District Assemblies. These areas have been selected because unlike the capital city of Accra, development is still lagging, and the MMDAs still have a lot of capital projects to undertake to meet the infrastructure needs of the communities. Since the works department undertakes various types of works under the MMDAs, this study will be conducted from two perspectives (the road projects and the building projects) so as to get a fairer understanding on the research problem.

1.8 RESEARCH METHODOLOGY

Collis & Hussey (2003) assert that research methodology is the overall approach to the design process from the hypothetical foundations to the collection of data and analysis adapted for a study. This study will apply a quantitative research strategy which will

emphasize objective measurements and the statistical, mathematical, or numerical analysis of data collected through polls, questionnaires, and surveys (Babbie, 2010). This research will utilize questionnaires in gathering primary data, while secondary data will also be gathered from other published works such as journals, articles and textbooks. The questionnaires will be handed to the staff of the Works Department at the selected district assemblies, who would be sampled using a purposive sampling technique. The data collected would then be analyzed using descriptive statistics, mean score ranking.

1.9 ORGANIZATION OF THE RESEARCH

This research shall be divided into five unique chapters which will entail the following:

Chapter one of the study will introduce it and detail the study background, state the problem, aim and objectives, as well as provide some highlights on the significance of the study. The chapter will also provide details on the research scope and the methodology to be followed in reaching the necessary conclusions. Chapter two covers the literature review entirely, and it will provide previously published work in relation to the study. Chapter three will detail the methodology for undertaking the study. The methodology will include the research design and strategy, the research data, population and instrument, as well as the tools for analysing the data. Chapter four will provide an analysis of the data collected using the preferred tools and present a discussion of the results in relation to the research objectives and literature. Finally chapter five will be the culmination of the study and will give a summary of the research findings, draw conclusions and make recommendations, all in relation to the objectives of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

The purpose of the literature review is to provide some context for achieving the objectives of the study by reviewing already published works (Royal Literary Fund, 2018). The literature review will provide definitions of key terms, historical contexts, and previous studies, and then outline further information in relation to the research objectives.

2.2 DEFINITION OF KEY TERMS

2.2.1 Works Department

The Works Department is one of the core departments of the MMDAs and its function is to provide all basic design, surveys, working and structural drawings as might be needed for the initiation, sourcing and procurement of works, as well as their implementation. The Works department often supervises any projects that are procured at the MMDAs, or in some cases of direct labour works, these are also supervised by the staff of the Works Department (AEDA, 2018). The categories of works undertaken by the Works Department fall under road works, which is directly handled by the roads unit, estate management, development control, which develops standards to regulate public developments in the Districts, and water section, which collaborates with the Ghana Water Company Ltd to provide pipe borne water to the districts, as well as contracting borehole drillers to provide boreholes to communities (AEDA, 2018).

2.2.2 Value for Money (VFM)

VFM is defined as the best combination of cost, quality and sustainability to meet or exceed the customer's expectations. In this definition, cost is taken in the context of the monetary value of the product or service over its whole life, quality is the specification which best fits the purpose and its sustainability represents the economic, social and environmental benefits to the customer (UK Department of Finance, 2018). The Business Dictionary (2018) also adds that VFM refers to the best utility which is derived from the least cost spent on a product or service, as against the maximum effectiveness and efficiency.

2.2.3 Metropolitan, Municipal and District Assemblies

The MMDAs as a subset of local administration are generally tasked with economic development, through the formulation and execution of plans and strategies to mobilize resources, promote productive activity, fill manpower needs of the districts and initiate programmes for the provision of infrastructure, as well as provide municipal works and services in the districts. The MMDAs undertake their functions through various officials and departments that fall under it (Agboklu, 2015).

2.3 CONCEPT OF VALUE FOR MONEY (VFM)

VFM noted by Fleming (2017), is often connoted to represent cost effectiveness in the planning and implementation of projects and the delivery of products and services. This concept has been in existence for years and borne the concept of value for money auditing in the public sector in many countries. It has been largely used as an instrument to control and manage public affairs, particularly with management of public funds (Morin, 2002). The Gateshead Housing Company (2017) also adds that VFM goes

beyond just saving money. It is supposed to ensure efficiency, effectiveness and economy. To do this, the organization in question must continually seek to ensure that its projects are undertaken at the least cost possible while also ensuring economy and efficiency.

Baker et al (2013) share the belief that the concept of VFM is one that has been popularized in many sectors and industries for many years, and many commercial and industrial organizations use it to evaluate performance regularly. Bidne et al (2012) also share in this assertion, and also allude to the fact that VFM is an internationally used concept often in the public sector.

2.4 REVIEW OF RELATED STUDIES

TTF (1998) notes that in trying to define what VFM is, least cost should not be the only factor that is considered. It was also highlighted that in the evaluation and application of the VFM method, it is important to compare the actual or potential results of the different options; Decorla-Souza (2015) undertook a project and evaluated the options of implementation of the project. It was identified that the entire success of the project depended to a large extent on the client's ability to adopt and maintain the VFM regime throughout the life of the project. Value For Money (VFM), in its most basic definition, concerns the best use of money for a project to achieve the most meaningful benefit to the client. Implying, taking into account total cost of living***;*** Quality means complying with the project details and meeting the client expectations succinctly. Sustainability has a broader meaning, and this means that factors such as economics, the social impact and the environmental concerns must be considered. VFM can however be replaced with the concept of Best Value, which looks at the most optimal value for the money spent on a

project. VFM and Best Value are concepts that have been adopted in many different industries and sectors, and offer measurable value to the users (Akintoye et al., 2003). HA (2006) also defines VFM as: "the achievement of business objectives at an affordable price while improving continuously, "The four key components of VFM are efficiency, economy, effectiveness and equity.

Ansell et al., (2009 undertook a study to determine the factors that ensures that projects are able to deliver value to their clients. Their findings showed that the respondents indicated factors such as delivering a defect-free project and to time and within the client budget set out at the beginning of the project. They found also that the project must fit the purpose for which it was designed and built, as well as aesthetically appealing. The construction must not exceed the construction schedule and must be able to last as long as expected by the client, in a most reasonable manner. Keep in mind that the optimization of resources is not limited to certain variants of project execution. Burger and Hawkesworth (2011) alluded to the fact that in governments determining the best procurement methods for delivering necessary infrastructure projects, it is important that the focus be on the best value and use of resources. However, in most cases, the distinction between value and then using the funds to just acquire a project is blurred and often just leaves the projects delivered without a real measure of value. Akintoye et al. (2003) emphasized that acquisition under a Public Finance Initiative (PFI) requires that the private sector must be made to bear more of the risks associated with the project delivery; Antoine (2012) stated that the price-quality ratio is a vital element in Public-Private Partnership (PPP) projects. The PPP is where the financing of the project is mainly based on the private sector. The Institute of Value Management (2002)

emphasized that the concept of value is based on the relationship between the satisfaction of many different needs and the resources used for that purpose. The different needs will probably include aspects such as high quality, good interior environment, durability, low maintenance cost, usability, etc.

Meanwhile, Cox and Townsend (1998) have argued that the quality-price ratio, productivity and overall customer satisfaction are relatively low in the construction sector.

Value For Money in Public Sector involves consideration of the contribution to be made to advancing government policies and priorities while achieving the best return and performance for the money being spent (Bauld & McGuinness, 2006, p.20)

2.5 APPROACHES TO VALUE FOR MONEY

2.5.1 The 4Es Approach

The most common approach to VFM is to use the 4Es principles, which takes into consideration Economy, Efficiency, Effectiveness and Equity (Department for International Development, 2016). The 4Es present the simplest measure for any VFM audit conducted on any project and is applied by many government and public administration bodies.

Efficiency

This is the measure of output (return on investment) based on how much is invested in a project (input). In this scenario the expectation is that there will be a wise use of inputs or resources, with the least bit of effort. To be able to measure the efficiency of the process, it is important to evaluate how a project will be undertaken in order to determine the least

amount of resources needed to get the best result. The concept, therefore, is to work smartly to achieve the best results.

Effectiveness

Effectiveness is measured on the basis of which goals or deliverables are achieved for a project. In this scenario the organization sets the expected realistic outcomes for the project, and then measures the final outcomes at the end of the project. As already stated, the goals set for a project must be challenging but also realistic enough to be achieved with the minimal expense of resources. Performance measures must be put in place to determine effectiveness upon completion, as well as benchmarks for determining effectiveness.

Economy

Economy has to do with whether the products or services being sought are at the right quality and the right price. The right price in this scenario is the lowest cost possible. Economy in value for money, is significant because resources are limited, and it is important that inputs for any project are at the lowest cost possible without any compromises to the quality needed.

Equity

This is the final and newest E in the approaches to VFM, and the understanding for this is that for there to be value in the procurement and execution of a project, it must be fair to all the recipients or users of the project. All people who are to benefit from the project must have equal benefit and access to the project when it is completed.

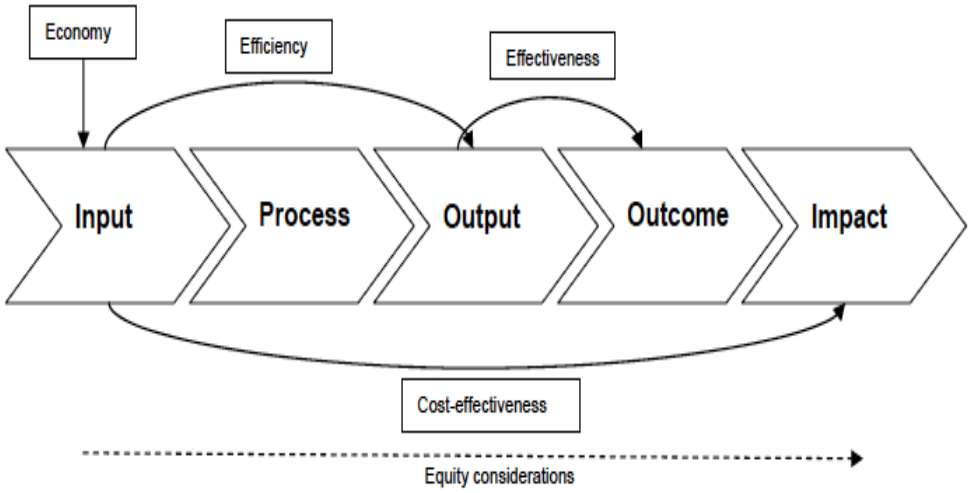

Figure. 1 4Es framework in Value for Money

Source: Beam Exchange, 2016

2.6 PRINCIPLES OF VALUE FOR MONEY

Various studies have outlined the guiding principles for value for money, and the basic principle is that Value For Money (VFM) is about maximizing the impact of every amount of money spent to improve people's lives. VFM does not mean to do the cheapest things. It is understood that the hardest to reach people and places that need peace-building support could cost more and the DCPSF will supports such interventions. The important thing is to get better understanding of what the main drivers of costs are and how to get the desired quality at the lowest price. Other guiding principles include the following:

2.6.1 Enhanced economy, efficiency and effectiveness

One of the basic principles of value for money is that it must ensure economy in the use of funds for project or service delivery. There must be efficient and judicious use of funds

while also ensuring that projects are delivered in a most effective manner for the benefit of the users.

2.6.2 Best overall value

Project selection, planning, procurement and delivery must all be in line with delivering the best overall value for tax payers and project beneficiaries. Project stakeholders must ensure that there is adequate consultation on the project with regards to the principle of best value before funds are committed to it.

2.6.3 Application of relevant benchmarks

Value For Money cannot be determined without adequate benchmarking and measurement of key performance indicators (KPI). The various project implementation bodies must determine the performance measures for the project in terms of cost performance right from the beginning and there must be adequate monitoring and evaluation throughout the project implementation.

2.6.4 Consistent approach to VFM

Value for money must be assessed in a consistent manner so that performance of projects can be measured in a uniform manner. Standards must be set which will be used as a uniform guideline for all projects which will be undertaken, thereby allowing for a uniform standard for measuring the value for money.

2.6.5 Strong competitive framework

The purpose of VFM is to ensure that projects that are undertaken are most competitive and offer the best value for money. In cases where projects are to be won by a contractor through a bidding process, it is important that the most competitively priced bid is

selected. This is a very vital step in the VFM process. The benchmarking framework must be installed to ensure that only the most competitively priced projects are selected.

2.6.6 Internal audit

Continuous evaluation is important to ensure that VFM is achieved for projects undertaken, and this is done by having an internal audit mechanism in place. The audit mechanism is to ensure that the VFM systems and objectives are all achieved at the most reasonable cost and most efficient manner.

2.6.7 Staff involvement

It is important during the implementation of any VFM programme that all staff members in the agency be abreast with the framework for implementing it, because people are more committed to a process when they fully understand the purpose for implementing VFM and the outcomes being sought.

2.7 ACHIEVING VFM IN PROJECT IMPLEMENTATION

To achieve value for money in project implementation it is necessary that the following steps be taken:

2.7.1 Detailed risk analysis and allocation of risk

Risks associated with projects must be evaluated and can include Approval and licensing and design risks. Construction risks are the risks involved in construction projects, risk procedures can be classified as (exceeded time and money, change in economic conditions, error in design, risk financing. The operational risks among others, include inefficient operation of a facility and the risks of income, that is, the disappointing return on capital. Contrary to the expectation (Regan, 2014), the discussion of this risk sharing

with an efficient plan to take risks for the various actors in the project will facilitate the search for safety and the value of the project and thus improve their value analysis (Partners Victoria, 2003).

2.7.2 Drive for faster project completion

The relationship among the various implementers can be more effective if Value For Money tools are used in their management duties, instead of reducing the total duration of the project. Knowledge about the different delivery methods of projects such as design-construction, public-private cooperation, restricted or sole sources system, etc, which deal with extensive plan of the project and the price-performance ratio the capital pushed into the project by the client. The use of project planning tools, such as line and pin diagram, network diagram and cash flow analysis, etc. also helps you track your project on site.

2.7.3 Reducing project cost

It is important that the project managers are able to keep project costs as reasonable as possible and not to be overly escalated. Managers must constantly monitor the project costs during execution as against the determined costs from the beginning of the project. Cost management tools can be adopted and used to ensure that throughout the lifecycle of the project the costs are kept at reasonable levels of these risks. Therefore it is important to identify the risk elements in a project that can lead to the costs escalating. There must be a dedication to reduce the impacts of these risk factors so that costs do not rise.

2.7.4 Innovation in project development

Introducing innovative strategies and concepts for procuring services and / or building a project can increase the value for customers and occupant, thus ensuring higher value and

/ or higher returns. Innovative strategies could consist of better and more efficient facilities and equipment, innovative developments or solutions, better motivational policies for workers, an acceptable framework which will enhance better communication, better supply chain and by incorporating advanced technologies. Databases of facilities and efficiency in tracking deliveries must be pursued. Indeed, DFID (2011) has argued/advocated new methods of evaluating the value of projects.

2.7.5 Maintenance cost accounted for

Lifecycle costs-analysis, using VFM tools ensure the use of sustainable and conservative structural elements and projects that can produce minimum expenses of maintaining a medium-term program. Maintenance costs should be taken into consideration in the design phase of the project, which defines the main components of the project, adopts objective decisions on alternative elements or design components, evaluations and ultimately selects the cost of each component of the alternative design.

Design-based component should be considered to have low cost, which provides the required functionality and meets optimal standard.

2.7.6 Accurate assessment of cost of project

When it comes to draft cost engineering project, the engineer should strive to implement the project cost and accurate evaluation, making sure that the fixed unit rate for each point of the invoice for calculation for different activities, materials, labor, plants and other variable cost necessary to accomplish these tasks. In addition, the quantifier must ensure that no work is wrong, except when there is no such error, but can win a contract that can cause claims and more disputes if a mismanaged person can influence the cost of

the project and it can have a negative impact in situations that lead to the reduction of the project, reducing the return on investment for the clients.

2.7.7 Detailed specifications

It is impossible to underline the importance of any adaptation of the project. Moreover if such a specification is properly detailed, it will take into account all the elements of the design, materials, work, day, work schedules, tariffs and more detailed description, of the greater the ease of the inspector or appraiser attitude. No detailed description can lead to disagreements between different consultants, in particular the architect, engineer and quantity Surveyors. Undetailed description leads to additional costs and subsequent deductible costs, which can vary from customer to customer.

2.8 MEASURING VALUE FOR MONEY

This section explains the various methods and techniques used for the design, appraise investment, life cycle cost analysis, cost management, information modelling, and thin design methods are all examples of value for money.

2.8.1 Life Cycle Cost (LCC) Analysis

The tool that is used to analyze purchases and maintenance costs is called Life Cycle Cost. Life Cycle Cost analysis is a method used to clarify whether it is possible to achieve the project or not. This management tool is often used by the project, a statement supported by Bidne et al. (2012), which performs SIS calculations earlier in order for the project is completed. Preserved literature (Messiha, Morton & Jaggar 1996) stated that LCC is basically used to ensure that the cost of a project from inception to the cost in use can be fully exploited. One of the characteristic features of VFM's official measurement is Project Cost Calculation (Regan, 2014). LCC is the method of determining total cost of

ownership. LCC is the total value of the property. Life-cycle costs are also referred to as total costs or useful lives (Olanrewaju, 2013); This includes investment in recovery and improvement assets, all maintenance and operating costs and a very important risk factor for acquired infrastructure services over 20 years or more (Regan, 2014). The main problem in LCC is in the analysis (Pascueire & Swaffield, 2006). In other words, LCC techniques for its estimated value (in associated future cost such as running, operation, maintenance, replacement, change costs (Ahuja & Walsh, 1983), are used in., Kiyoyuki, Sugisaki & Kobayashi 2003 Bennett,, 2005 , Morton and Jagar, 1995. Otherwise, it is defined as customer interest (Flanagan & Jewell, 2005). Lifecycle costs go hand in hand like a World Cup survey and it is important to study the World Cup (Coetzee, 2010). It is the most planned and structured approach to LCC analysis. For example, in the LCC estimate, it is a good idea to include different components and / or elements. LCC has to cover the costs of the public sector (Bidne et al., 2012). This calculation usually uses the following formula:

Life Cycle Value = Starting Value + Repair and Maintenance + Energy + Water + Replacement + Replacement Cost.

2.8.2 Value Management

Another technique for achieving value for money invested is the value management (VM) methodology, however as noted by Olanrewaju (2013), there are misconceptions and misunderstandings as to which of the two techniques (LCC & VM) is more involving, proactive and can ultimately create and sustain best value for construction projects. Various terms such as value engineering, value control, value analysis and value engineering have been used to describe the principle of value engineering. VM was

developed due to a shortage of materials and components that faced the manufacturing industry in the North America during the World War II. VM is both problem solving and problem seeking processes. As a problem seeking system, it identified problems that might arise in future and develop or identified a solution to the problem (Olanrewaju, 2013; Woodhead & Downs, 2001). Value management as explained by Kelly and Male (2001) is a proactive and problems solving management system that maximizes the functional value of a project by managing its development from concept stage to operation stage of projects through multidisciplinary value team.

The Institute of Value Management (2002) described value management (VM) as a technique used to reconcile the different value judgements made by various stakeholders and enable an organization to achieve the greatest progress toward its stated goals with the use of minimum resources, in order to achieve value. Value management was also defined by Olanrewaju and Khairuddin (2007) as an organized set of procedures and processes that are introduced, purposely to enhance the function of a designs, services, facilities or systems at the lowest possible total cost of effective ownership, taken cognizance of the client's value system for quality, reliability, durability, conformance, durability, aesthetic, time, and cost. Meanwhile, the Construction Industry Board (1997) defined it as a structured approach to establishing what value means to a client in meeting a perceived need by clearly defining and agreeing on the project objectives and establishing how they can best be achieved. Value management involves the identification of the required functions and the selection of alternative that maximize the achievement of the functions and performance at the lowest possible total cost (Best & De Valennce, 2002). It makes client value system explicitly clear at the project's

conceptual stage and seeks to obtain the best functional balance between cost, quality, reliability, safety and aesthetic (Olanrewaju, 2013). VM considers various issues before proposing the best solution to clients (Abidin & Pasquire, 2005) The value management approach reduces the risk of project failure, lower cost, shorter projects schedules, improve quality, functions, performance and ensure high reliability and safety (Olanrewaju, 2013) hence, secures the requisite value for money for clients. While, life cycle costing is useful when a 'project' has been 'selected or defined', value management is introduced much earlier. Value management is introduced when a decision has not been made yet either to build or not; at this stage, the 'project' is still soft; the client's solution to the client's problem might not even be constructed facilities. According to Kelly and Male (2001), value management is introduced to determine the kind of project that will provide to the client the expected return on investment. The approach could be introduced at any stage of the projects' life cycle, but it is more beneficial if it is introduced from the pre-construction phase of the projects; before any design is committed (Ahuja & Walsh, 1983).

2.8.3 Building Information Modelling (BIM)

This Modelling (BIM) is the building or infrastructure construction and information management throughout the lifetime of the project Eastman et al. (2011) defines BIM as a technology and a series of related processes for fabricating, transmitting and analyzing building models; They also use BIM tools as special programs for tasks that produce a specific result because of the tools for model generation, production schedules, right specifications, cost estimates, collision detection and errors, energy analysis, rendering, programming, and visualization; and the National BIM Standard (NBIMS) describes it as

"the body of physical and functional features of digital representation" (National Institute of Civil Engineering, 2007, p. 21).

The use of BIM has been adopted in some countries and has been made compulsory for public projects because of its advantages. These countries include USA, UK, Norway, Denmark, South Korea, China, Finland, Singapore, Germany, Sweden and France (Singh, 2017).

The use of BIM in the developed countries has helped improve communication in collaborative works. Sharing of information and collaborations are very essential throughout the AEC industry. However, collaborative working has led to a number of problems in the past because of the different aspects of design project. With the help of BIM, professionals have access to every relevant information whenever necessary. Essentially, BIM has helped to streamline coordinated communication and collaboration between teams (Bethany, 2017).

BIM is used effectively and strictly in conjunction with construction works to facilitate the dissemination of information, track shipments, facilitate the rate of increase and increased costs, conceptual considerations among others. When it is collected, it provides the customer with the required value for the money and the return on investment.

2.8.4 Lean Construction

Lean construction is a method of building process efficiency on time and effort to create the highest possible value. The technique must first be used to determine the requirements and expectations of the customer when interpreting the value. Secondarily, it identifies the flow of values and excludes valueless processes. Another fundamental

principle is the adaptation of production to consumer wish for a change in the push-to-pull approach (Limon, 2015).

Gabriel (1997) opined "a simple approach to project management pays much attention to the dedication and motivation of those who participate in the project." Increment in some of its advantages have emerged such as risk reduction for the customer with the right balance between quality, productivity and the ratio of price and quality. As a result of this process, the productivity and functioning of services and the high level of crafts and raw materials, work within the estimate. As mentioned above, advantages in combining Productivity and Functioning Service provide a safe price-to-price ratio invested by the client and an increase in the cost of such a project while attempt is made to reduce costs.

2.8.5 Cost Effectiveness Analysis

This is defined as the assessment of multiple alternatives to result, taking into consideration cost. This method can be used as compared to programs. This method represents each feature based on the common utility scale. This can be faded. The X-axis offers the lowest rating as the highest alternative. Y-axis shows a useful bar. Certain attributes are associated with growing use. The smaller the attribute, the larger the result. You can tune the other features.

2.8.6 Cost Utility (CU) Analysis

CUA is used to evaluate two or more alternatives that compare costs with useful or costly ones. This method can be used if the revenue generation results are not available or relevant. This method is most common in the field of health care. The QALY makes it possible to compare medical interventions over the years of life. Cost-effectiveness and cost analysis are useful for evaluating programs that pursue the same goal in a non-

monetary sense. In educational programs this may mean that the school is enrolled, present, completed or cognitively developed. The main difference between the two methods is that the CU takes into account the prospects of the beneficiaries. Famous CU analysis programs are in the field of health care, with QALY.

With the QALY, every possible program can measure itself to the expected life expectancy. The development of this indicator means satisfaction.

2.8.7 Cost Benefit Analysis

This is an evaluation of an alternative plan that represents the cost, benefit and time regulation for each cash substitute. This method can be used to determine if the approach is useful (or land) if the costs outweigh the benefits. You can use this method to compare alternatives that do not share the same goal or sector. Earnings and expenses need to be evaluated in cash. For this reason, this method is best suited for cases where it is possible to convert most of the benefits into monetary value, where non-convertible methods are not important, or where comparison is possible between alternatives.

2.8.8 Social Return on Investment (SROI)

The cost-benefit analysis and SROI on the investment will assess whether the program makes sense in the absolute. SROI measures the social, environmental and economic costs and benefits. Both results are monetized and both types of programs come from other institutions, SROI is considered to provide the needed result

2.8.9 Moralles findings

Moralles (2008) also identified certain performance measures which are applicable to VFM and these include the following:

I Integration and adaptiveness of cost saving project implementation

II Economy: Getting the best value inputs for projects

III Ability to track input cycle from procurement to handing over

IV Key strategic costs are easily identifiable

V Comparative costs across similar projects

VI Efficiency: Maximize outputs from minimum inputs

VII Delivery of outputs in a timely manner

VIII Meeting or exceeding realistic quality standards

IX Cost effectiveness

X Equity in ensuring that project is viable to all users

2.9 CHALLENGES ASSOCIATED WITH VFM IMPLEMENTATION

The value of the monetary valuation provides important information to help with the development of issues so that risk can be identified, well assessed and later allocated, in order to service life cycle cost, case analysis, weighted financial forecast by risk, project evaluation and bidder process. These provide multiple levels and reporting (Regan, 2014). Several issues, however, were documented and evaluated as monetary value restrictions. The various hindrances can be explained under these headings.

2.9.1 Technicalities of VFM management tools

Abidin and Pasquire (2005) have revealed that there is no formal guide to effectively using some of these devices as barriers. This means that some organizations and stakeholders have internal manuals to use some of these VFM tools. These tools also called "secrets," are tools that can improve the effective and efficient use of these methods.

2.9.2 Lack of awareness of VFM tools

The lack of awareness or knowledge of VFM tools can create serious effects for practitioners who cannot take advantage of the availability of the VFM tools. Indeed, the present study is about the lack of knowledge and awareness to Practitioners and Stakeholders. This implies that some Stakeholders do not recognize that these tools are related to the concept of customers' fair value. However, interested participants such as architects, search engines and indicators must bring this knowledge to all customers.

2.9.3 Unclear priorities and objectives

Assessment of the value of money takes place in the best planning phase, but in the situation where the employer/customer still does not know the type of project, the use of such a location of project or use the project after deployment. The deployment may affect the right evaluation of the VFM of such projects. For example, the customer's indecisiveness can lead to an erroneous VFM assessment when the location of buildings by office or block of one of the minilabs (for meetings and workshops) has been completed. The evaluation of VFM is to consider the optimal balance between the total cost of the life cycle and the quality of distribution.

Cox and Townsend (1998), issues to achieve 'monetary value', so discontinuous demand such as master disability, frequent changes in specifications, criteria for inappropriate (entrepreneurs and consultants) selection have been revealed risk inadequate allocation, inefficient construction and low quality, lack of control, lack of investment, conflicting culture, fragmented industrial structure, etc. Other obstacles to obtain good value for money in construction projects are the following.

I Poor information from the client at the onset of the project

II Inconsiderate demands made by the client

III Negotiation processes being time consuming

IV Poor communication with the client

V Challenges associated with management of risks

VI Bidding costs associated with the process may be high

VII Lack of a standardized evaluation method for VFM

VIII Inadequate government subventions to undertake projects and measure VFM

IX Poor internal funds generation at the MMDAs to support VFM projects

X Poorly training staff for proper understanding of VFM

XI Partisanship in development process can stifle VFM projects

XII Timing and role of VFM implementation for projects is challenging

XIII Unavailability of independent checks and balances for VFM projects

XIV Lack of incentives for the MMDAs to undertake VFM projects

XV Poor interpretation of results for VFM analysis of projects.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 INTRODUCTION

The research methodology outlines the strategies and procedures for collecting, analyzing and presenting data for the study. The methodology details the research approach and design, the forms of data to be used as well as the methods for collecting it, research population, sampling techniques and the method for data analysis.

3.2 RESEARCH STRATEGY

Research strategy is the activity that needs to be undertaken to ensure that there are adequate resources available to complete the study in the time available, to make sure that the approach to the design of the study is the appropriate one to achieve the study's objectives, that suitable software are available to manage and analyze the data, that sensible sets of data are collected to ensure that analysis will allow the required information to be extracted, and so on (Zina, 2004). Baiden notes that there are three research strategies, namely, the quantitative, qualitative and triangulation, which is a combination of the first two (Baiden, 2006). This study however chooses the quantitative research strategy.

3.2.1 Quantitative Research Strategy

Quantitative methods emphasize objective measurements and the statistical, mathematical, or numerical analysis of data collected through polls, questionnaires, and surveys, or by manipulating pre-existing statistical data using computational techniques.

Quantitative research focuses on gathering numerical data and generalizing it across groups of people or to explain a particular phenomenon (Babbie, 2010).

This research will thus apply the quantitative approach to meeting the objectives because it allows for opinions from study respondents to be quantified and analyzed for the study. The research adopts a questionnaire survey in the quest to assess the capacity of Works Department of MMDA's in the delivery of value for money on construction project in Ghana. Questionnaire survey enhances consistency of observations and improves replication due to its inherent standardized measurement and sampling techniques (Oppenheim, 2003).

3.3 RESEARCH DATA

Research data is defined as recorded factual material commonly retained by and accepted in the scientific community as necessary to validate research findings; although the majority of such data is created in digital format, all research data is included irrespective of the format in which it is created.

3.3.1 Primary Data

Primary research data refers to data that has not been collected before for a study and is often collected directly from source. It is gathered first hand, following careful operationalization of variables and using carefully chosen procedures. The primary data was collected directly from the research respondents using the structured questionnaire.

3.3.2 Secondary data

Secondary data is the data that have been already collected by and readily available from other sources. Such data are cheaper and more quickly obtainable than the primary data and also may be available when primary data cannot be obtained at all. It is economical,

saves efforts and expenses, time saving and helps to make primary data collection more specific since with the help of secondary data, we are able to make out what are the gaps and deficiencies and what additional information needs to be collected (Moore, 2006). The secondary data was made up of already published works from journals, textbooks, articles and websites.

3.4 RESEARCH INSTRUMENT

To develop the questionnaire there must first be an understanding of what is required and the research population to be targeted for the study (Fray, 2002). The questionnaire designed included close-ended questions and scaled response questions. The likert response scale employed, measured the strength or intensity of each respondent's opinions about the factors identified from the literature.

The questionnaire was to serve as a guide in achieving the objectives of the study, and as such in its development, the first part dealt with the demographic data on the respondents. This demographic data is to ensure that the respondents are qualified to provide responses to the study. The second part dealt with the performance measures for delivery of value for money projects at the Works Department of the MMDAs. The third part of the questionnaire identified the challenges faced by the Works Department of the MMDAs and the fourth part identified value for money indicators for construction projects of the MMDAs.

3.5 RESEARCH POPULATION

A research population can be defined as the totality of a well-defined collection of individuals or objects that have a common, binding characteristics or traits (Polit and Hungler, 1993). Burns and Grove (1993) added that a population is defined as all

elements (individuals, objects and events) that meet the sample criteria for inclusion in a study. The population for the study was made up of staff of the Works Departments of the Metropolitan, Municipal and District Assemblies (MMDAs). The study targeted the selected MMDAs in the Central Region due to the volume of works ongoing within that area and proximity to the researcher.

Table 3.5.1 staffing norms for Gomoa West District Assembly

DEPARTMENT/SECTION/GRADE	GOMOA WEST DISTRICT ASSEMBLY		
	MIN	MAX	NO. AT POST
ENGINEER (PROFESSIONAL)	7	9	5
ENGINEER (SUB-PROFESSIONAL)	4	6	4
ARCHITECTURE (PROFESSIONAL)	3	4	1
QUANTITY SURVEYING	3	4	3
TECHNICAL	5	7	3
RURAL HOUSING (PROFESSIONAL)	2	2	2
TECHNICAL (BUILDING INSPECTORATE)	6	8	5
TOTAL	**30**	**40**	**24**

Source: Local Government Service, 2014 / Field Survey

Table 3.5.2 staffing norms for Gomoa East District Assembly

DEPARTMENT/SECTION/GRADE	GOMOA EAST DISTRICT ASSEMBLY		
	MIN	MAX	NO. AT POST
ENGINEER (PROFESSIONAL)	7	9	3
ENGINEER (SUB-PROFESSIONAL)	4	6	5
ARCHITECTURE (PROFESSIONAL)	3	4	1
QUANTITY SURVEYING	3	4	2
TECHNICAL	5	7	4
RURAL HOUSING (PROFESSIONAL)	2	2	1
TECHNICAL (BUILDING INSPECTORATE)	6	8	4
TOTAL	**30**	**40**	**20**

Source: local Government Service, 2014 / Fields survey

Table 3.5.3 staffing norms for Gomoa Central District Assembly

DEPARTMENT/SECTION/GRADE	GOMOA CENTRAL DISTRICT ASSEMBLY		
	MIN	MAX	NO. AT POST
ENGINEER (PROFESSIONAL)	7	9	2
ENGINEER (SUB-PROFESSIONAL)	4	6	3
ARCHITECTURE (PROFESSIONAL)	3	4	1
QUANTITY SURVEYING	3	4	2
TECHNICAL	5	7	4
RURAL HOUSING (PROFESSIONAL)	2	2	2
TECHNICAL (BUILDING INSPECTORATE)	6	8	4
TOTAL	**30**	**40**	**18**

Source: local Government Service, 2014 / Fields survey

Table 3.5.4 staffing norms for Agona East District Assembly

DEPARTMENT/SECTION/GRADE	AGONA EAST DISTRICT ASSEMBLY		
	MIN	MAX	NO. AT POST
ENGINEER (PROFESSIONAL)	7	9	5
ENGINEER (SUB-PROFESSIONAL)	4	6	4
ARCHITECTURE (PROFESSIONAL)	3	4	1
QUANTITY SURVEYING	3	4	1
TECHNICAL	5	7	5
RURAL HOUSING (PROFESSIONAL)	2	2	2
TECHNICAL (BUILDING INSPECTORATE)	6	8	4
TOTAL	**30**	**40**	**22**

Source: local Government Service, 2014 / Fields survey

Table 3.5.5 staffing norms for Mfantsiman Municipal District Assembly

DEPARTMENT/SECTION/GRADE	MFANTSIMAN MUNICIPAL DISTRICT ASSEMBLY		
	MIN	MAX	NO. AT POST
ENGINEER (PROFESSIONAL)	7	9	7
ENGINEER (SUB-PROFESSIONAL)	4	6	5
ARCHITECTURE (PROFESSIONAL)	3	4	2
QUANTITY SURVEYING	3	4	2
TECHNICAL	5	7	6
RURAL HOUSING (PROFESSIONAL)	2	2	2
TECHNICAL (BUILDING INSPECTORATE)	6	8	7
TOTAL	**30**	**49**	**31**

Source: local Government Service, 2014 / Fields survey.

Table 3.5.6 staffing norms for Agona West Municipal District Assembly

DEPARTMENT/SECTION/GRADE	AGONA WEST MUNICIPAL DISTRICT ASSEMBLY		
	MIN	MAX	NO. AT POST
ENGINEER (PROFESSIONAL)	7	9	7
ENGINEER (SUB-PROFESSIONAL)	4	6	5
ARCHITECTURE (PROFESSIONAL)	3	4	1
QUANTITY SURVEYING	3	4	2
TECHNICAL	5	7	6
RURAL HOUSING (PROFESSIONAL)	2	2	2
TECHNICAL (BUILDING INSPECTORATE)	6	8	6
TOTAL	**30**	**49**	**29**

Source: local Government Service, 2014 / Fields survey.

Table 3.5.7 staffing norms for Ekumfi District Assembly

DEPARTMENT/SECTION/GRADE	EKUMFI DISTRICT ASSEMBLY		
	MIN	MAX	NO. AT POST
ENGINEER (PROFESSIONAL)	7	9	3
ENGINEER (SUB-PROFESSIONAL)	4	6	5
ARCHITECTURE (PROFESSIONAL)	3	4	1
QUANTITY SURVEYING	3	4	3
TECHNICAL	5	7	3
RURAL HOUSING (PROFESSIONAL)	2	2	2
TECHNICAL (BUILDING INSPECTORATE)	6	8	4
TOTAL	**30**	**40**	**21**

Source: local Government Service, 2014 / Fields survey.

Table 3.5.8 staffing norms for Cape Coast Metro

DEPARTMENT/SECTION/GRADE	CAPE COAST METRO		
	MIN	MAX	NO. AT POST
ENGINEER (PROFESSIONAL)	7	9	8
ENGINEER (SUB-PROFESSIONAL)	4	6	4
ARCHITECTURE (PROFESSIONAL)	3	4	3
QUANTITY SURVEYING	3	4	3
TECHNICAL	5	7	5
RURAL HOUSING (PROFESSIONAL)	2	2	2
TECHNICAL (BUILDING INSPECTORATE)	6	8	6
TOTAL	**30**	**49**	**31**

Source: local Government Service, 2014 / Fields survey.

Table 3.5.9 Summary of Staffing Norms for selected MMDA's in Central Region

SELECTED MMDA's	NO. AT POST
Gomoa West District	23
Gomoa Central District	18
Gomoa East District	20
Agona East District	22
Ekumfi District	21
Mfantsiman Municipal	31
Agona West Municipal	29
Cape Coast Metro	31
TOTAL	**195**

Source: local Government Service, 2014 / Fields survey.

3.6 SAMPLING TECHNIQUE AND SAMPLE SIZE

3.6.1 Sampling technique

A research sample is a group of people, objects or items that are taken from a larger population for measurement. The sample is representative of the whole population to ensure that the findings for the sample can be generalized for the whole population. Kumar (1999) in his research posits that the entire population can be expressed using an ideal representation which is a sub-group of the population is known as the sample. The sampling technique applied for the study was the purposive technique. Since the research population was made up of employees of the Works Department of the selected MMDAs in the Central Region, the technique was a good one since the findings could be easily generalized for the other MMDAs.

3.6.2 Sample size determination

To determine the sample size the Yamane Formula (1967) was applied. However, the first point to note was to determine the total number of employees working in the selected MMDAs in the Central Region.

As at the time the study was done, a total of one hundred and ninety-five (195) employees were at post. The formula was then used as follows:

$$n = \frac{N}{1+N(e)^2}$$

where n= Sample size

N= population

e= level of precision

$$n = \frac{195}{1+195(0.07)^2}$$

n= 100

3.7 DATA ANALYSIS

The data collected using the questionnaire was presented using descriptive statistics, mean score ranking. The descriptive statistics were used mainly to describe the basic features of the data collected for the study. The demographic characteristics of the respondents were presented using tally tables. Data collected using the Likert type questions was analyzed using mean score ranking. The mean score determines the ranking of means of different factors as against a predetermined mean can be better understood.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION OF RESULTS

4.1 INTRODUCTION

Chapter four of this study provides an analysis of the data collected using the structured Likert scale questionnaires and discusses the results in relation to the literature that was found on the study. This chapter is divided into different parts, with the first part focused on the demographic characteristics, and the second part focusing on the objectives of the study. The analysis methods used include the descriptive statistics and mean score ranking.

4.2 DEMOGRAPHIC STATISTICS

A total of 100 questionnaires were distributed and successfully collected from the respondents, and this section is to detail the characteristics that make them reliable respondents to participate in the study. It also gives confidence about their experiences and qualifications to provide credible responses. The demographic characteristics are presented using tally tables.

Table 4.2.1 Demographic characteristics of respondents

FACTOR	FREQUENCY	PERCENTAGE
Metropolitan Assembly	6	6%
Municipal Assembly	23	23%
District Assembly	71	71%
TOTAL		100%
Designation of respondent		
Quantity Surveyor	18	18%
Project Manager	11	11%
Architect	3	3%
Engineer	25	25%
Technician Engineer	29	29%
Draftsmen	14	14%
TOTAL		100%
Years with Works Department		
Less than a year	3	3%
1 – 5 years	54	54%

6 – 10 years	41	41%
11 – 15 years	2	2%
Over 15 years	0	0%
TOTAL		100%
Number of projects worked on at Works Department		
1 – 10 projects	3	3%
11 – 20 projects	26	26%
21 – 30 projects	43	43%
More than 30 projects	28	28%

Awareness of Value for Money		
YES	100	100%
NO	0	0%
TOTAL		100%
Source of knowledge on Value for Money		
MMDA training	87	87%
Personal studies	13	13%
Social media	0	0%
Internet	0	0%
TOTAL		100%
Do MMDAs work to achieve VFM in construction projects		
YES	100	100%
NO	0	0%
TOTAL		100%

Source: Field study, 2018

Table 4.2.1 gives the summary of the demographic characteristics of the respondents, and as already indicated, the purpose of this information is to ensure that the respondents are fully aware of the purpose for the study and as well, as properly knowledgeable and experienced enough to qualify them as respondents for the study.

The table 4.2.1 shows that all respondents actually work with one form or the other either Metropolitan, Municipal or District Assembly in the Central Region of Ghana, with 6%

at the Metropolitan Assembly (Cape Coast), 23% at the Municipal Assembly and 71% at the District Assembly. This shows that on the whole all respondents are workers with the assemblies and can provide relevant responses. However it was also important to determine that those targeted did not only work at the MMDA but specifically at the works department. Due to the fact that the respondents were targeted purposely to ensure that they all worked in the Works Department, the response percentage on that was 100.

Beyond they working at the Works Department, the next was to determine that the respondents also held some construction related designation, and the responses showed that 18% were quantity surveyors, 11% were project managers, 3% were architects, 25% were of some variety of engineers, 29% were technician engineers for project sites and finally 14% described their designation as draftsmen. So this also shows that all respondents are construction industry designates and thus work on construction projects.

With their designations determined it was relevant to also determine how much experience they had, since the level of experience at the MMDA and on construction projects would also impact their level of knowledge of VFM in construction projects. 54% of respondents had been with the MMDA between a year and five years, while 41% had worked with them for up to ten years. Overall, 97% of the respondents had worked with their MMDA at least one year, giving them ample time to work on enough projects to gather relevant knowledge on VFM. Table 4.2.1 also shows that 97% of the respondents had worked on at least ten or more projects for the MMDAs in their designation, which also adds to their ample knowledge on projects undertaken at the MMDA level.

With the experience level determined the demographic characteristics now focused on the level of knowledge of VFM among the respondents, which actually forms the core of the study, and all respondents expressed a knowledge of VFM, and 87% indicated that this knowledge was from the MMDA training, while the remainder also got the knowledge from personal studies. All respondents also indicated that they believed the MMDAs worked to achieve VFM in construction projects.

In all, the demographic characteristics gave some level of confidence in the respondents for this study, that they are duly experienced and knowledgeable on the core areas this study is focusing on and can give relevant responses to the questions.

4.3 TO DETERMINE THE PERFORMANCE MEASURES FOR DELIVERY OF VALUE FOR MONEY PROJECTS AT THE WORKS DEPARTMENT OF THE MMDAS

With the demographic data on the respondents presented above the next step is to delve into the stated objectives of the study and first objective of the study is to determine the performance measures which the MMDAs apply in determining value for money for construction projects they undertake. The objective was divided into two parts, with the first part requiring the respondents to identify the determinants of VFM for construction projects by the MMDAs and the second part identifying the performance measures for VFM by the MMDA.

The determinants of VFM were identified in the literature and presented to the study respondents on a 5-point Likert scale. Tables 4.3.1 below gives a summary of the data analyzed.

Table 4.3.1 Mean scores for determinants of Value for Money at MMDAs

FACTOR	MEAN SCORE	STD. DEVIATION	RANKING
Performance measurement	4.85	.752	1
Performance and the use of output specification	4.63	1.058	2
Risk transfer	4.14	.847	3
Project incentives	3.93	.525	4
Competitiveness of projects	3.90	.386	5
Long term nature of contracts	3.53	1.066	6
Management skills	3.06	1.090	7

Source: Field study, 2018

Table 4.3.1 gives the mean score and ranking of the determinants of VFM for construction projects. The determinants were ranked on a scale of 1 to 5, and for any determinant to be considered significant for the study they need to have a mean score above 3.00.

From the table 4.3.1 it can be seen that all the determinants of VFM for construction projects were considered significant by the respondents, with mean scores above 3.00. However, considering the ranking from the highest to the lowest, it can be seen that performance measurement, performance and use of output specification and risk transfer

were the top three highest ranked determinants. All three fall within the mean values of significant to very significant. Moralles (2008) identified these determinants as significant, particularly for performance measurement and also the use of output specification. Performance measurement is a significant tool in project delivery because it helps to ensure that the project is delivered to certain quality targets. Output specification as well as risk transfer is significant for project delivery because successfully mitigating or eliminating the potential risks involved with a project can help in meeting the outline specifications (Moralles, 2008).

Next ranked are the project incentives and competitiveness of the project, and these are also significant, as identified by Decorla-souza (2015). He shows that financial incentives often motivate the need for VFM on construction projects, and as well, where the project offers some competitiveness in terms of the benefits to the users, it can also be a determinant for the use of VFM (Moralles, 2008).

Finally, the respondents identified the long term nature of projects as another determinant of VFM in construction because as again identified by Moralles (2008), long term projects often need to be carefully monitored to ensure that they meet outlined specifications, and the management of these projects become very significant. Management of these projects often also require that there be VFM measures in place as a guide to meet set performance targets (Reagan, 2014).

With the determinants of VFM identified above, and performance measures being ranked the highest by the respondents, it is therefore important to identify which performance measures are most significant for determining VFM in construction projects. These were also identified in the literature and presented to the respondents to rank on a five point

Likert scale to show the degree on significance. Table 4.3.2 gives a summary of the responses.

Table 4.3.2 Summary of Mean scores for VFM performance measures for MMDAs

FACTOR	MEAN SCORE	STD. DEVIATION	RANKING
Economy: Getting the best value inputs for projects	4.95	.456	1
Comparative costs across similar projects	4.80	.000	2
Meeting or exceeding realistic quality standards	4.70	.451	3
Efficiency: Maximize outputs from minimum inputs	4.76	.461	4
Ability to track input cycle from procurement to handing over	4.72	.000	5
Integration and adaptiveness of the cost saving project implementation	4.71	.429	6
Key strategic costs identifiable	4.70	.482	7
Cost effectiveness measurable against completed project	4.65	.000	8
Delivery of outputs in a timely manner	4.64	.479	9
Equity in ensuring that project is viable to all users	4.56	.498	10

Source: Field study, 2018

Tables 4.3.2 above show the mean score and the ranking of the data collected on the performance measures for VFM and the ranking of the mean scores to determine the most significant. As already stated, the performance measures were ranked on a scale of 1 to 5, and for any to be considered significant for the study they need to score a mean value greater than 3.00, which is the neutral point.

Table 4.3.2 shows that on the whole the respondents considered all the performance measures for VFM to be quite significant, as they all scored mean values within the rank of significant to very significant. The top three out of the performance measures scored perfect mean values of 5.00 each, which shows how very significant the respondents consider them within the sphere of construction project delivery. The highest ranked performance measure was economy, and specifically, securing the best value inputs for project delivery. As noted by DFID (2016) economy is one of the 4Es of VFM, and it has to do with ensuring that projects are delivered at the right price and quality for the beneficiaries. As with economy, costs of project should also be comparable across similar projects to give a sense of the value for money. Where the cost of a project is significantly higher than those of similar projects, and no clear explanation, such as inflation or significant price increases exists, then there is no measurable VFM (Moralles, 2008). The third highest ranked performance measure for VFM is for the project to meet or exceed the quality standards expected. Though quality is subjective, it is easily measurable as being the best fit to what the client wants, (UK Department of Finance, 2018), and where this is exceeded, it is then a clear performance measure for VFM.

Respondents then next ranked efficiency with a high of 4.76, and this are also one of the 4Es of VFM so is very significant. Efficiency is measurable in that if the project is able to

deliver greater value from lower cost components then VFM can be achieved. However in such a case it is important to compare costs with similar projects to be able to determine that there has been efficiency in the delivery of the project (DFIF, 2016). The ability to do this will also require that the input cycle for the project be measurable from procurement to handing over. Tracking of inputs at all stages of the project is very significant and performance measures at each stage can help determine that the output specifications have been met or otherwise, and through that VFM can be determined (Moralles, 2008).

VFM performance can also be measured through the evidence of an integrated and adaptive cost-saving measures from start to finish. The project stakeholders must actively work to achieve VFM by placing along the project delivery chain various cost-saving measures that will ensure that the most economical and efficient inputs and methods are used (Akintoye et al., 2003). As already noted, the input cycle of for the project must be measurable from procurement to handing over, and this can also be achieved where the key strategic costs are identifiable to the stakeholders. Strategic costs are identifiable right from design through procurement and project delivery, and if these can be identified and measured then VFM can be achieved also (Morallos, 2008).

Cost-effectiveness of the project should be determinable for the finished project through comparison with similar projects, and as well, measuring the key strategic costs for the project. Economy is directly related to cost effectiveness, and as identified by DFID (2016), this is a very fundamental aspect of VFM. The final measures are the delivery of the project in a timely manner and as well ensuring equity. Time is a part of the triple constraint in project management, and it goes hand in hand with quality and cost

effectiveness, and the ability to achieve this is an important measure of VFM for construction projects. Equity may not be directly measurable against any specific metrics, but it can however be determined by the impact the project will have on the expected beneficiaries (Moralles, 2008).

4.4 CHALLENGES FACED BY THE WORKS DEPARTMENT OF THE MMDAS

With the determinants and performance measures for VFM determined in the objective above, the next step objective is to identify the challenges faced by the Works Department of the MMDAs in relation to the implementation of VFM for construction projects. Identifying these challenges will help in developing solutions that can ensure a greater application of VFM in construction projects for the MMDAs. The literature identified several challenges which were presented to the study respondents who ranked them on the scale of how negative they are to VFM implementation. The analysis and results are presented in tables 4.4.1 below.

Table 4.4.1 Mean score of challenges faced by Works Department in implementation of VFM

FACTOR	**MEAN SCORE**	Std. Deviation	**RANKING**
Unavailability of independent checks and balances for VFM projects	4.42	.941	1
Poor internal funds generation at the MMDAs to support VFM projects	4.40	1.030	2
Lack of incentives for the MMDAs to undertake VFM projects	4.23	1.048	3
Timing and role of VFM implementation for projects is challenging	3.83	.990	4
Client demands being inconsiderate	3.81	.813	5
Technicalities of VFM management tools	3.73	.982	6
Poor information from client from project onset	3.70	1.022	7
Poor interpretation of results for VFM analysis of projects.	3.38	.816	8
Lack of a standardized VFM evaluation strategy	3.37	.865	9
Costs related to bidding may be very high	3.33	.971	10
Poor communication with client,	3.13	1.016	11

especially on risks			
Poorly trained staff with an understanding of VFM	2.97	.667	12
Unclear priorities and objectives	2.82	.822	13
Lack of awareness of VFM tools	2.49	.665	14
Slow negotiations	2.38	.817	15
Unreliable assessment of project risk across different departments	2.04	.654	16
Partisanship in development process can stifle VFM projects	2.04	.633	16

Source: Field study, 2018

Tables 4.4.1 above gives the analysis and ranking of the mean values for the challenges faced by the MMDAs in their quest to implement VFM principles in the delivery of construction projects. The challenges identified in the literature were presented to the study respondents who ranked them on a scale 1 – 5, with the significant challenges being those that have a mean score above the median point of 3.00.

A total of seventeen challenges were identified and ranked and table 4.4.1 shows that eleven of them were ranked as significant enough to the VFM process of MMDAs and the highest ranked was unavailability of independent checks and balances for VFM projects by the MMDAs. This is a significant challenge for institutions which are now trying to implement these performance models and will require some independent guidance to ensure that things are being done the right way. Independent checks and balances ensure that the implementing institution does not fudge results and measures in

order to seem to meet these standards (Moralles, 2008). Another significant challenge identified in VFM implementation at the MMDAs is the poor internal funds generation to support projects. Historically one of the greatest challenges faced by MMDAs in Ghana has been funding for projects, with most having to rely on the District Assemblies Common Fund (DACF) to finance projects and their operations (Ofori, 2012). The DACF however often delays, and though most of these MMDAs have internal funds generation mechanisms, these are woefully inadequate for projects, much less to put in mechanisms to measure VFM.

Another significant challenge as identified by the respondents is the lack of incentives for the MMDAs to actually implement VFM in projects, and this is because finance is a major challenge for these institutions, and VFM is not implemented in a vacuum, requiring financial resources dedicated to implementation and monitoring. Where the funding is challenged, the incentives to undertake it become very diminished also (Cox and Townsend, 1998). As well, the timing for VFM becomes challenged when determination of when funding will be made available for project implementation is unclear. It becomes also very difficult to implement a plan when funding is not sure. Client demands can also prove challenging to the VFM implementation process when these demands are classified more as wish lists than rather achievable. Though the MMDAs themselves have to determine projects which they believe are beneficial to the population under their jurisdiction, they however have projects commissioned by the central government which also fall under their control to implement, and sometimes in the bid to impress voters, projects may be commissioned which do not necessarily meet the standards for VFM.

Though there is ample knowledge of VFM among the Works Department staff of the MMDAs, this however does not translate directly into knowledge of the management of the VFM tools, which is often a specialized skill area. As such, even where there is a will to undertake projects to meet VFM standards, the limitation on the knowledge of these tools can limit implementation (Moralles, 2008). Where the client does not provide relevant information right from the beginning of the project, it can also hamper VFM implementation as identified by the respondents. This aligns with conventional knowledge by Cox and Townsend (1998) who says that in such a case, the client is unable to clearly define what their expectations are, either due to uncertainty or lack of relevant knowledge on their part.

Standards and performance measures for VFM are quite numerous and it is important that the implementing body actually makes a determination on which VM standards to apply to projects. Where this determination is not made, there may not be a clear cut expectation on VFM which may be met by projects. As already noted, the client needs to be able to clearly express what their expectations are in relation to the VFM implementation of projects, but where there is poor communication of these expectations, it will actually be difficult for VFM standards to be implemented and monitored to determine success (Cox and Townsend, 1998).

Though these were the highest ranked challenges according to the staff of the MMDAs, it should however be noted that the other six challenges not be discounted entirely since they do not meet the ranking standard. They are also clear challenges that may exist but not on a scale that will be considered very significant at this stage.

4.5 VALUE FOR MONEY INDICATORS FOR CONSTRUCTION PROJECTS OF THE MMDAS

The final objective of this study is to identify the value for money indicators that can be adopted for construction projects undertaken by the Works Department of the MMDAs. Construction projects form a greater percentage of expenditure at the local government level as they work to deliver much needed infrastructure projects, and it is important that these are delivered with VFM in mind. It has already been determined that there is ample knowledge among the workers of the Works Department, as they were able to identify the determinants and performance measures for VFM. However the study has also determined that there are significant challenges that are associated with VFM implementation for construction projects and it is important to identify VFM indicators that can be adopted to promote greater use. The identifiable indicators were presented to the study respondents who ranked them on the five point Likert scale to determine the level of significance of each. Table 4.5.1 gives a summary of the responses.

Table 4.5.1 Mean score for VFM indicators to be adopted by the MMDA

FACTOR	MEAN SCORE	STD. DEVIATION	RANKING
Satisfaction for finished projects	4.86	.429	1
Project management effectively supports the minimization of impact on the environment	4.86	.643	1
Best use of land and resources	4.85	.359	3
Trained personnel to measure project performance	4.85	.349	3
Efficient and cost-effective project management	4.76	.593	5
Low unplanned cost upon project completion	4.73	.349	6
Comparability of projects to similar ones	4.67	.473	7
Significant improvement in construction time for projects	4.60	.492	8
Proper maintenance management culture for projects	4.54	.446	9
Construction projects that are fit for purpose	4.49	.359	10

Source: Field study, 2018

Table 4.5.1 above gives the analysis and ranking respectively, of the VFM indicators that can be adopted by the Works Department of the MMDAs for construction projects. The hierarchical ranking shows the most significant indicators with the greatest impact for the construction projects to the least impactful. The ranking table 4.5.1 however shows that the respondents selected all indicators as significant for the MMDAs, evidenced by them all receiving mean scores above 4.00. However, taking the indicators individually, the highest ranked is the satisfaction for all finished projects. The Institute of Value Management (2002) stressed that the concept of value relies on the relationship between the satisfaction of many differing needs and the resources used in doing so. The differing needs are likely to include aspects such as high quality, good indoor environment, durability, cheaper-to-maintain and user-friendly. The Works Department must put in place measures for determining the level of satisfaction that the users have with the finished project and its satisfaction level in-use. The next ranked indicator is that project management effectively supports the minimization of impact on the environment, and this aligns with the definition of VFM by the UK Department of Finance (2018) which notes that there should be an environmental benefit derived from VFM implementation, and with the current drive to minimize environmental impact of particularly the construction industry it is important that VFM be directly related to the environment. Next the respondents ranked the best use of land and resources; Baker et al. (2013) also in that summation believe that VFM does not have a universally accepted definition, but rather the concept just focuses on proper use of resources and get the best benefit out of them. Thus the MMDAs, in aligning with this definition can ensure that there is greater

management of resources used in construction projects, particularly with land and the other resources.

Respondents next indicated that to ensure that VFM is actually practiced by these institutions there must be trained personnel who will be in charge of this implementation. Without the necessary training for personnel who can institute performance measures for VFM and actually monitoring them then any VFM programme cannot be guaranteed success. As well, efficient and cost-effective project management is another relevant indicator for VFM implementation at the MMDAs. The project duration can be actively reduced and managed where all the project team members work assiduously, using various management tools to achieve this, and also same with the project cost, thereby ensuring the VFM can be achieved (Moralles, 2008).

Unplanned costs can add up significantly when there are no concrete plans for the whole project life cycle, and for VFM to be achieved it is necessary that there be measures in place to monitor project costs, particularly the key strategic costs (Moralles, 2008). Another factor indicated previously also is that there be comparability among the completed projects with similar projects, particularly in terms of cost, satisfaction in use and impact on the environment. There are various measures that can be put in place to determine this across different projects. As well, construction time for projects should significantly improve as innovative measures are put in place to speed up the construction process. Ansell et al., (2009) undertook a study to determine the factors that ensure that projects are able to deliver value to their clients. Their findings showed that the factors such as delivering a defect-free project and to time and within the client budget set out at the beginning of the project. As well, they found also that the project must fit the purpose

for which it was designed and built, as well as aesthetically appealing. The construction must not exceed the construction schedule and be able to last as long as expected by the client, in a most reasonable manner. The value is also measured in terms of the life cycle costs, such as maintenance and repair costs, as well as not requiring major disruptions to adjacent projects and brings about safety challenges. The project value measures and tools such as LCC and value management, when properly applied will ensure that the project will apply cost saving measures but still maintain a high level of durability. It is important however that the cost allocations such as maintenance and repair are evaluated also at the design stage so the client can fully know the cost to own the project. This can be done by the project team evaluating different alternatives and their cost to own, and then making a final determination on the very best.

Finally, the projects must be fit for purpose, and Akintoye et al (2003) note that quality means meeting a specification which is fit for purpose and sufficient to meet the customer's requirements; sustainability means economic, social and environmental benefits.

The second part of this objective then is to determine which tools for measuring VFM are considered most significant for adoption by the Works Department of the MMDAs. Without these necessary tools it is almost impossible to measure credibly whether or not VFM is achieved for projects. The literature identified certain standard tools for measuring VFM and these were presented to the study respondents to rank on the scale 1 to 5, with table 4.6.1 giving a summary of the responses.

Table 4.6.1 Mean score of relevant tools for measuring VFM for construction projects at the MMDAs

FACTOR	MEAN SCORE	STD. DEVIATION	RANKING
Cost Effectiveness Analysis	4.69	.476	1
Cost Utility Analysis	4.69	.479	1
Life Cycle Cost Analysis	4.66	.580	3
Value Management	4.65	.675	4
Cost Benefit Analysis	4.57	.465	5
Social Return on Investment	4.56	.465	6
Lean Construction	4.22	.498	7
Building Information Modelling	3.87	.498	8

Source: Field study, 2018

Table 4.6.1 above gives the ranking of the various VFM tools identified by the study respondents which they believe are necessary to be adopted by the MMDAs to improve on VFM implementation for construction projects. The summary table 4.6 shows that all the tools were considered significant by the study respondents, as each score a mean value above the median point of 3.00. However, the highest ranked is the Cost Effectiveness Analysis which is the evaluation of two or more alternatives, based on the relative costs and outcomes (effects), in reaching a particular goal. This method can be used when comparing programmes that aim to achieve the same goal. This method presents each attribute according to a common utility scale. This principle is easy because it allows for the simple comparison with other existing projects. The next ranked tool

according to the respondents is the Cost Utility Analysis. The evaluation of two or more alternatives by comparing their costs to their utility or value (a measure of effectiveness developed from the preferences of individuals). Cost Effectiveness and Cost Utility analyses are useful for evaluating programmes or projects that aim to reach the same goal in non-monetary terms. Thus these two measures focus on effectiveness and equity in VFM projects.

Life Cycle Cost Analysis was next identified by the respondents, and according to Bidne et al., (2012) construction professionals like to employs this tool from the beginning of the project. The calculations for this is initiated by the consultants from conceptualization of the project to determine how much it will cost to install the project and related costs in use as well (Olanrewaju, 2013). This thus gives a clear picture of the cost to build and operate any constructed facility, thereby being able to measure the value of the project before even constructing.

Respondents then next identified value management as another significant VFM tool for the MMDAs. Kelly and Male (2001) in seeking to explain what value management is note that it is about identifying and solving problems in a project in a way that does not diminish in any way the value that can be got out of it. It involves a variety of actions and processes that all work together to maintain the expected value. Value management involves the identification of the required functions and the selection of alternative that maximize the achievement of the functions and performance at the lowest possible total cost (Best & De Valennce, 2002). Right from the development of the project the value that the client will be seeking will be made clear, and the project team will need to work

to ensure that they achieve this with a balance of cost and other connected factors (Olanrewaju, 2013).

Cost Benefit Analysis was next ranked and this is the evaluation of alternatives by identifying the costs and benefits of each alternative in monetary terms, and adjusting for time. This method can be used to identify if a course of action is worthwhile in an absolute sense—whether the costs outweigh the benefits—and allows for comparison among alternatives that do not share the same objective or the same sector. Benefits and costs must be assessed in money terms. This can then give a clear value to which money will be put for each individual project. Social Return on Investment can be used when comparing programmes with different goals or in different sectors. Cost Benefit Analysis and Social Return on Investment evaluate whether a programme is beneficial in an absolute sense. They both monetize outcomes and both methods allow for comparison of programmes with different objectives or from different sectors. This method is also very comprehensive because it allows for the impact of the project to be measured in terms of different outcomes.

The final two ranked tools are lean construction and Building Information Management (BIM). Lean Thinking is a philosophy based on the concept of Lean Production (Koskela, 1992). Building Information Modelling (BIM) and Lean Construction have existed as two different initiatives to be talked about (Dave et al, 2013). However, in recent time it has gained some strength, which is being pushed by stakeholders. The stakeholders, that is academies and practitioners have gotten high level of synergy which has caused these two initiatives to be talked about.

In view of that, there are increasing needs to make BIM champion the lean principle. It is equally important to make users and implementers aware and knowledgeable of this principle, the methods and tools of the Functionalities of BIM.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

The fifth chapter of the study gives a summary of the findings made throughout the whole study, and will draw conclusions from them, as well as making necessary recommendations. The findings, conclusion and recommendations will all be done in line with the stated aim and objectives of the study. The stated objectives of the study included the following:

(i) to determine the performance measures for delivery of Value For Money projects at the Works Department of the MMDAs

(ii) to identify the challenges faced by the Works Department of the MMDAs

(iii) to identify Value For Money indicators for construction projects of the MMDAs

5.2 SUMMARY OF FINDINGS

From data collected, analysis has been carried out on the results and the following findings were made in relation to the objectives;

5.2.1 Determine the performance measures for delivery of value for money projects at the Works Department of the MMDAs

To achieve this objective the study was divided into two parts, with the first part dedicated to identifying the indicators of VFM for construction projects at the MMDAs and the second part was to identify the performance measures also applicable to the delivery of construction projects for the MMDAs. A total of seven (7) key determinants

were identified in the literature as essential to VFM and were presented to the study respondents to rank based on how identifiable they were. Based on the ranking of the data analysed it was determined that all seven determinants were significant, and were ranked in the order of Performance measurement, Performance and the use of output specification, Risk transfer, Project incentives, Competitiveness of projects, Long term nature of contracts and Management skills. These findings show that on a whole there is significant knowledge about VFM among the Works Department staff of the MMDAs, and they also identify the need for VFM in construction projects.

With the determinants identified the literature also identified the performance measures for VFM projects and then presented them to the study respondents who ranked them to determine significance. Ranking showed that all the performance measures identified were deemed significant, and the most significant of the lot included economy, comparative costs across similar projects, meeting or exceeding realistic quality standards and efficiency, among others. These findings also showed that cost and quality management are significant performance measures for VFM projects.

5.2.2 Identifying the challenges faced by the Works Department of the MMDAs

With the determinants and performance measures of VFM for construction projects identified by the study respondents, the next step was to identify the significant challenges that impact the implementation of VFM for construction projects. A total of seventeen challenges associated with VFM implementation were identified in the literature and also presented to the study respondents to rank to show the degree of significance. Based on the analysis of the data collected the findings made were that eleven out of the seventeen challenges were deemed significant by the respondents and

included unavailability of independent checks and balances for VFM projects, poor internal funds generation at the MMDAs to support VFM projects, lack of incentives for the MMDAs to undertake VFM projects, timing and role of VFM implementation for projects, some clients making unreasonable demands, technicalities of VFM management tools, etc. These normally lead to unnecessary delays and mistakes and poor interpretation of results for VFM analysis of projects.

5.2.3 Identifying value for money indicators for construction projects of the MMDAs

The final objective of the study was to identify the VFM indicators for construction projects by the MMDAs, and these would be adopted by the Works Departments of the various MMDAs. To achieve this objective the study divided it into two parts, with the first part identifying the VFM indicators and the second part identifying the VFM tools that can be adopted for measuring performance. The literature again identified the VFM indicators that could be adopted and these were also presented to the study respondents who ranked them to show which were most significant to be adopted by the MMDAs. The most significant identified included satisfaction for finished projects, project management effectively supports the minimization of impact on the environment, best use of land and resources, trained personnel to measure project performance, efficient and cost-effective project management, low unplanned cost upon project completion and comparability of projects to similar ones. The VFM measuring tools were also identified in the literature and also ranked by the respondents, and the most significant tools for VFM to be adopted by the MMDAs include Cost Effectiveness Analysis, Cost Utility

Analysis, Life Cycle Cost Analysis, Value Management, Cost Benefit Analysis, Social Return on Investment, Lean Construction and Building Information Modelling.

5.3 CONCLUSION

This study was aimed at assessing the capacity of the Works Department of the MMDAs in Ghana to deliver value for money projects and three objectives were set out to achieve this. Based on the findings made from the study so far the following conclusions can be drawn.

There is relevant knowledge among the respondents with regards to the concept of Value for Money, through various training programmes that are held by the MMDAs. This existing knowledge among the staff of the MMDAs translated to their ability to identify the determinants of the VFM which include, performance and the use of output specification, risk transfer, project motivation and competitiveness of projects. The staff were also able to identify the performance measures for VFM and these also included economy, comparative costs across similar projects, meeting or exceeding realistic quality standards and efficiency. The ability of the respondents to identify these determinants and performance measures indicates great awareness of how VFM can be applied and will actually work for construction projects at the MMDAs.

The respondents then identified the challenges which are associated with the implementation of the VFM principles by the MMDAs and these included primarily unavailability of independent checks and balances for VFM projects, poor internal funds generation at the MMDAs to support VFM projects, lack of incentives for the MMDAs to undertake VFM projects, timing and role of VFM implementation for projects is challenging, technicalities of VFM management tools. This identification of the

challenges shows that they fall in the categories of monitoring and evaluation, funding and the motivation to actually undertake VFM projects. Isolating these categories of challenges conclusively is helpful in that the implementers can be able to deal with them when the necessary steps are undertaken. The MMDAs will only need to upgrade their capacity to manage these challenges in terms of neutral evaluation, monitoring, funding and the incentives to undertake VFM.

Finally the respondents were also able to identify the VFM indicators that could be adopted and they included primarily satisfaction offered by completed projects, impact on the environment as well as best use of resources, training of personnel, appropriate project management performance comparability. These fundamental indicators can go a long way to ensure that the MMDAs have the capacity to implement VFM. In addition to these indicators it can also be concluded that there is a need for performance measurement tools and these can include Cost Effectiveness Analysis, Cost Utility Analysis, Life Cycle Cost Analysis, Value Management, Cost Benefit Analysis, Social Return on Investment, Lean Construction and Building Information Modelling. Staff need to be trained appropriately in the use of these of these tools at the MMDAs so that each project can be adequately measured to determine VFM.

5.4 RECOMMENDATIONS

Based on the significant findings of this research work, recommendations and conclusions of this research work are captured in this section. Generally the staff of the Works Department of the MMDAs is aware of the principles of VFM and its determinants and performance measures. However, their capacity to implement VFM for

every project is greatly hindered by the numerous challenges identified. These challenges, however, can generally be remedied by using the following:

(I) there should be extensive training for staff members in VFM implementation.

(II) relevant funding must be allocated towards VFM implementation.

(III) the relevant tools such as Life Cycle Cost, Cost Effectiveness and Cost Utility Analysis must be adopted for the implementation of VFM at the MMDAs.

When the above mentioned measures are put in place (as outlined in the recommendations), the 4Es in each project; that is, Economy, Efficiency, Effectiveness and Equity, will be achieved in all construction projects.

5.5 RECOMMENDATION FOR FURTHER STUDIES

It is highly recommended that further research be conducted on the Availability of Independent Checks and Balances in Construction Projects in MMDAs.

5.6 LIMITATIONS TO THE STUDY

The study was limited to only one region. This had an effect on the size of the population and the sample size and consequently the findings and conclusions cannot be applied wholly to other regions due to the difference in the geographical areas.

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APPENDICES

Appendix 1

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

RESEARCH QUESTIONNAIRE

TOPIC

ASSESSING THE CAPACITY OF WORKS DEPARTMENT IN THE DELIVERY OF VALUE FOR MONEY CONSTRUCTION PROJECTS IN SELECTED MMDAs IN GHANA

Dear Sir/Madam,

This questionnaire forms part of postgraduate thesis to assess the capacity of the works department in the delivery of value for money construction projects. This questionnaire forms part of the structured field survey.

I appreciate that you are already busy and that participating in this survey will be another task to add to a busy schedule, but by contributing you will be providing important information. **All data held are purely for research purposes and will be treated as strictly confidential.**

If you wish to receive feedback on the research findings, a section is provided at the end of the questionnaire for you to indicate. In the event of questions or queries, please do not hesitate to contact me. Thank you for your time and valid contribution in advance.

Yours faithfully,

EMMANUEL EGYIR

0243-764863

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SECTION A – DEMOGRAPHIC DATA

Part A

Respondents' Profile

1. Please state which MMDA you work with
   A. Metropolitan Assembly
   B. Municipal Assembly
   C. District Assembly
   D. Other……
2. Do you work with the Works Department at the MMDA?
   A. YES
   B. NO
   C. Other…….
3. Designation of respondent
   A. Quantity Surveyor
   B. Project Manager
   C. Architect
   D. Engineer
   E. Other……..
4. How many years have you worked with the Works Department?
   A. Less than a year
   B. 1 – 5 years
   C. 6 – 10 years

D. 11 – 15 years

E. Over 15 years

5. How many projects have you worked on at the Works Department?

   A. 5 – 10 projects

   B. 11 – 20 projects

   C. 21 – 30 projects

   D. More than 30 projects

6. Are you aware of the concept of Value for Money in construction projects?

   A. YES

   B. NO

   C. Other……

7. How did you come to know about the concept of Value for Money

   A. MMDA training programmes

   B. Personal studies

   C. Social media

   D. Internet

   E. Other……

8. Do the MMDAs actively work to achieve Value for Money in construction projects?

   A. YES

   B. NO

   C. Other…….

SECTION B - TO DETERMINE THE PERFORMANCE MEASURES FOR DELIVERY OF VALUE FOR MONEY PROJECTS AT THE WORKS DEPARTMENT OF THE MMDAS

9. Please rank on a scale of 1 – 5 how significant the following determinants of VFM to the MMDAs, and the scale is 1 – Not Significant, 2 – Less Significant, 3 – Neutral, 4 – Significant, 5 – Very Significant

	1	2	3	4	5
Risk transfer					
Long term nature of contracts					
Competitiveness of projects					
Performance measurement and the use of an output specification					
Performance measurement					
Project incentives					
Management skills					

10. This section of the questionnaire is to determine from respondents the performance measures for delivery of value for money projects at the works department. Please rank on a scale of 1 – 5 how significant you determine the following performance measures for delivery of value for money projects. The

scale is 1 – Not Significant, 2 – Less Significant, 3 – Neutral, 4 – Significant, 5 – Very Significant

	1	2	3	4	5
Integration and adaptiveness of cost saving project implementation					
Economy: Getting the best value inputs for projects					
Ability to track input cycle from procurement to handing over					
Key strategic costs are easily identifiable					
Comparative costs across similar projects					
Efficiency: Maximize outputs from minimum inputs					
Delivery of outputs in a timely manner					
Meeting or exceeding realistic quality standards					
Cost effectiveness measurable against completed project					
Equity in ensuring that project is viable to all users					

SECTION C - TO IDENTIFY THE CHALLENGES FACED BY THE WORKS DEPARTMENT OF THE MMDAS

11. This section of the questionnaire is to identify the challenges faced by the works department of the MMDAs in the delivery of value for money projects. Please rank on a scale how negative these challenges are to them, and the scale is 1 – Not Negative, 2 – Less Negative, 3 – Neutral, 4 – Negative, 5 – Very Negative.

	1	2	3	4	5
Technicalities of VFM management tools					
Lack of awareness of VFM tools					
Unclear priorities and objectives					
Provision of incomprehensive up-front project information by clients, leading to unnecessary delays and mistakes;					
Demands of clients being 'wish lists', instead of sensible;					
Slow negotiations					
Less open communication with the client, especially on the pricing of specific risks;					
Inconsistent risk assessment and management across different organizations of a consortium					
High bidding costs mainly attributed to the cost of					

consultancy services, of which the legal services are usually the most expensive					
No standard for VFM evaluation and/or assessment procedure					
Inadequate government subventions to undertake projects and measure VFM					
Poor internal funds generation at the MMDAs to support VFM projects					
Poorly training staff with an understanding of VFM					
Partisanship in development process can stifle VFM projects					
Timing and role of VFM implementation for projects is challenging					
Unavailability of independent checks and balances for VFM projects					
Lack of incentives for the MMDAs to undertake VFM projects					
Poor interpretation of results for VFM analysis of projects.					

SECTION D - IDENTIFY VALUE FOR MONEY INDICATORS FOR CONSTRUCTION PROJECTS OF THE MMDAS

12. This section of the questionnaire is to identify the Value for Money indicators for construction projects of the MMDAs. Please rank on a scale how significant these indicator are, and the scale is 1 – Not Significant, 2 – Less Significant, 3 – Neutral, 4 – Significant, 5 – Very Significant

	1	2	3	4	5
Efficient and cost-effective project management					
Construction projects that are fit for purpose					
Best use of land and resources					
Project management effectively supports the minimization of impact on the environment					
Proper maintenance management culture for projects					
Satisfaction for finished projects					
Comparability of projects to similar ones					
Significant improvement in construction time for projects					
Low unplanned cost upon project completion					
Trained personnel to measure project performance					

13. Please rank on a scale of 1 – 5 how identifiable the following tools for measuring VFM in projects at the MMDAs are. The scale is 1 – Not Identifiable, 2 – Less Identifiable, 3 – Neutral, 4 – Identifiable, 5 – Very Identifiable

	1	2	3	4	5
Cycle Cost Analysis					
Value Management					
Building Information Modelling					
Lean Construction					
Cost Effectiveness Analysis					
Cost Utility Analysis					
Cost Benefit Analysis					
Social Return on Investment (SROI)					

THANK YOU