SUCCESS FACTORS FOR ACHIEVING VALUE FOR MONEY IN URBAN ROAD CONSTRUCTION IN GHANA

By

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DECLARATION

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

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ABSTRACT

The study aimed at exploring the success factors in achieving value for money in urban roads construction in Ghana. Three (3) objectives were established to identify the significant barriers inherent in achieving value for money in urban roads, to identify the success factors towards value for money and to identify the project management techniques that can be adopted by project managers to improve value for money in urban road construction in Ghana. Literature review was conducted on the objectives to identify relating variable to aid in the development of an instrument for the research. A closed-ended questionnaire was employed in eliciting responses from respondents in the Urban Roads Department. Forty (40) questionnaires were administered to qualified participants. The data collected was analysed using SPSS version 25. From the analysis, it was realized that, poor contract administration, lack of inexperienced and incompetent contractors\consultants were significant barriers to achieving value for money in urban road construction. Extensive stakeholder's engagement, and project management techniques including quality management and time management were significant in achieving value for money in urban constructions. It was therefore recommended that government should introduce value for money practices in urban road construction projects. The study explores a relatively new area and consequently serves as the basis to spur future research.

Keywords: Value for Money (VFM), VFM techniques, barriers, Road Construction Projects

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DEDICATION

I dedicate this work to God Almighty and to my entire family for their incessant prayer, selfless and restless contribution, moral support and encouragement to the success of my education.

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LIST OF ABBREVIATIONS

ANOVA   Analysis of Variance

ASTM   American Society for Testing Materials

DFR   Department of Feeder Roads

DUR   Department of Urban Roads

EVM   Earned Value Management

FA   Functional Analysis

GHA   Ghana Highway Authority

GhIE   Ghana Institution of Engineers

GhIS   Ghana Institution of Surveyors

LCC   Life Cycle Cost

MRH   Ministry of Roads and Highways

PM   Project Management

PMBOK   Project Management Body of Knowledge

PMI   Project Management Institute

RISA   Road Infrastructure and Support Agencies

RPs   Road Professionals

LIST OF ABBREVIATIONS

SPSS   Statistical Package for the Social Sciences

ST   Systems Thinking

TPs   Technical Professionals

VA   Value Analysis

VBM   Value Based Management

VC   Value Clause

VE   Value Engineering

VEA   Value Engineering Analysis

VECP   Value Engineering Change Proposal

VES   Value Engineering System

VM   Value for Money

VP   Value Planning

VT   Value Thinking

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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

Construction is among the leading productions that contribute to about 10% of the gross state product (GNP) in developed countries (Navon, 2005). As such, construction industry is crucially expanding the economy of any country, especially in developing Sub Saharan countries, where economic development is of topmost priority (Ibironke, 2008).The construction production is compound in its character, which constitute a huge number of parties as clients, contractors, stakeholders, and consultants. As such the success of the construction sector is affected by national economies (Navon, 2005).

The road industry is an economic investment which contributes to the economic development of countries (Myers, 2013).Generally, the success of road construction projects have been slowed down below the standard of performance due to hindrances. In most developing countries, measurement systems for the performance of road construction projects have not been successful or proficient enough to prevail over this predicament. Consequently, most road projects fail in the aspects of time performance, cost performance and other indicators. Poor performance have been reported at the completion of numerous road construction projects, in the past, due to reasons such as: obstacles by client, lack of inadequate materials, road closure, changes in project drawing, additional works, delays in decision-making, inappropriate handing off, variation order, and alterations in BOQ (UNRWA, 2006). One promising tool to salvage the situation of poor road construction performance is Value for Money (VFM). Understanding the idea to achieve or assess how to, when

to, and/or where to attain value for money requires clarification of the term 'Value for Money'. Incentive for money as indicated by HM Treasury (2006) is characterized as the ideal mix of entire existence of cost and quality for qualification for reasonable of the great or administration to meet the client necessity. The entire of life cost could incorporate the underlying price tag of the products and ventures; upkeep costs, change out expense of extra highlights obtained after the underlying acquirement consumable expenses and transfer costs. Moreover, Jackson (2012) explained that Value for money is striking the balance between the three E's; economy (cost minimization), efficiency (output maximization) and effectiveness (full attainment of the intended results). In other words, a measure for quality that assesses the monetary of the produced goods or services by (NAO, 2017) is a way of viewing resource well. According to (Prempeh and Nsiah-Asare, 2016) VFM is not about attaining the lowest initial price, instead, it is the best possible use of available finances to produce quality goods and services. Clients can prove to VFM when they feel that they have received goods, or service that value the price they had paid for. Government is currently facing immense challenges in road infrastructure development and public service delivery, all of which retard the growth of the Ghanaian economy. The Ghana Road Fund currently sustains 40 percent of road projects, thus, serving as a measure to improve road infrastructure in the country. Nevertheless, the remaining 60 percent of road network maintenance has been left unattended to, and the Ministry of Roads and Highways has announced that government would have to look for funding from donor partners to fix them (GNA, 2014). The practice of soliciting for funds from donor partners has always been frowned upon, and cannot be allowed to continue. Hence, there is a need for effort

and measures to explore new avenues to build more roads for effective road network in Ghana.

1.2 PROBLEM STATEMENT

A general overview of the road sector in Ghana depicts that most of the road projects in Ghana have also been capital intensive from time immemorial with very poor service quality of roads which don't even meet their useful or functional lives when designed and constructed; even when funding has also been a major issue to grapple with up till now. In spite of all these myriad of challenges on road projects, Chan *et al.* (2014) emphatically established that all construction professionals respond to inevitable challenges and stresses with different coping strategies as a result of their distinctive cultural ecological values which builds up structural associations and consequently informs it recital.

The construction manufacturing is one of the largest job-creating industries in developing countries like Ghana. Ahadzie (2009) acknowledged that construction contributes to the national socioeconomic development by providing extensive occupation prospects for non-skilled and trained levels. Beyond that, the industry provides the infrastructure and services required for other sectors of the economy to boom, such sectors include institutions of learning and training centers, housing for basic human requests, industrial unit and factories for commercial and business activities, hospitals for health care, and structures for the national communications network and so on. According to Ofori-Kuragu *et al.,* (2016) the Ghanaian construction industry is the pillar of the economy contributing about 8.5% to the overall Gross Domestic Product (GDP) and employing 2.3% of the active population.

In summary, as far as the economy of Ghana is concerned, there is a serious problem with achieving VFM adequacy on road projects since they have been found by the general public platform as projects that don't last since road projects have up till now not achieved an adequate VFM as a consequence of its inadequate existing management techniques and practices by RPs. Therefore the need to spend some time, money and process values on VE to reduce the high budgets and low productivities (Ji,2002). In order to ensure that the design, construction, and maintenance of roads in Ghana receive a well valued system, there must be value and quality investigation to have adequate supervision from inception towards completion as much as to avoid cost overruns, schedules are also properly managed (to avoid time overruns) and the quality is as well not compromised but maintained, not ignoring safety, to be able to deliver successful projects (not challenged or impaired ones).

1.3 RESEARCH QUESTIONS

From the study, three main research questions were proposed:

1. What are the barriers inherent in the achievement of the success factors for attaining VFM?
2. What are the success factors for the achievement of VFM in urban road projects in Ghana and;
3. What are the project management techniques to apply for the success factors in achieving value for money in urban road construction in Ghana?

1.4 AIM OF THE STUDY

The study aimed to investigate the success factors to achieving value for money in urban road projects.

OBJECTIVES OF THE STUDY

This research sought to achieve these specific objectives:

1. To identify the barriers to achieving VFM on urban road infrastructure projects;

2. To identify success factors to achieving value for money; and

3. To outline project techniques to achieving VFM on urban road projects.

1.5 SIGNIFICANCE OF THE STUDY

Many interventions are being made on executing road projects in Ghana to accelerate productive activities in the country since about a billion Ghana cedis has been pumped into this sector which demands a lot of concerted efforts from now till 2019.. (The Presidency, State of the Nation Address, 2015). The Government recognizes the importance of road transport in facilitating socio-economic progress of the nation. It's essential to know that enhancing socio-economic activities in the Ghana, urban roads project should be undertaken. Agriculture, mining and other socio-economic activities of Ghana thrive so much on the sustainable management of very good road projects without which activities are suddenly halted. Again, urban road projects stimulate growth and development as well as representing a real dominant force in developing countries such as Ghana (Narh, 2014). When urban roads become so expensive to maintain as a result of the inadequate VFM by professionals, economic activities retard then such roads will be associated with high propensity for costs to be incurred by the nation. To optimize this, an adequate VFM

agenda through a VE methodology is to be adopted and implemented on road projects in Ghana. This is introduce to ensure that road projects both now and in the future receives adequate VFM, as per this technique. RPs is predominantly responsible and liable for whichever approach embraced. Since for the past few years a lot of heightened interest has been generated among development professionals in developing countries on the use of project or organizational values as a tool for driving project performance through VE (Buchko, 2007).It is strongly believed that at the end of this thesis, there will be a facelift in the achieving VFM in urban road projects in Ghana and as a result, RPs will be enhanced in their functional deliveries for the betterment of this nation.

1.6 SCOPE OF THE STUDY

The study was carried out exclusively in Accra, Ghana. The scope of the study was limited to Contract Managers, Project Managers, Civil Engineers and Quantity Surveyors in addition to A1 B1 category of road contractors in Accra. However, it is hoped that the data obtained from the study gave a true reflection of the success factors. This sector was chosen because of the huge demand for investment needed to improve the road network which could not be provided by the government due to the current global economic recession in addition to Ghana's declining revenue base which makes sources of alternative means of funding infrastructure very challenging.

1.7 METHODOLOGY OF THE RESEARCH

This study employed a quantitative and qualitative methodological approach based on deductive reasoning and was accomplished in three stages. The first segment saw the review of relevant literature on the subject of success factors. In the second phase, a structured questionnaire with multiple choice and scaled questions were

prepared to obtain data from respondent for consideration. However, the final point further elaborated on the investigation received using descriptive with inferential statistical methods.

1.8 THE STUDY ORGANISATION

The study comprised 5 stages, which begun with an Introduction, Review of Literature, Methodology, Analysis of data presentation, and Conclusions.

CHAPTER 1 Described the introduction, problem statement, research questions, objectives, the study significance and scope.

CHAPTER 2 Presented the concept success for achieving VFM in urban road projects. It entails the overview of construction projects and its significance to the development of its economy deliberated. This is followed by project management practices in Ghanaian construction industry; challenges affecting the development, stakeholder's involvement in the industry are also elaborated.

CHAPTER 3 Involved the detailed research processes used in this study, which formed third segment of the thesis. This part focused on the techniques that were used in controlling the empirical research, framework for the study and research designed.

CHAPTER 4 Featured with the experiential information brought together from the field and respondents addressed of the objectives.

CHAPTER 5 This section finalised the information discovered and contributed to academic practice with recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

Construction of roads is to provide adequate benefit to the users and to the client organization (thus, the government of Ghana). Achieving this value for money through an adequate Road Project Management (RPM) technique is all about (VA) and knowledge in (VP). Astute Road Competent do not only use previous managerial knowledge but apply managerial expertise as well. When we say management is inadequate, it underscores the fact that only previous managerial knowledge is applied to delivering works, however, managerial expertise is lacked and thus, no value for money is achieved. Managerial expertise stems from the premises that a limitation in previous knowledge or concept exists and as such the need to do a proper review of the existing body of management understanding, as a result, an advanced managerial knowledge which paves the way for professional insight to reach an optimum worth for money in urban road construction projects.

As far as the management of urban road projects in Ghana is concerned, there is still more to be done (The Presidency, State of the Nations Address, 2015). This is so because road projects have formed significant and substantial portions of the annual estimated budget of all projects in Ghana for the past decades. Road projects in Ghana, in spite, of the characteristic premium placed on its execution even to the extent of endearing past and present governments to citizens to win their votes, have over the years recorded an incomprehensible mismanaged system of approach since the current road management system seems not to adequately improve upon the roles or functions of Road Professionals in their administration in Ghana.

All these issues primarily rest on the RPs of Ghana to really assist the government of the day with their technical value engineering (VE) and managerial value management (VM) expertise which is still not sufficient. To inform this occurrence of managerial value inadequacies in Ghana and arrest its future unsustainable infrastructure menace, an intensive literature review has been undergone to ascertain and thereby establish the gaps existing with advanced value engineering practice and PM techniques so as to institute usefulness of VE on urban roads, this can be achieve by continuously practice of VFM by Road Professionals (RPs) in Ghana who have an additional responsibility to ensure that all road projects achieve a satisfactory value for money for the nation.

2.2 OVERVIEW OF ROAD CONSTRUCTION IN GHANA

The construction industry in Ghana has two components, that is the road and building components. The road component is to facilitate the construction of roads, be it feeder or urban roads, with regulation from the Ministry of Road and Transport. The Ministry also serves as the client (Ofori, 2012). The buildings component is regulated by the Ministry of Water Resources, Works and Housing. The built environment is coined to enhance the life of mankind in the society. It also comprises of irrigation system, transportation system, buildings, electrical installations and among others, these physical developments address the infrastructure needs of the society (Khan, 2008). Although all the listed forms are equally important, transportation plays a key role in the twenty-first century. Transportation system can be further classified into air, road, rails and water transport. Notwithstanding these options, it is believed that most commuters are conversant with the road transport especially in developing countries like Ghana. The history of road construction is difficult to trace however, it can be linked to the world wars as during those times

roads were constructed intentionally and un-intentionally with the aim of transporting ammunitions, food and other military installations. According to (Ofori, 2012) the industry is faced with problems and challenges such as inadequate engineering capacity, inadequate working capital and managerial capacity, low productivity and quality of work among others. In addition to these, the industry is constrained by the tenets of globalization which is facilitated by technology use and sustainable design practices, which the local firms are not akin to.

As the infrastructural hub of the country, it engineers the building of schools, hospitals, roads, houses/offices, telecommunications, irrigation systems and airports. A marked effect of the construction production on financial development is critical since most of the government's socio-economic and political goals have an infrastructure component which is serviced by the construction industry. Studies have revealed that the construction industry's contribution to GDP ratio averaged 9.1% during the period 1993-2011 whiles the industrial output for the same period is 35.9% according to (Osei, 2013).

2.2.1 Stages of in the development of Ghana's Trunk and Urban Road Network

According to the Ministry of Roads and Highways (MRH), Ministry of Transport (MoT) and Ghana Statistical Service (GSS) the vehicle population in Ghana increased from 511,755 in 2000 to 1, 1127,986 in 2009. Over this period, the average yearly growth of the vehicle population was about 8.2%. The vehicle population in 2005 was 767,067 and this increased to 1,127,986 in 2009 resulting in an annual average growth rate of 8.3% during that period (MRH et al., 2011).

From the previous years it is realised that:

- The number of settlements and traffic volume on the country's roads are increasing.

- There is an increased need for designs to handle higher levels of traffic and traffic conflicts with a view to safety and economy.

It was also reported that as at the end of the year 2009 there were 605km of missing links within the trunk road network of Ghana (MRH et al., 2011). The author found out that between the years 1948 and 2000 the number of urban areas in Ghana has increased from 41 to 364.

2.2.2 Advantages and Disadvantages of Urban Road Construction

According to Mikkelson (2005) road transportation has gained popularity in developing countries since most government and international organization finance its construction. As such urban road transportation is noted to create avenue of infiltrating the local market of society and even the cultural values of a society and also environmental related challenges such as deforestation, soil erosion amongst others. In terms of weight it could be realized that its importance outweighs its flaws, the road sector also contributes to the development of the agriculture sector which is one of the developing industry sector in Ghana. Road construction in the developing countries is labour intensive thus acting as a source of employment to people, it actually contribute to the Gross Domestic Product (GDP) and also contribute to the socio-economic standing of nations by Mikkelson (2005). Road constructions like other projects arise as a result of needs, which require different kinds of resources in realising it, ranging from human resource to financial resources.

2.2.3   Role and impact of urban road projects on the economy

A dependable in addition to a reasonable road transportation framework plays a means of job in the financial improvement of Ghana. Road processes additionally frames a significant piece of the social wellbeing net, encouraging the dispersion of capital through exchange and business openings in urban and rural environment.

The World Development Report noticed that as the economy develops, an increasing proportion of the country would need to open up by the construction of roads (World Bank, 1994). Undoubtedly, road transportation encourage the development of individual, product and administration in all areas of the financial system including the travelling industries, mining, wellbeing, exchange, training, horticulture, among others. A powerful and proficient road transport frame work decreases cost and relative separation between exchanging accomplices, in this manner expanding exchange adequacy and boost returns on existing modern speculation and generation. Along these lines, for Ghanaian items to wind-up focused on the world market, there is the need to improve our road transportation framework through and compelling and very much coordinated path arrangement.

Good roads in Ghana are very valuable assets. It has provided users with mobility required and giving government tax revenue due to the tremendous increase of car ownership and the flourishing car industry; this was confirmed by a Daily Graphic publication August 2, 2013 edition revealing an increase in car registration from 41,328 in 2012 to 49,537 in January to April 2013.

Nationwide focus for development and destitution decrease additionally depend intensely on a compelling road transportation framework. Failure to access employment and administration since road transportation is inaccessible or is too costly is a significant component of social rejection which characterise destitution.

The department in this way target given availability to encourage the development of product and ventures all through the country. Moreover compelling urban roads transportation systems support national development and diminishes neediness in the urban regions, it is in this ineffective that the issues related to the road transport arrange in Ghana's urban, focuses are of developing worried to the service and its organizations. It has been assessed that road transportation carries around 98% of the traveller and cargo traffic in Ghana. It is therefore that interest in the arrangement of roads foundation is significant. It upgrades the presentation of different parts in the economy. The service is conducted by GSGDA and the national vehicle arrangement for the improvement and upgrading of transportation as a rule, together with road carrying. This is required to direct the future improvement of the complete vehicle arrangement of the nation. Accordingly, the remarkable duty with it effect of an incorporated should be very much kept up towards road transportation system on the socio-economic development of Ghana, the focus of the ministry is to develop technique principles that will make possible the provision and safeguarding urban roads.

2.2.4   Overview of Achieving Value for Money

Achieving product value for money is the most advantageous which can is the composite of cost, quality and able to be upheld the essentials of the client and users. As such Value for money is not about achieving the lowest initial price: it is defined as the finest combination of whole life costs and quality. It was discovered that best value is related to delivering on time, within budget, low project estimate, brief construction duration, satisfactory life of repair, low maintenance price to the public. At the centre of the theory of VFM, there are three fundamental basics that are

economy, efficiency and effectiveness. This is known as the three E's. (Batho Pele Handbook, 2007)

Economy: Inquire as to detailed what is put in are obtained at the least cost and at the right period. **Efficiency:** Also allude to how profitably inputs are express into outputs. It additionally means that, there must be utmost production with small cost.

Effectiveness: Relate to the extent to which outputs accomplish the required outcomes (Batho Pele Handbook, 2007).

2.3 GENERAL FUNDAMENTAL OF VALUE FOR MONEY

- It is interesting to note that all expected values of professionals can impact the acceptance of managing behaviours to stressful situations in construction. There is, therefore, the need to acknowledge this fact as a professional and try as much as possible to mitigate it since for a successful VE methodology. (Chan *et al.,* 2014).

- VE methodology has as well championed the cause of great efforts being made to break down the cost with structures that are low in efficiency, thereby improving service quality but lowering cost (JI, 2002).

- Whiles VM/VE might be widely known among professionals, it is likely for its minimal practice which resulted due to wrong understanding of VM that might seem minimal cost reduction tool according.

- VM is also a very robust, potent and adaptable tool for obtaining ground-breaking solutions to organizational problems (Jay and Bowen, 2015).

- Increasing comprehension of the nature, characteristics, problems, theoretical foundation and process for the development of the VM framework are also essential to the beginning of projects.

- The techniques of VM are generally known by certain categories of professionals, it is less widely practiced (Bowen *et al*., 2010).

- Even though VM processes might be practiced for a long time by certain professionals in a particular setting, it doesn't necessarily mean that the VM processes have been well embraced and accordingly, countless movements should be taken to apply and advance its full potential to improve VFM for customers 'organisations (Shen and Liu, 2004).

- The practice of a value-adding toolbox to help road professionals (RPs) to resolve practical project difficulties with regards to client prospects of value is vital and much priority should be placed on this (Thomson *et al.,* 2006).

- Research has it that sustainable development is an expanse that has inordinately probable for the implementation of VM procedure to ensure sustainable design and development (Shen and Yu, 2012).

- Global Project Management (PM) problems are relationship-based (VBM) (Wilkinson, 2001).

- Projects cost more and take a long time without the principles and practices of the advanced VFM methodology (Harrison, 1985).

- Project values influence project quality expectations (Thomson *et al.,* 2006).

2.3.1   The VFM Inter-relationship

VFM association on projects consists of two standards: achieving practice (human) values before product (project) values. Vehemently it is acknowledged as a strategy for accomplishing VFM. Wandahi (2005) in his attempt to investigate the improved emphasis that lack of efficiency increases in the roads industry which give rise to productive consequences revealed with the aim of eventual demonstration satisfactory management practices is founded on valuable consideration, thus, VM,

VE and VBM. VM underscores the ability to integrate client needs and requirements and needs with its distribution and completion. VBM emphasizes the united productivity of the facility organization through the utilization of human worth (i.e., process values) as an additional management tool. Consequently, the difference between VM and VBM lies in the definition of value according to (Wandahi, 2005). By and large, the knowledge of VM therefore help to appreciate the VFM relationship from client's viewpoint. Value Management (VM) and Value Engineering (VE) are associated with the value delivery to the customer outfit (Wandahi, 2005). Accordingly, it can be predefined that value is not equal to money, even though a link does occur. In VM and VE, value is carefully associated with the project, its purposes and accompanying facilities. The VFM relationship comes in performance when a client asks himself 'did the task achieve any value? The client is therefore producing a value decision where the expected financial amount is set up alongside the observed worth of the project (Thomson *et al.*, 2006).

The current greatest leading observation of the practice for value is the provision of value to the client outfit in a "Value for Money (VFM)" association. This is what the management concepts of Value Engineering (VE) and Value Management (VM) emphasize. Value Management (VM) is realized at the commencement phase of the construction preparation and process to accommodate and relay the client outfit's requests, supplies, and requirements. The agenda for this is to secure these requests, necessities, and requirements as accommodated in the design explanation. Value Engineering (VE) is applied in the margin between the design phase and the construction phase to enhance the price of the plan description and to safeguard the viability of the design. Conversely, an additional value proposition is in operation (Wandahi, 2005). This significance model is deep-rooted within the thoughtfulness

of values as human standards of right or wrong; hence the effects on individual nature and activities. This assess that, configuration is utilized in the practice of Value-Based Management (VBM), which dynamically rests on generating mutual values of the project establishment. This generates an additional cooperation based philosophy, which has been exposed to be more practical than the conventional management systems like performance, duration, investments, etc. In that way, Value- Based Management (VBM) is to be observed as an additional management technique, which should advance the effectiveness of VFM on road construction projects.

2.3.2 Implementation of Road Construction in Ghanaian Industry

According to the Ministry of Roads and Highways (MRH et.al., 2011) road project execution in Ghana goes through these processes:

1. Before any road in Ghana is constructed in any region, the first stage is the prioritization and selection based on its importance, worst conditions or state, surface conditions, its value in relation to farming or other economic activities, just to mention a few, by the Road Engineer in an area liaising with the Local Assemblies or Authorities.

2. The next stage is for the Road Engineer to undertake a field condition survey to be able to know the optimum design interventions or solutions like culverts, u-drains, base, sub-base, primer seal, inter-alia, for the selected or prioritised road in the area.

3. A desk study is then conducted by the Road Engineer and Surveyor to investigate the hydrological and catchment areas or zones by studying the roadmap of the area. This is to enable the team to come up finally with a

feasible and viable design intervention or solution for the road area prioritised.

4. A Quantity Surveyor (Q/S) is then tasked to come up with an estimate based on the design information finally supplied by the Road Engineer.

5. The Quantity Surveyor then brings it back to the Road Engineer who then vets it to ensure that it is an optimum estimate.

6. The Road Area Engineer then sends this vetted estimate to the Regional Manager, who as well vets it and if found satisfactory attaches a cover letter.

7. This is then sent to the National Director of the Road Agency, who looks at the budget at his disposal and sees whether it is feasible or viable to execute.

8. If it is found to be feasible as per budget, Tendering is done to select the lowest evaluated bidder or contractor for the task.

9. Conditions of Contract and possession of the site are offered to the successful Road Contractor, who then moves to the site to commence works.

10. During construction or maintenance works, these RPs offer effective supervision, Quality assurance, monitoring and control. If the Contractor raises any certificate for payments, these RPs vet the certificate to ensure that an optimum VFM is achieved for the state.

2.3.3 The Department and agencies that operate under the direct ambit of the Ministry of Roads and Highways;

- Ghana Highways Authority (GHA);
- Department of Urban Roads (DUR);
- Department of Feeder Roads (DFR);
- Ghana Road Fund Secretariat (GRFS)

Vision of MRH is to provide and retain a combined, economical, harmless and supportable network road receptive to users and development alleviation.

2.4 Ghana Highway Authority

Under Act 540(December, 1997) the GHA is obligated for the administration, development and maintenance of our highways and other related roads in Ghana

2.4.1   Urban Road Department

The urban road department under the ministry is in charge for the improvement, management and safeguarding of our urban roads and other like road within Ghana for safe and proficient travels of commodities and citizens. As a result it reduces the walking and waiting time for the civic transportation in low income community in each metropolitan and municipalities.

2.4.2   Feeder Road Department

With feeder road department, it is sets out to ensure that, roads that feed into the highway are established properly conveyance of individuals, goods, and facilities. The section focal point is also on the socio-economic and agricultural progress of the country.

2.4.3   WAYS OF REACHING VFM IN URBAN ROADS

There are many ways and methods adopted towards VFM in roads with it techniques that are accessible to organizations which can reveal the profit on capital invested.

2.4.4   Analysis Cost Effectiveness

This describe the evaluation of two or more different base on their relative costs and effect, in reaching particular goal, this is adopted when there is realization of projects that aim to achieve same expectation.

2.4.5   The use of VM

According to Olanrewaju and Khairuddin (2007) a well structured set of procedures and processes that are introduced, purposely to enhance the function of a designs, systems, facilities at the lowest possible total price of effectual ownership, taken awareness of the client's value system for quality, dependability, strength, conformance, aesthetic, time, and cost are classified as VM.

2.4.6   Benefit Cost Analysis

In this approach, we analysis by identifying the cost incurred and it benefit of each in terms of money and adjust for time. Also on the resource in terms of their performance e.g. personnel, amenities, equipment & material and the requisite user input.

2.4.7   Combined cost and effectiveness

Organization should establish a cost effectiveness rations for each alternatives by establishing the following:

- Put in up-front planning

- Assess offers for VFM

- VFM should be included in objectives and the outcome

- Give advance notice and undertake engagement of parties

- Impel VFM through the life of the road constructions

- There must be selection of offers that demonstrate best overall VFM

2.5 HINDRANCES TOWARDS THE ATTAINMENT OF VFM

According to Cox and Townsend low and discontinuous demand, frequent changes in specification, inappropriate contractor and consultant selection, inappropriate allocation of risk, poor quality, poor management, inadequate investment are some of the main barriers to achieve VFM. Hence, the study revealed some barriers inherent

in the attainment of VFM in urban roads project are as a result of the some of the under listed challenges:

- Need of involvement of stakeholders in decision- making

- Need of knowledge about VM

- Incomplete project

- Tender documents not sufficient

- Inexperienced & incompetent contractors and consultants

- There is also inconsistent assessment of risk and management in organisation

- Lack of open communication with client with regards on pricing

2.6 FACTORS FOR REACHING VALUE FOR MONEY

According to Moore et al, 1992 lack of trust, little cooperation, and inefficient communication can cause adversarial contact between parties and that will lead to project delays, trouble in resolving claims, cost overruns, legal action, and a win-lose climate. Thomas (2002) identified the main performance criteria of construction projects as financial stability, progress of work, standard of quality, health and safety, resources, relationship with clients, relationship with consultants, management capabilities, claim and contractual disputes, relationship with subcontractors, reputation and amount of subcontracting

From the literature review, study shows that there are some factors leading to value for money in urban roads construction:

- Implementation of proper legislation

- Engagement of stakeholders throughout the project

- Introduce VE concept from the beginning and after

- Identify areas of weaknesses on the present routine

- VFM practices and the operation of its equipment.

- Quality of work done and proper supervision of project

- Proper selection of project team members, contractors and consultant for the project

2.7 CHAPTER SUMMARY

In summary construction industry presents the most effective and elaborate attempt employed by the client to provide the much needed infrastructure base of the country. The outcome of this study gives the essential assistance in value for money during and after execution of urban roads in Ghana.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter elaborated on the processes adopted for the study in order to achieve the said aim and objectives. This chapter discussed the research strategy used for the study, the approach used in soliciting for data and how the results will be presented. Research Methodology is therefore the mode to discover how to go about a task of finding out what we believe to be true (Christou *et al.,* 2008). Hence, this section highlights on research design, study population, sample and sampling procedure and data collection procedures, validity and reliability of research instruments and data analysis techniques.

3.2 RESEARCH DESIGN

According to Saunders *et al* (2009), research is classified into three main areas according to their purpose. These are exploratory, descriptive and explanatory. Exploratory research enhances researchers understanding of a concept and useful in appreciating into 24 details a problem associated with a concept. An advantage of exploratory research is its flexibility and adaptability to change (Kothari, 2004). Descriptive research is mostly used when the purpose of the study is to accurately, describe a concept or theory. The study sought to establish the factors for achieving value for money in urban road construction in Ghana adopted the descriptive design in the quest to understand the factors through the distribution of questionnaires and collecting data from professionals for the study.

3.3 RESEARCH STRATEGY

This section explains the direction the researcher takes conducting the research. Naoum (1998) defines research strategy as the enquiry of research objectives. Accordingly, Baiden (2006) asserted that, the three main types of research strategies are quantitative, qualitative, and triangulation. However, the choice to adapt any particular strategy depends on the purpose of the study, the type, as well as availability of information for the research (Naoum, 1998; *c.f* Baiden, 2006). Hence, this research adapts a quantitative strategy, as the main data collection techniques used in this research was questionnaires.

This method will allow the researcher to ask all respondent the same question with predetermined responses, which allowed objective data to be collected throughout the study therefore being in cycle with the positivist tradition with survey as the main data collection approach.

3.4 POPULATION OF STUDY

According to (Saunders, Lewis, & Thornhill, 2009), population is the totality of an object or group of people with similar or same specific qualities. Targeted respondents were from the Urban Roads Department, Accra. Those involved were the Contract Managers, Project Managers, Civil Engineers, and Quantity Surveyors in addition to A1B1 category of road contractors. According to Mugenda and Mugenda (2003) target population should have recognizable features to which the research purposes to simplify the result.

3.4.1   SAMPLE SIZE

Sample means a part of a population drawn to reflect the remaining of the population (Naoum, 1998). The sample size required for this particular study is influenced by a

number of factors. These factors include the population size, the purpose of the study, the level of precision, the level of confidence or risk and the degree of variability in the attributes measured (Miaoulis and Michenser, (1976). The population size is about 50. Out of a total of 40 questionnaires sent to the different target group at the Department of Urban Road (Head Office, Accra) under consideration 36 responded.

3.4.2   SAMPLING TECHNIQUES

The idea of the researcher introducing his own judgement on who is the best person to give him the answers to the research is purposive sampling. Generally, the researcher establishes what should be added or what will be needed and goes on to gather data from individuals who have the right experience on the subject matter (Bernard, 2002; Lewis and Sheppard, 2006). This study adopted the purposive sampling under the non-probability sampling technique. It was established that professionals from the various sections had the qualification the researcher needed in carrying out the work. Respondents from the Head office of the Department of Urban Roads, Accra were engineers and quantity surveyors who are professionals registered with the relevant professional bodies.

3.4.3   COLLECTION OF DATA

Data collection is one of the most important phases in research works. Data collection according to Bohrnstedt and Knoke (1994) helps in gathering data to address research questions therefore this process should be tactfully planned out. In this current study both secondary and primary data were collected. The secondary data was collected through review of a number of literatures and existing studies on factors for achieving value for money in road construction especially Accra roads.

Primary information or data was gathered as a result of the findings from these sources as the basis.

3.5 SECONDARY & PRIMARY INFORMATION

The researcher made use of a combination of primary and secondary data. In that, the secondary data which is the (review of literature) help to identify the success factors and methods in attaining value for money in urban roads. The primary data also was provided through the survey questionnaire gathered for further analysis.

3.5.1 QUESTIONNAIRE DESIGN

Information was solicited from the respondents through structured questionnaires. Self-administered questionnaires were used to gather primary data from the respondents. The use of questionnaire was chosen due to the fact that it helps the researcher to quickly and/or easily get a lot of information from people in a non-threatening way (Fellows and Liu, 2008). Data was collected from the field by the administration of questionnaires. In designing the questionnaires attempts were made to ask relevant questions which were devoid of uncertainty to facilitate analytical interpretation and for reasonable conclusions to the study to be made. Regular follow-up was made after distribution of questionnaires to clarify any difficulties faced by the respondents, Calls and electronic mail reminders was also sent periodically.

In all, the questionnaire had both close and open-ended questions. The closed-ended questions were meant to ensure consistency of the respondents' feedback and moreover aid the data analysis. On the other hand, the open-ended questions gave the respondent the opportunity to add up other issues which were not captures on the questionnaires but relevant to the study.

A copy of the questionnaires can be found at the Appendix.

3.5.2   DATA ANALYSIS

The study discuss the identified tools relevant to the success factors for achieving value for money in urban road projects in Ghana and develop a merged version of the sampled scheduling tools. The retrieved questionnaires were aggregated into larger units and were processed and entered into the Statistical Packages for Social Sciences (SPSS). To elucidate the discussion in this discipline, the results obtained were presented graphically and in tabular form. Information involving the background of respondents is presented in pie charts and bar graphs.

3.6 ETHICAL CONSIDERATIONS

The paper and topic of interest was well researched with the basis aimed at privacy protection of all individual participants who provided their personal details in the process of the study when they were invited to take part in the research work. Every participant (here in called subject) who became a subject in the research work was first informed of the aim and objective of the research. Under no instance was a participant selected to take part in the study without him or her being notified of the study aim and objectives and his/ her concern to become a subject.

CHAPTER FOUR

ANALYSIS AND DISCUSSION OF RESULTS

4.1 INTRODUCTION

In this section, results are presented based on objectives that were geared toward the success factors in VFM relating to urban roads in Ghana. Descriptive statistics and RII were introduced as instrument to gather data received from the respondents. In view of this the research data is divided into five sections. The first section of analysis dealt with the general information on respondents. The second section dealt with value for money practice. The third section dealt with the barriers inherent in the achievement of the success factors in urban road constructions in Ghana, A case study of Accra. The fourth section dealt with the success factors towards accomplishment of VFM. Lastly, fifth section dealt with how project management techniques play in the application within VFM (usefulness of VE) in urban roads project in Ghana with a section for general recommendation to improve the value for money. Out of 40 distributed questionnaires, thirty six (36) responded. Which constitute a measure of 90.00% that falls within accepted limits, as a result of the fact that I instituted successive follow-ups even after administering questionnaires by email and as well quoted with plea on the cover page of questionnaire a time limit for responses to questions.

4.2 DISCUSSION OF RESULTS

The section addresses the analysis and discussion of the objectives of the research work which was undertaken as follows;

1. To identify the barriers inherent in the achievement of the success factors

2. To identify success factors that contribute to VFM in constructing urban roads; and

3. To outline project management techniques in the application of these success factors

4.2.1 Respondents Profile from Questionnaire Data

In this segment of the survey consist of question demanding personal information to provide detailed respondent's characteristics. Data in this section included: the sector of respondents, number of years respondents have been with organization respondents' professional background and the biggest type of construction respondents managed. The demography of the respondent's information typically was derived by the introduction of (SPSS), version 25. Thirty six opinions gathered more than half of the participants (55.6%) had obtained the Bachelor of Science degree as their highest level of education. Quite a number of the respondents (33.3%) had a Master of Science degree, with a handful acquiring PhD and other degrees (2.8% each).Most of the respondents were associated with a professional body (77.8%), and were privy to the concept of Value Engineering (VE) for optimum Value for Money (VFM)on road projects. All the respondents (100%) agreed that Value Engineering (VE) is practiced in their agencies. The results are presented in Table 4.1 below.

Table 4.1: Baseline characteristics of the study participants

Characteristic	Frequency (N)	Percentage (%)
Level of education		
HND	2	5.6
BSc	20	55.6
MSc	12	33.3
PhD	1	2.8
Others	1	2.8
Belong to a professional body		
Yes	28	77.8
No	8	22.2
Privy to concept of VE for optimum Value for VFM on road projects		
Yes	27	75
No	9	25
VE is practiced in my Agency		
Yes	36	100
No	0	0.0

VE-Value Engineering: VFM- Value for Money

Figure 4.1 shows the proportion of participants associated with the various types of professional bodies. The Institute of Engineering &Technology (IET) was the least observed (2.8%) professional body among the study participants. Exactly half of the (50%) respondents were associated with the Ghana institute of Engineers professional body, followed by those with the Ghana Institute of Surveyors (36.1%). Moreover, quite a number (11.1%) of the participants were affiliated to other professional bodies, aside the listed ones in the current study.
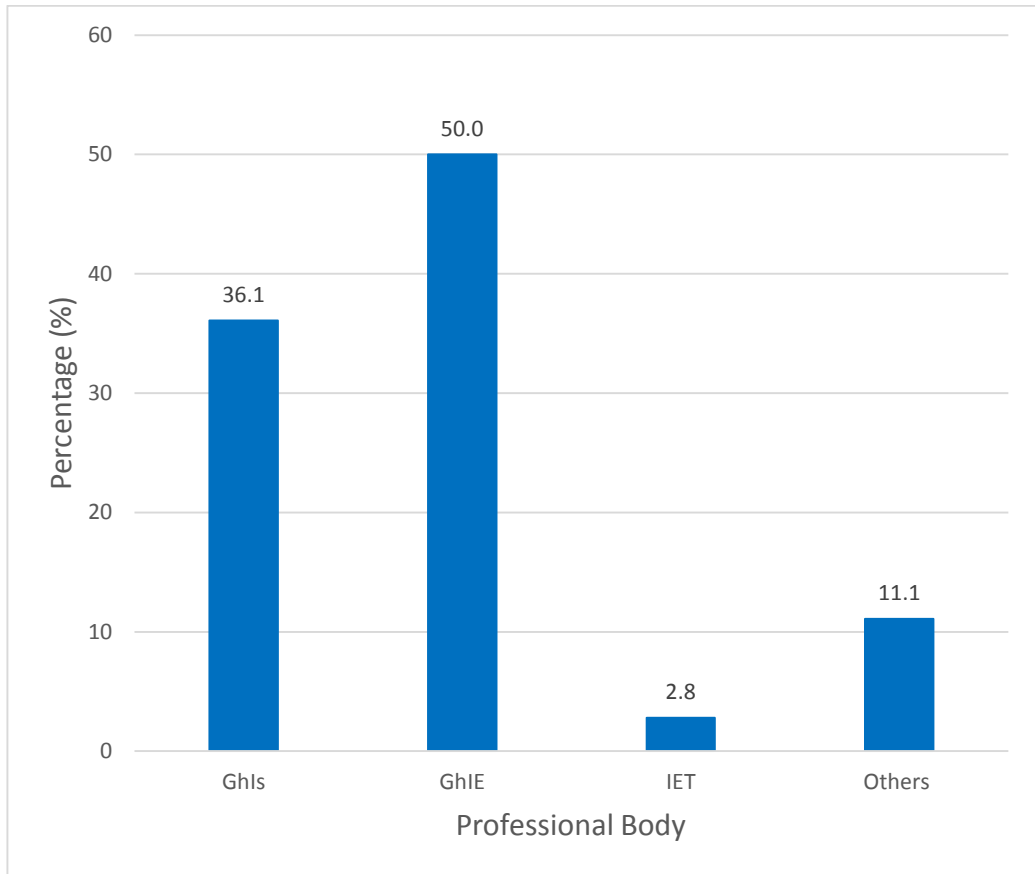
Source: Field Survey, 2019

Figure 4.1: Proportion of participants associated with the various types of professional bodies

The proportions of the various positions occupied by the respondents were further investigated. Quantity surveyor was the most widely occupied position by the respondents (30.6%).Interestingly, the predominance of Quantity surveyors was followed by "other positions" (27.8%) not listed among the famous 7 positions in the road construction industry. Nevertheless, Land surveyor was the least occupied position among the respondents (2.8%), followed by the Contract manager and Material Engineer positions (5.6% each). Contractor was the 3rd most occupied position (11.0%). Technician Engineer and Maintenance Manager recorded the 4th most occupied position among the study participants in the current study. The results are presented in Figure 4.2 below.
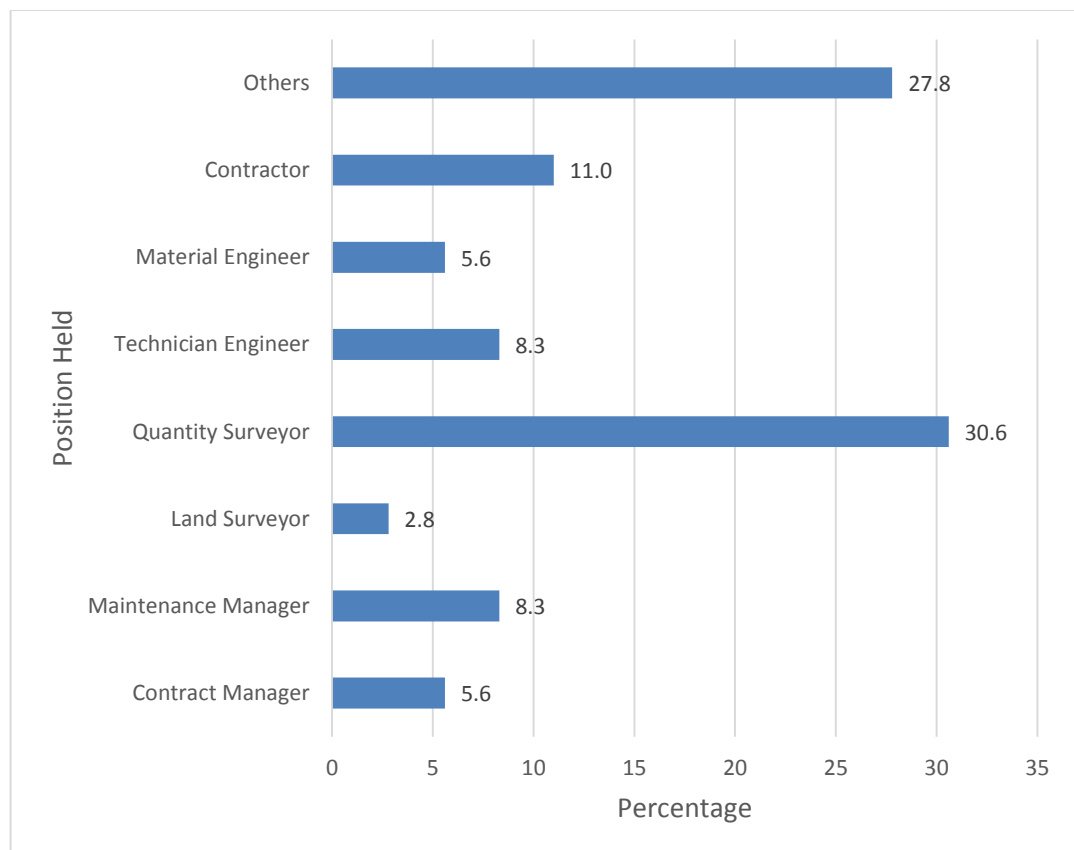
Source: Field Survey, 2019

Figure 4.2: Proportion of the various positions occupied by the study participants

The demographic analysis also showed that majority the respondents (41.7%) in the study had 1 – 10 years practical experience in road construction. This was by followed by those with 6 – 10 years of practical experience (27.8%). About one-fourth of the entire study population (25.0%) had 11 – 15 years of practical experience in road construction, while a handful (5.5%)had served more 15 years in the road construction field(see Figure 4.3).

Years of experience

5.5%

25.0%

41.7%

27.8%

■ 1-5 years ■ 6-10 years ■ 11-15 years ■ Above 15 years
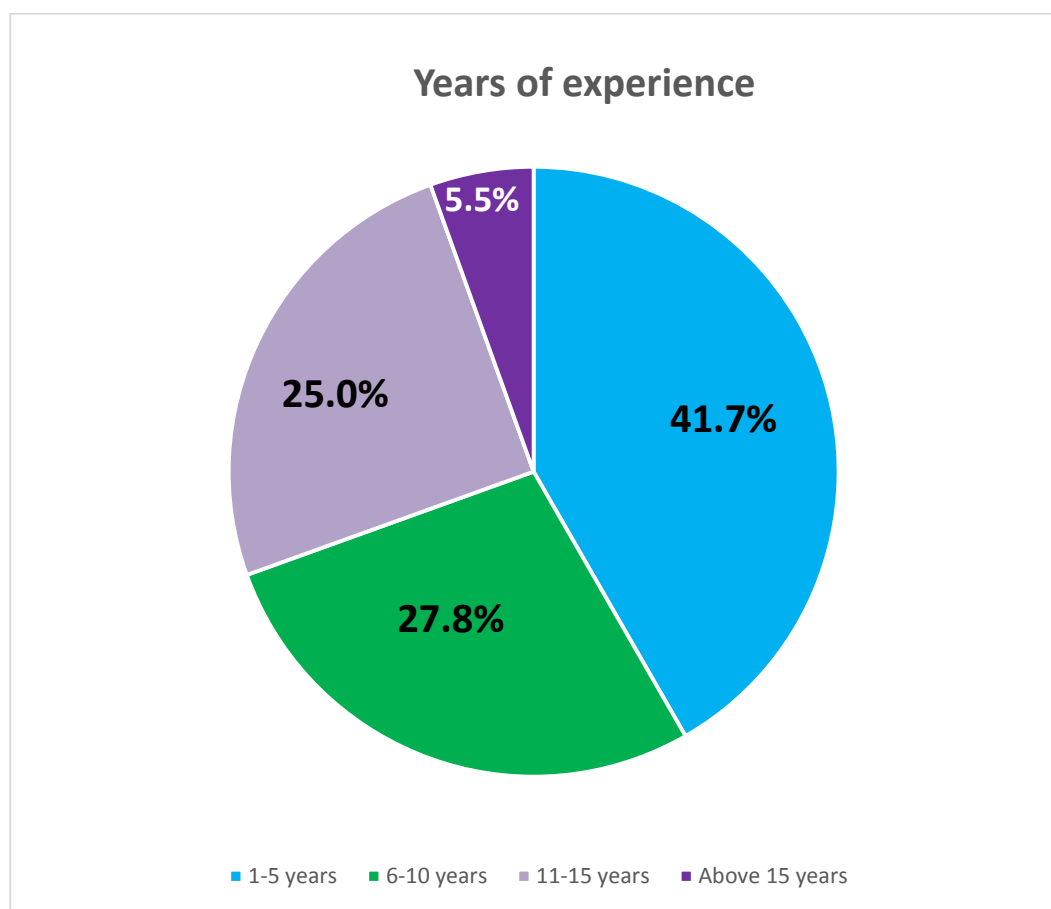
Source: Field Survey, 2019

Figure 4.3: Years of experience on road projects acquired by the study participants

Value for money was assessed among the study participants. It was observed from this study that Urban road project was the most remarkable project managed so far by the respondents (69.4%), followed by Trunk road project (13.9%), Feeder road project (8.3%), Donor funded project (5.6%) and other projects respectively (2.8%). Most of these listed projects (77.8%) were executed from the year 2000 to date, while a few took place between 1990 and 2000. It was further observed that the initial budgeted cost for the construction was mostly above 10,000,000 ghc, with just a few being below 1,000,000 ghc. More than half of the road construction projects (52.8%) were executed between 12 to 18 months, albeit quite a number (27.8%) took more than 18 months to be executed. The combined influence of cost and time overruns (33.3%) was the factor perceived by the respondents to greatly affect the outcome of the road construction projects. The participants' self-evaluation on the road project indicated that they experienced challenged projects (61.1%) more than successful ones (38.9%).The results are presented in Table 4.2 below.

Table 4.2: Evaluation of Value for money among the respondents

Characteristic	Frequency (N)	Percentage (%)
Most remarkable road project managed so far		
Trunk road project	5	13.9
Feeder road project	3	8.3
Urban road project	25	69.4
Donor funded project	2	5.6
Others	1	2.8

Characteristic	Frequency (N)	Percentage (%)
Years of project execution		
Between 1990 and 2000	8	22.2
From 2000 to date	28	77.8
Initial budgeted Cost for the construction		
Below 1,000,000 ghc	7	19.4
1,000,000 ghc – 10,000,000 ghc	13	36.1
Above 10,000,000 ghc	16	44.4
Initial estimated Time for the construction		
Below 12 months	7	19.4
Between 12 to 18 months	19	52.8
Above 18 months	10	27.8
Factors impacted on the road construction		
Cost overruns alone	9	25
Time overruns alone	9	25
A combination of any two of the above	12	33.3
Time overruns, Cost overruns and poor quality all together	6	16.7
Assessment of this road project		
Successful project	14	38.9
Challenged project	22	61.1

Source: Field Survey, 2019

Barriers that hindered the success of the road construction projects were also evaluated. Generally, the suggested barriers listed in the current study were of value, as perceived by the respondents. Inexperienced and incompetent contractors and consultants, Poor contract administration, Lack of gathered information in early stage causing difficulties in creating ideas and alternatives, and Lack of value management team competence to accurately estimate costs, were all ranked 1st of the barriers from the respondents' views, and were of value (mean=3.75) to the hindrance of project success. Difficulties conducting analysis and evaluating alternatives occupied the 5thrank among the other barriers, and was also of value (mean=3.69). It was also observed that Lack of knowledge about value management was of value (mean=3.64), as a barrier to the success of road construction projects. Lack of legislation providing for application of value management in the construction industry was the least ranked barrier (11th) among others, from the participants' perspective, and was also of value to the hindrance of construction projects. The overall mean and standard deviation of the barriers to the success of construction projects were 3.56 and 0.81(Table 4.3).

Table 4.3: Barriers inherent in the achievement of a successful road project

Characteristic	Mean	Std. Dev	Level of significance	Rank of Barrier
Lack of knowledge about value management	3.64	1.18	Value	6th
Lack of incomplete or non-completion of project	3.44	1.25	Value	8th
Insufficient Tender Documents	3.28	1.39	Value	10th
Lack of support and active participation from owners and stakeholders	3.58	1.30	Value	7th

Characteristic	Mean	Std. Dev	Level of significance	Rank of Barrier
Lack of contract provisions for implementation value management on projects	3.44	1.13	Value	8th
Inexperienced and incompetent contractors, consultants	3.75	1.11	Value	3rd
Poor contract administration	3.75	1.05	Value	1st
Lack of gathered information in early stage causing difficulties in creating ideas and alternatives	3.75	1.08	Value	2nd
Lack of value management team competence to accurately estimate costs	3.75	1.13	Value	4th
Difficulties conducting analysis and evaluating alternatives	3.69	1.01	Value	5th
Lack of legislation providing for application of value management in the construction industry	3.11	0.95	Value	11th
Overall mean:	**3.56**	**0.81**	**Value**	

Source: Field Survey, 2019

4.2.2 Discussion of the barriers inherent in achieving value for money in urban roads

The outcome of this research indicated that, the eleven (11no.) identified barriers towards value for money as reveal in the road sector are recognized and accepted as hindrances to the road industry in Ghana. The understanding that, VM are used to measure VFM in road construction project by Ofori, 2012 and was highlighted agreed upon by respondents. That, inadequate engineering capacity, inadequate working capital and managerial capacity, low productivity and quality of work among others are barriers facing VFM. From the Literature review, *Thomson et al.,2006* ranked the practice of value –adding toolbox as vital barrier but from the

survey research disagree with the ranking as result reveals that, inexperience and incompetent contractor and consultant , poor contract administration, need of gathered information in early stage causing difficulties in creating ideas are all significance in the ranking barriers from the Anova result.

In summary, the work discovers that the finding of the barriers towards VFM in urban road projects according to this work done and their significance is distinct. Therefore, it is on the right path to assent with Cox and Townsend, that low and discontinuous demand, in appropriate contractor and consultant selection, inappropriate allocation of risk, poor management are the most areas that hinder VFM in urban roads.

4.2.3 Participant knowledge level for the Success factors in attainment of value for money in urban roads

Factors for achieving optimum value for money (VFM) in urban road construction was also further evaluated. Generally, the factors listed in the current study were of value to the achievement of optimum VFM in construction projects, as perceived by the respondents. Strong support from top management and Open communications among project team members, were the least ranked factors (9th and 10th respectively), and were both of value for optimum VFM. Extensive stakeholders' engagement occupied the 1st rank(mean=4.28) among the other factors, followed by Seek ways to incorporate VFM practices effectively, Introduce a guide for VFM practices and the utilization of its tools, Efficiency & Effectiveness, and Assess current performance to identify areas of weaknesses (mean=4.17 each), all of which were ranked 2nd and were of value. The composite mean of the entire response of the participants to the factors for achieving optimum VFM in urban road construction projects was 4.05, with a standard deviation of 0.56 (Table 4.4).

Table 4.4: Success factors for achieving value for money in urban road construction in Ghana.

Characteristic	Mean	Std. Dev	Level of significance	Rank of factor
Seek ways to incorporate VFM practices effectively	4.17	0.97	Value	2nd
Proper managerial value management practice	3.94	0.86	Value	8th
Strong administrative and technical capabilities of project managers	4.11	0.71	Value	6th
Strong support from top management	3.69	1.04	Value	9th
Open communications among project team members	3.64	0.93	Value	10th
Introduce a guide for VFM practices and the utilisation of its tools	4.17	0.85	Value	2nd
Quality of work done and proper supervision	4.11	0.98	Value	6th
Efficiency & Effectiveness	4.17	0.97	Value	2nd
Extensive stakeholders engagement	4.28	0.62	Value	1st
Assess current performance to identify areas of weaknesses	4.17	0.91	Value	2nd
Overall mean:	**4.05**	**0.56**	**Value**	

Source: Field Survey, 2019

4.2.4 Discussion of the success factors towards value for money in urban roads

To discover the success factors for VFM in urban roads, the study was concerned with the key factors/characteristics that leads to value for money. The result established ten (10no.) elements of success factors for this study, where Extensive Stakeholder Engagement was very significant. This agree with the statement made by Male (2007) expressing VM as a practice to enhance PM with it aim of

integrating changes in view between Stakeholders and customers as to the true significance of value.

4.2.5 Participant knowledge level in the application of Project Management Techniques in value for money

Furthermore, some Project Management (PM) techniques for optimum Value for Money (VFM) on road constructions in Ghana were presented to the study participants for assessment. All the techniques were perceived to be of value by the respondents, albeit the rank differed for each technique. Project Quality Management was ranked 1st (mean=4.53), with Project Time Management and Project Cost Management occupying the 2nd and 5th ranks (means=4.25 and 4.11) respectively, all of which were of value. Both Project Scope Management and Project Procurement Management were ranked 3rd according the analysis, while Project Communications Management obtained the least rank (9th).The overall mean and standard deviation of the responses of the respondents on project management techniques in the application for VFM were 4.1 and 0.55 respectively (Table 4.5).

Table 4.5: Project management techniques in the application of value for money, for usefulness of value engineering

Characteristic	Mean	Std. Dev	Level of significance	Rank of elements
Project Integration Management	4.0	0.89	Value	6th
Project Scope Management	4.22	0.83	Value	3rd
Project Procurement Management	4.22	0.87	Value	3rd
Project Risk Management	3.92	1.03	Value	8th
Project Communications Management	3.78	0.93	Value	9th
Project Human Resource Management	3.97	0.81	Value	7th
Project Cost Management	4.11	0.89	Value	5th
Project Time Management	4.25	0.77	Value	2nd
Project Quality Management	4.53	0.65	Value	1st
Overall mean:	**4.1**	**0.55**	**Value**	

Source: Field Survey, 2019

4.2.6 Discussion on the application of Project Management Techniques in achieving value for money on urban roads projects in Ghana

The next area was to ascertain project management techniques in order to attain VFM in urban roads. The study foremost identified that Project Quality Management is significant among the nine (9) knowledge areas during road construction. This validate (Rohn, 2004) research that enhancing quality, minimizing total cost, reducing construction time, ensuring safe operations and ensuring ecological gaols should be met.

In conclusion, the result identified Project Quality Management as the techniques which was ranked 1st by participants. (Prempah and Nsiah-Asare, 2016) said VFM is

not about attaining the lowest initial price, instead, it is the best possible use of available finance resource to produce quality goods and services.

4.3 SUMMARY

In a widespread, the outcome of the research survey as discussed was found to reflect the actual conditions in the Ghanaian road construction sector especially urban road projects. It demonstrated how various personnel's view the barriers inherent in the achievement of VFM and their acknowledgment of the success factors and how project techniques can be adopted to achieve success in road project within Ghana. The survey shows that most people are aware of the barriers and agreed to the fact that these elements have an influence on achieving VFM in roads. Inexperience and incompetent contractor, consultant, poor contract administration and lack of value management to estimate cost were the most statically influenced barriers. The chapter commenced with identifying barriers for attaining VFM in urban roads projects in Ghana. It then followed by success factors that help to achieve VFM when undertaking road project. Then lastly, it explores the nine knowledge areas in project management using their techniques to achieve VFM in urban roads. The findings evidently revealed that to achieve VFM, VE should be carried from the conception stage and after the project.

5.1 INTRODUCTION

This part brings the study carried out to an end. It concludes and discusses recommendation to the study. It's also the last chapter of the research which would conclude the analysis in the chapter 4, that's being referred to the objective of the study. The objective of the study was to identify the success factors that lead to attain value for money in urban roads in Ghana. The study aim targeted all professionals involved in urban road constructions. A total number of 40 questionnaire were issued to qualified participants. Out of the numbers only **thirty six (36)** actually demonstrated the wiliness to participate to the questionnaire. A summary of how the main objective was content and discussion about the study's purpose is provided to highlight the contributions of the research. The chapter concludes with a recommendation for further research that can be conducted on the basis of the conclusion and the limitation of the study.

5.2 SUMMARY OF FINDINGS

The aim of the research was to investigate and bring to understanding how value for money can be achieved on urban road construction in Ghana with three main objectives. The findings from the objectives are discussed below;

5.3.1 To identify the barriers inherent in the achievement of the success factors

The first objective was achieved through an extensive review of relevant literature on barriers that hinders the success factors (*see chapter 2, page 24.*) Generally, the

suggested obstacles listed in the current study were somewhat of a barrier to the projects about eleven (11), as perceived by the respondents are lack of knowledge about value management, lack of incomplete project, insufficient tender documents, need of contract provision for implementation value management on projects, lack of legislation providing for application of value management in the construction industry. Though these are barriers towards achieving value in money for urban road construction project in Ghana, the most significant factor were, inexperienced and incompetent contractors and consultants, poor contract administration, need of value management team competence to accurately estimate costs. Using a one-way variance (Anova), the results revealed that the overall mean and standard deviation of the barriers to the success of construction projects were 3.56 and 0.81 respectively, which is equivalent to "somewhat of a barrier" as indicated in table 4.3(Chapter 4).

5.3.2 To identify success factors in attaining value for money in urban roads in Ghana

This second objective was achieved through a further and extensive review of relevant literature on ways by which value for money in road projects can be discovered. In general, the desk survey revealed that some of the success factors can be grouped into ten (10) as define in the sample questionnaires (*see page39 table 4.4*). Using a one-way (Anova), the grades revealed largely success factor to be extensive stakeholder's engagement.

5.3.3 To outline project management techniques in the application of success factors

By developed questionnaires, regression analysis between the identified project management techniques of value for money through value engineering ranks each

technique. Further analysis showed that, Project quality management have the most significance among the nine (9) knowledge areas.

5.3 CONCLUSION

As road construction in Ghanaians shapes the way of life and society, it is not possible to ignore the impact it play in development. The objectives of the research helped draw the following conclusions based on the research work done; study revealed that there were seven (10) main success factors toward the achievement in value for money in urban roads, while exploring that, all these factors are significant in achieving project success. Extensive stakeholder's engagement ranked as the most significant factor.

Secondly, there were eleven (11) barriers that were used in the research questions for the success factors in achieving project success. Inexperienced and incompetent contractors and consultants, Poor contract administration, Need of information gathered during conception causing problems in bringing suggestions and options, and the need of value management group proficiency in precisely estimation costs, were all ranked 1st of the barriers from the respondents' views.

Thirdly, the level of knowledge among Ghanaians on project management techniques of value for money was assessed and Project Quality Management was ranked 1st among other techniques. Further, the research explored and revealed that there is a statistical significance among the religious elements and the factors for measuring project performance in the Ghanaian construction industry.

5.4 RECOMMENDATION

In light of the above findings, the respondents were given the opportunity to write down personal things they would recommend, to be incorporated into road

construction projects in Ghana to improve value for money. These personal recommendations have been compiled and outline below:

Recommendations by the participants to improve urban roads value for money in Ghana

1. Stakeholders should be educated on value for money by conducting seminars.

2. A guide line would have to be provided in the contract defining clear ground rules in the administration of value for money.

3. Proper managerial, operational and administrative structures to be put in place to achieve better results.

4. Integrate the use of BIM and other technologies available to facilitate more accurate project estimates, before works are commenced. Data acquired for these projects can be kept for future references to aid more accurate estimations for other projects.

5. Compliance of law and regulations covering road construction must be adhered to by all parties in the road construction processes.

6. Recommend a thorough value for money audit.

7. Effective training on value for money for road construction in Ghana.

8. There should be consultations among stakeholders and employing qualify Technical competency.

9. Prompt payment of Interim Payment Certificate & Improve quality control.

10. Proper legislation and implementation.

11. Accountable professionals to lead procurement processes, less interference by external forces in procurement process.

12. Effective and regular maintenance of urban road after construction.

13. Plan the project from concept through operation and completion.

14. VFM & value engineering concepts should be solicited during tender. And contractors who provide proposals should be given more marks once proposals will improve efficiency and quality.

5.5 RESEARCH LIMITATION

Time available for this research was not enough to adequately exhaust all issues available. This was so because the study was an academic study. The study is still constrained although lots of efforts have gone into planning. For instance, the public perception of value for money on road projects was not adequately investigated even though the public is a major stakeholder.

5.6 RECOMMENDATION FOR FUTURE RESEARCH

This work has opened possible avenues for further research into the subject matter of value for money in urban roads in the Ghanaian construction industry. It is recommended that future research work should explore further the degree to which these barriers affects the success factors in value for money and how to maximize the benefits to help increase/improve construction project performances in Ghana.

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APPENDIX 1: QUESTIONNAIRES FOR THE STUDY

Kwame Nkrumah University of Science and Technology

Department of Construction Technology and Management

Institute of Distance Learning (IDL)

TOPIC;

SUCCESS FACTORS FOR ACHIEVING VALUE FOR MONEY IN URBAN ROAD CONSTRUCTIONS IN GHANA

To whom it may concern

Dear Sir/Madam,

Invitation to participate in a research to explore success factors inachieving value for money in urban road construction in Ghana

I am undertaking a research study in KNUST as part of my partial fulfilment of the award MSc. Project Management. The topic of my research is: *Success factors for achieving value for money in urban road construction in Ghana*

The main objectives of the research are:

1. To identify the barriers inherent in the achievement of the success factors

2. To identify success factors for achieving value for money in urban road construction in Ghana;

3. To outline project management techniques in the application of success factors for achieving value for money in urban road construction in Ghana.

Attached is a copy of my questionnaire. I will be very grateful if you could answer this questionnaire to aid the study. All information collected will be confidential and would be used only for academic purposes. Thank you for your time and contribution in   advance.

Email: ohemengcharles3@gmail.com Mobile: 0540462282.

Yours faithfully.

Charles Ohemeng, MSC Student

Mr. **Peter Amoah**, Supervisor

Department of Construction Technology and Management

Institute of Distance Learning (IDL)

Kwame Nkrumah University of Science and Technology, Ghana

INSTRUCTIONS: You are please required to tick (√), write or highlight your responses as appropriately as possible *options*

(SECTION ONE): BACKGROUND INFORMATION OF RESPONDENTS

1.Please indicate the position that you hold in the area of working under the Department of Urban Roads?

a) Regional Manager [   ]   b) Operations Manager   [   ]

c) Contract Manager [   ]   d) Maintenance Manager [   ]

e) Land Surveyor [   ]   f) Quality Surveyor   [   ]

g) Technician Engineer [   ]   h) Material Engineer [   ]

i) Contractor   [   ]   j) Others (please specify)

……………………………………

2.What is your highest level of education?

a) HND   [   ]   b) BSc   [   ]   c) MSc   [   ]   d) PhD [   ]   e) Certificate [   ]   f) Others (please specify) ……………………

3.Do you belong to any professional body?   a) Yes [   ]   b) No [   ]

4. If yes, please which professional body do you belong to?

a) Ghana Institute of Surveyors (GhIs) []   b) Ghana institute of Engineers(GhIE)   [   ]

c) Ghana institute of Architect (GIA) [ ] d) Institute of Engineering &Technology (IET) [   ]Others (please specify) ……………………

5. How many years of experience on road projects have you acquired?

a) 1-5 years [   ]   b) 6-10 years [   ]   c) 11-15 years [   ]

d) Above 15 years [   ]

6. Are you privy to the concept of Value Engineering (VE) for optimum Value for Money (VFM)on road projects?   a) Yes [   ]   b) No [   ]

7. Do you think Value Engineering (VE) is practiced in your Agency?

a) Yes   [   ]   b) No [   ]

2. (SECTION TWO): *VALUE FOR MONEY PRACTICE.*

1. Identify the category of the most remarkable road project you have managed so far?
a) Trunk road project   [   ]   b) Feeder road project   [   ]   c) Urban road project [   ]
d) Cocoa road project [   ] e) Donor funded project [   ]   f) Ghana Road Fund Secretariat[]g) Others (please specify) ……………………..

2. Within which years was the project executed?
a) Before 1990 [   ]   b) Between 1990 and 2000 [   ]   c) From 2000 to date [   ]

3. What was the initial budgeted cost for the construction?
a) Below 1,000,000 ghc [   ]   b) 1,000,000 ghc – 10,000,000 ghc [   ]

c) Above 10,000,000 ghc [   ]

4. What was the initial estimated time for the construction?
a) Below 12 months   [   ]   b) Between 12 to 18 months   [   ]
c) Above 18 months   [   ]

5. Which of these factors impacted on the road construction?
a) Cost overruns alone   b) Time overruns alone
c) A combination of any two of the above   d) Poor Quality alone
e) Time overruns, Cost overruns and poor quality all together

6. How will you assess this road project today?
a) Successful project [   ]   b) Challenged project [   ]   c) Impaired project [   ]

3. (SECTION THREE): *BARRIERS INHERENT IN THE ACHIEVEMENT OF THE SUCCESS FACTORS*

Below are some factors identified in literature as being barriers to the implementation of value for money in project management practice. Based on experience rate the following factors on a five-point Likert scale (1= Not a Barrier to 5 = Extreme Barrier).

Key: 1 – Not a Barrier, 2 – Minor Barrier, 3 – Somewhat of a Barrier, 4 – Moderate Barrier, 5– Extreme Barrier

Statements	1	2	3	4	5
Lack of knowledge about value management					
Lack of incomplete or non-completion of project					
Insufficient Tender Documents					
Lack of support and active participation from owners and stakeholders					
Lack of contract provisions for implementation value management on projects					
Inexperienced and incompetent contractors, consultants					
Poor contract administration					
Need of information collected during conception creating problem in bringing suggestions and options					
The need of value management group proficiency to precisely calculate costs					
Difficulties conducting analysis and evaluating alternatives					
Lack of legislation providing for application of value management in the construction industry					
Others (please Specify)					

(SECTION FOUR): *FACTORS FOR ACHIEVING VALUE FOR MONEY IN URBAN ROAD CONSTRUCTIONS IN GHANA.*

4. Below are important Value Engineering (VE) Value for Money (VFM) concepts. How do youassess each of the following form an optimum VFM on road constructions in Ghana? (Kindly use this 5-point likert scale to address the following by ticking (√) the cells corresponding to your responses: 1- Not relevant, 2- Quite relevant, 3- Moderately relevant, 4- Relevant, 5- Very relevant)

Factors in achieving optimum value for money (VFM) on road constructions in Ghana	1	2	3	4	5
Seek ways to incorporate VFM practices effectively					
Proper managerial value management practice					
Strong administrative and technical capabilities of project managers					
Strong support from top management					
Open communications among project team members					
Set up conduct for the training of VFM and its device usefulness					
Quality of work done and proper supervision					
Efficiency & Effectiveness					
Extensive stakeholders engagement					
Measure existing routine to discover the state of delicacy					
Others (please Specify)					

(SECTION FIVE): *PROJECT MANAGEMENT TECHNIQUES IN THE APPLICATION OF VALUE FOR MONEY*) *USEFULNESS OF VALUE ENGINEERING*

4. Below are the nine (9) Project Management (PM) Knowledge areas. Assess the usefulness inthe integration of VE in each of the following for an optimum VFM on road projects in Ghana?(Kindly use this 5-point likert scale to address the following by ticking (√) the cells correspondingto your responses: 1- No Value, 2- Low Value, 3- Medium Value, 4- High Value, 5- Very High Value)

5.

Project Management (PM) knowledge area (with VE integrated) for an optimum Value For Money (VFM) on road constructions in Ghana	Effect Levels				
	1	2	3	4	5
Project Integration Management					
Project Scope Management					
Project Procurement Management					
Project Risk Management					
Project Communications Management					
Project Human Resource Management					
Project Cost Management					
Project Time Management					
Project Quality Management					

6**. In general what would you recommend to be done to improve the value for money in urban road construction in Ghana**?

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....

THANK YOU FOR YOUR TIME AND PARTICIPATION!!!!!!