KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

COLLEGE OF ART AND BUILT ENVIRONMENT

DEPARTMENT OF CONSTRUCTION TECHNOLOGY AND MANAGEMENT

DEVELOPMENT OF A TECHNIQUE TO MONITOR INVESTMENT PERFORMANCE: CASE STUDY OF OUR LADY OF GRACE PROJECTS IN MANPONTENG, ASHANTI.

By

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A thesis submitted to the department of construction technology and management,

College of Art and Built Environment

In partial fulfilment of the requirements for the award of

MASTER OF SCIENCE

NOVEMBER, 2018

DECLARATION

I hereby declare that this submission is my own work towards the MSc. Project Management and that, to the best of my knowledge, it contains no material previously published by another person, nor material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.

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ABSTRACT

A case study research was conducted to develop a technique to monitor investment performance in the construction industry, due to the short fall of the existing techniques to detect high price, high budget, and cost inflated projects. The study follows a pragmatic research philosophy approach to allow the positivist and interpretivism mixed method strategy for quantitative and qualitative analysis for deduction and induction development of a technique to monitor investment performance to ensure value for money. The primary and secondary data was in need where a questionnaire was used to collect primary data and our lady of grace senior high school physical infrastructural projects was used as a secondary data. The first objective was to search for techniques available in the literature to avoid duplication of theories; the respondent accepted thirty-seven theories as techniques. The second objective was to identify the components of value for money on the pricing of physical infrastructure projects and minor components was identified under the three major components, economic, efficiency and effectiveness. Third objective was to identify what goes into market value and earned value when monitoring the cost performance and eleven variables identified. Finally, a technique for monitoring investment performance (FT-MIP) was developed and tested, based on the policy documents of Our Lady of Grace Senior High School infrastructural projects. The technique (FT-MIP) is used to one; determine value for money in physical infrastructural projects. Two, identify high price, high budget, cost inflated projects. Finally, it is used to determine performance of a physical infrastructural investment. In conclusion, FT-MIP follows three steps; the FIT-MIP framework, testing, and validation. The researcher recommend: first, the investors in the construction industry are encouraged to use the technique to monitor their investment, to guarantee total value for money on all their investments. Second, call for further studies to identify the strength and weakness in the application of frank technique for monitoring investment performance (FT-MIP).

KEYWORDS: Investment, Performance, Market Value, forced sale value, Construction, Ghana

ACKNOWLEDGEMENT

Many people have contributed in diverse ways towards bringing this research work to a successful end. First my innermost gratitude and greatest appreciating go to the Almighty God, my second thanks goes to my our supervisor DR. DE-GRAFT OWUSU-MANU of the Department of Building Technology KNUST for his guidance, encouragement and the valuable decisions and contributions at all stages of this project work.

I would like to also render my profound gratitude and deepest appreciation to all the lecturers in the Building Technology Department, KNUST for their Love, support and encouragement during our studies. I extend my thanks to the stakeholders of Our Lady of Grace Senior High School special Rev. Fr. Dr. Paul Attah-Nsiah, Rev. Fr. Sylvester Frimpong, and FAPIM company Limited for their support and prayers. I also like to thank my Wife Mrs Gloria Amoah for her advice and support. Finally to my head master, Mr Manfred Owusu and the entire teachers of Fufuo Methodist J.H.S.

DEDICATION

I would first of all like to dedicate this piece to the almighty God who kept me in good health and saw me throughout my studies. Special dedication to my supervisor, Dr. De-Graft Owusu-Manu and his family, and to my beloved wife Mrs Gloria Amoah and My lovely Son and Daughters, Eucharist Ampofo Amoah, Kirra Agyeiwaa Amoah and Marry Lynn S. Amoah and my entire Class mate MSc project management 2018.

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CHAPTER ONE

GENERAL INTRODUCTION TO THE RESEARCH

1.1 INTRODUCTION

This chapter highlight the background of the study, statement of the problem, aim, and objectives. It further justification the reason for the research, Scope of the study and outline the methodology for the study.

1.2 BACKGROUND

In recent years, a number of emerging economies have begun to play a growing role in the finance of infrastructure in part of Africa (Foster, 2009). Any government in sub-Saharan Africa that implementing appropriate policies for financing infrastructure will gain essential ingredient for success (Badu et al., 2012). The greater involvement of private investors and the design of economically rational financing structures can mitigate housing deficit problem (Ehlers, 2014). Big investors commit a bigger portion of their fiscal capitals to infrastructure when they see a suitable strategy proposal for investable projects. To ominously enhance infrastructure finance, one needs to tap the immense resources of capital markets, which thus far have been underutilized. To help to make infrastructure more appealing for the private investors is a greater variability of financial implements for infrastructure finance and would permit a better modification of risk among the stakeholders. Danyansah (2017) projected a metaphysis and empirical bases that, despite the housing deficit has reached 1.7million units and expected to reach two million by 2018, there is a need of billions of USA dollars to bring the ontological sand castle in to reality (Oti-Agyen, 2017).

Expenditure has been rising steadily due to increase in demand for physical infrastructure both in the private and the public sector Antwi and Atta Mills (2013). To ensure private sector participation to overcoming the housing deficit, there is a need for motivation, cost control and technique to monitor their investment performance.

The appraisal techniques listed by Fugar (2009) are much interested in selecting best investment at the initial stage of a project. Irani (2010) presents evaluation as a life-cycle process, that goes through the life cycle of a project, rather than as a hurdle that needs to be cleared to ensure financial approval. In an investment life cycle (Al-Jibouri, 2003) study indicate effectiveness of some commonly used monitoring systems, in detecting deviations from the planned cost and performance. The monitoring systems used are: Leading parameter technique, Variances method and Activity based ratios technique also (Lukas and Pecce, 2008) found out ten variables why earned valve analysis doesn't work for cost control as: budget incorrect, and management influence etc.

A cost for infrastructure is influence by exchange rate and inflation or relative price changes as the major factors affecting the final cost of a construction project (Abera, 2015). A study also assessed the cost performance of construction projects in Malaysia and it revealed that 92% of construction projects were overruns it planned cost Memon et al (2012). Conflict of interest, bribery, embezzlement, kickbacks, tender manipulation and fraud are observed corruption practices in the Ghanaian infrastructure projects delivery system. The severity of corruption practices have led to huge budget (Anvuur et al., 2006) for projects in Ghana (Osei-Tutu et al., 2010). This gnosiology empirical (Oti-Agyen, 2017) studies shows that earned value analysis fail to control project cost due to demerit point out by Parikh (2017), Buyse et al. (2010) cited from Fleming and

Koppelman (2004) and Valle and Soares (2006) provides the means for integrated management of schedule, progress and cost based on 3 variables: Planned Value (PV), Earned Value (EV) and Actual Costs (AC), as well as the related Cost Performance Index (CPI) is required, over budget or under budget can contribute inefficient use of earned value for project performance. A study suggested that, there is need for policy intervention to make the cost of doing business favourable to the private sector Quartey and Afful-Mensah (2014). Foreclosure discounts or force sale value are on average at 27% lower than the actual market value of an investment. In good practice it is better to used forced sale value over earned value, when comparing cost performance of an investment (Campbell et al., 2011). A study justify that, intensified the search for more innovative means of delivering infrastructure projects will help to achieve value for money (Osei-Tutu et al., 2010). The policy for infrastructure development is now vital in Ghana Badu et al (2012). The procurement act 2003(663), and amendment 2016 act (914) is not sufficient to manage corruption Namur et al (2006). Project budget, and cost control mechanisms recommended by PMBOK (2017) cost performance index depend on planned cost, earned value and actual cost. The third variable actual cost is only known by the contractor, also the earned value for the contractor is actual cost to the client, it means that earned value management favours contractor more than the sponsor, client or financer. Therefore there is a need for a technique to monitor value for money for the client and control unacceptable budget, and enhancing confidence in public private partnership.

1.2 STATEMENT OF THE PROBLEM

The emerging markets in developing countries require a major up stand in infrastructure investment to alleviate growth constraints. Financing of infrastructure investments poses

a number of challenges around revenue streams associated with policy uncertainties (Bhattacharya et al., 2012). Maafo (2017) said contractors intentionally inflate the cost of infrastructure. The experience from China suggested that it is necessary to design an economic policy that improves the physical infrastructure for sustainable economic growth in developing countries (Sahoo et al., 2010). Intensified the search for more innovative means of delivering infrastructure projects will ensure value for money Osei-Tutu et al. (2010).

Increased investment must be underpinned by better policies (Briceno et al., 2004). As part of infrastructure policy recommended by scientific researchers, the Government of Ghana have implemented the Public Procurement Act 2003 (Act 663) and amendment Act 2016 (Act 914) as a policy to ensure value for money in procurement activities and PPP Act 2003 (Act 663). Despite innovative policy: conflict of interest, bribery, embezzlement, kickbacks, tender manipulation and fraud have taken control of Ghanaian infrastructure projects delivery system and infrastructure deficit problem is increasing day by day Anvuur et al. (2006) and (Osei-Tutu et al., 2010).

Earned value analysis as a cost control technique, study says it favour contractor more than client, because all the analysis is based on three variables: planned cost, earned value and actual cost, which fail to consider the market value and force sale value Campbell (2011). However, where corruption is deeply embedded, breaking the links among participants in the various stages of project delivery may be the only way to improving value for money Wells (2015). To ensure value for money there a need to evaluate project performance, that will not only depend on the initial planned cost or budget cost, earned value and actual cost variables PMBOK (2017). But also make

consideration on: market value, force sale value, earned value and actual cost incurred by the financier. To monitor inflated infrastructure project cost, planned cost or budget cost should not exceed force sale value of that project. Average forced sale value is 27% less of the market value of the project. Empirical research had provided many techniques and tools for monitoring project performance that are very effective for project management as indicated by Buyse et al (2010) cited from (Caletka et al., 2009) includes: Critical Path Method Scheduling (CPM) Harris and McCaffer (2013), Work Breakdown Structure (WBS), Earned Value Management (EVM) and Value Management or Risk Management VM/RM.

On the other hand (PMBOOK, 2017) recommend: expert judgement, Data analysis, to completion performance index, and project information management system, as a control cost tools and techniques. The traditional theoretical view holds planned value (PV), earned value (EV), and actual cost (AC) for data analysis (Soares et al., 2006). The variables provided, it is clear that all variables depend on the initial budget for the work to be perform for accuracy that ignore market value which help to determined investment performance in economics. That has called for research in to another technique that will not depend solely on the initial budget but further look at market value, return on investment, force sale value and value for money at the project life cycle. The following gaps in the used of cost performance index was the motivational factors for further research: One; the used of economic component only for end value analysis and ignore efficiency and effectiveness that has be recognized by project management professionals for project cost control PMBOK (2017). Two, to point toward the strength of the management system of the contractor, the cost performance index is utilized. This support the argument that, cost performance index favour contractor as

compare to investor Payne (1990). Three, most management tools and techniques recommended by PMBOK (2017) for project cost control is solely interested in project completion, without putting necessary attention to returns on investment, cost performance index is no exception. Earned value management (EVM) does not have a check system for quality and value of work being one of the major shortcoming of EVM since it only checks whether the work is on time and within financial plan (Parikh, 2017). Finally the actual cost to contractor is different from actual cost to the sponsor or financier, in this case which actual cost is best to use for value for money.

New infrastructure policy and technique is needed to ensure trust in the infrastructure financing Badu et al., (2012) corruption reduction in infrastructure financing Wells (2015) and gaps in the used of earned value analysis (cost performance index) Parikh (2017) are the empirical variables that have initiated this case study during the construction of our lady of grace senior high school (OLAG) for scientific investigation after these questions were asked by the donors: if the budgeted cost is inflated, what is the assurance that, there is value for money. And what is the assurance that our investment in these infrastructures are performing on the market. These questions called for the immediate study to add knowledge on how to detect high price project despite cost performance index is on track.

1.3 AIM AND OBJECTIVES

1.3.1 AIMS

The primary aim of this study is to develop a technique to monitor investment performance as a means of detecting, high priced, high budget and cost inflated projects.

1.3.2 OBJECTIVES

To successfully accomplish the aim of this research, the following specific objectives have been outlined:

1. To identify the tools and techniques used to monitor investment performance in the construction industry.
2. To identify the components of value for money on the pricing of physical infrastructure projects.
3. To identify what goes into market value and earned value when monitoring the cost performance.
4. To develop a technique to monitor investment performance in the construction industry.

1.4 RESEARCH QUESTION

1. What are the existing tools available to monitor investment performance?
2. What are the components when determining value for money?
3. What goes into market value and earned value, when monitoring the cost performance of a physical infrastructure?
4. What is the percentage discount or increase on the market value, when determine forced sale value, auction value, and cross price.

1.5 JUSTIFICATION OF THE RESEARCH

There are limited scientific researches on the tools and techniques used to monitor highly cost, high budget and inflated project in the construction industry Wells (2015). Contractors intentionally inflate the cost of infrastructural project due to lack of limited techniques and pragmatic ways of detecting cost inflated projects Maafo (2017). The cost

performance index used for cost control management favour contractors more than the client. There is no assurance for value for money, because the planned cost can be inflated due to corruption and the procurement act 2003(663), and amendment 2016 act (914) policy in Ghana have fail as a result of tender process manipulated or influence that will result in over pricing due to, lack of policy adequate mechanism to monitor inflated project. Wells (2015) and Payne (1990). Intensified the search for more innovative means of delivering infrastructure projects will ensure value for money Osei-Tutu et al. (2010) and Hayes (2001). If the projected objectives of this study are successfully achieved, it will fill the following gaps in the literature: First, it will serve as an indicator to inform client, if a project budget have being inflated or not. Secondly, it will serve as a technique to monitor value for money on all private and public physical infrastructural projects. Three, it will serve as a technique to indicate if there is a positive or negative profit on real estate developer's investment. Finally it will add up to the existing techniques used to monitor investment performance in the construction industry.

1.6 SCOPE OF THE STUDY

They are many areas that are sufficiently open to undertake investment (Kolupaev et al., 2015). The study is march interested in the investment in the construction industry by first conduct a critical scientific search on tools and techniques used to monitor investment performance in the construction industry, secondly, identify the components of value for money on the pricing of physical infrastructure projects Walliman (2011). Thirdly, Identify what goes into market value and earned value when monitoring the cost performance and finally, develop a technique to monitor investment performance in the construction industry.

Since the construction industry encompasses a worldwide geographical area with a multi mix Knowledge areas PMBOK (2017). The case study was focus on project cost management section of the knowledge areas in the project management body of knowledge because of the vital cost policy of the project used for the case study and the interest of the stakeholders to design a technique to monitor value for money on all physical infrastructural projects. The end result can be generalized in all construction of physical infrastructural projects in the construction industry in the world for public, private and a partnership when the state and individuals to undertake projects, to monitor worth for cash at hand. Precisely the case study will cover the construction of Our Lady of Grace Senior high School projects at Manponterg in the Kwabre east district (Yin, 2013) and focus on repeated structures: Six number dormitories, six number mistress residences, three number Teachers staff residence and Auditorium.

1.7 METHODOLOGY

The study was based on pragmatic research philosophy approach because of its ability to combine both, the positivist and interpretivism positions within the scope of a single research and the nature of objectives with existentialism philosophy adopted. Pragmatism allow a deconstructivism paradigm that advocates the use of mixed methods in research and mono-methodology position Andrew (2007) and Tashakkori and Teddlie (1998, 2002).

The research strategy adopted for this study is the mixed method that allow for the application of quantitative and qualitative date analysis. The qualitative method will deal with the closed ended questions, to ensure scientific logic of deduction (Snieder and Larner, 2009). Questionnaires with summated ordinal scale was used, while the

qualitative strategy adopted will emphasize on open ended question and the secondary data from the project document for our lady of Grace Senior High School for the betterment of inductive development of new technique for monitoring the investment performance in the construction industry Cresswell (2003). The mixed method was adopted due to the nature of objective set for the study; also the data require for the study encompass both primary and secondary. The data will be given further metaphysis approach to look in to the cosmology, theology, anthropology and ontology of the date and finally epistemologically exam the result of quantitative and qualitative for the development of the fourth objective. Oti-Agyen (2017). The construction industry encompass a worldwide geographical area, a case study in Ghana will be adopted, precisely on the construction of Our Lady of Grace Senior high School projects at Manponteng Ashanti (Yin, 2009, 2013). The study will focus on five structures in our lady of grace senior high school project documents, example six number dormitories, six number house master or mistress residences, three number Teachers residence and Auditorium.

A purposive sampling adopted for the study due to the heterogeneous nature of construction projects and the most technique used for research in the field of construction because of it unlimited construction geographical area Marshall (1996). The sample size is limited to the construction project for our Lady of grace senior high school. The primary data will be gathered from targeted professionals with a structure questionnaire be administered four members each: project management professional (PMP), Ghana Institute of surveyors (Land survey, Quantity Survey, Valuation and Estate Survey), Ghana Institute of Construction (GIOC), cost engineers and sponsors of Our Lady of

Grace Senior High School. The secondary data will be gathered from the construction project documents of our Lady of Grace Senior High School.

Statistical Package for the Social Sciences (SPSS) will be applied to test the variables with the help of relative important index to analyse the data. The values will be rank with relative important index (RII) as used by many researchers to determine the influence of values and the impact of variables and trend analysis will be used to analyse the secondary data for the formulation of the new technique to monitor investment performance in the construction industry.

1.8 ORGANIZATION OF THE RESEARCH

This study will consist of five chapters; the chapter one is the introductory chapter which encompass the background, statement of the problem, aim, objectives, justification of the research, scope of the study, and methodology. The chapter two is the literature review that will telescope into the need for infrastructures in the developing countries, project financing policy and strategies, public financing policy, private financing policy, compare cost of privet project to public projects, corruption into infrastructure development, technique for cost management techniques control, investment appraisal techniques, technique for monitoring infrastructure investment performance and the weakness of cost performance index. The chapter three is the research methodology, which detail research philosophy, research strategy, research approach, instrument design, Sampling technique, data type. Chapter four is the stage for the analysis, discussion of result, and development of technique for monitoring investment performance and test and validate the technique on practical completed projects. The last chapter is chapter five that is the summary, conclusion and recommendation, it focus on

review of objective, summary of findings and further research. Figure 1.1 outlined the research study process.

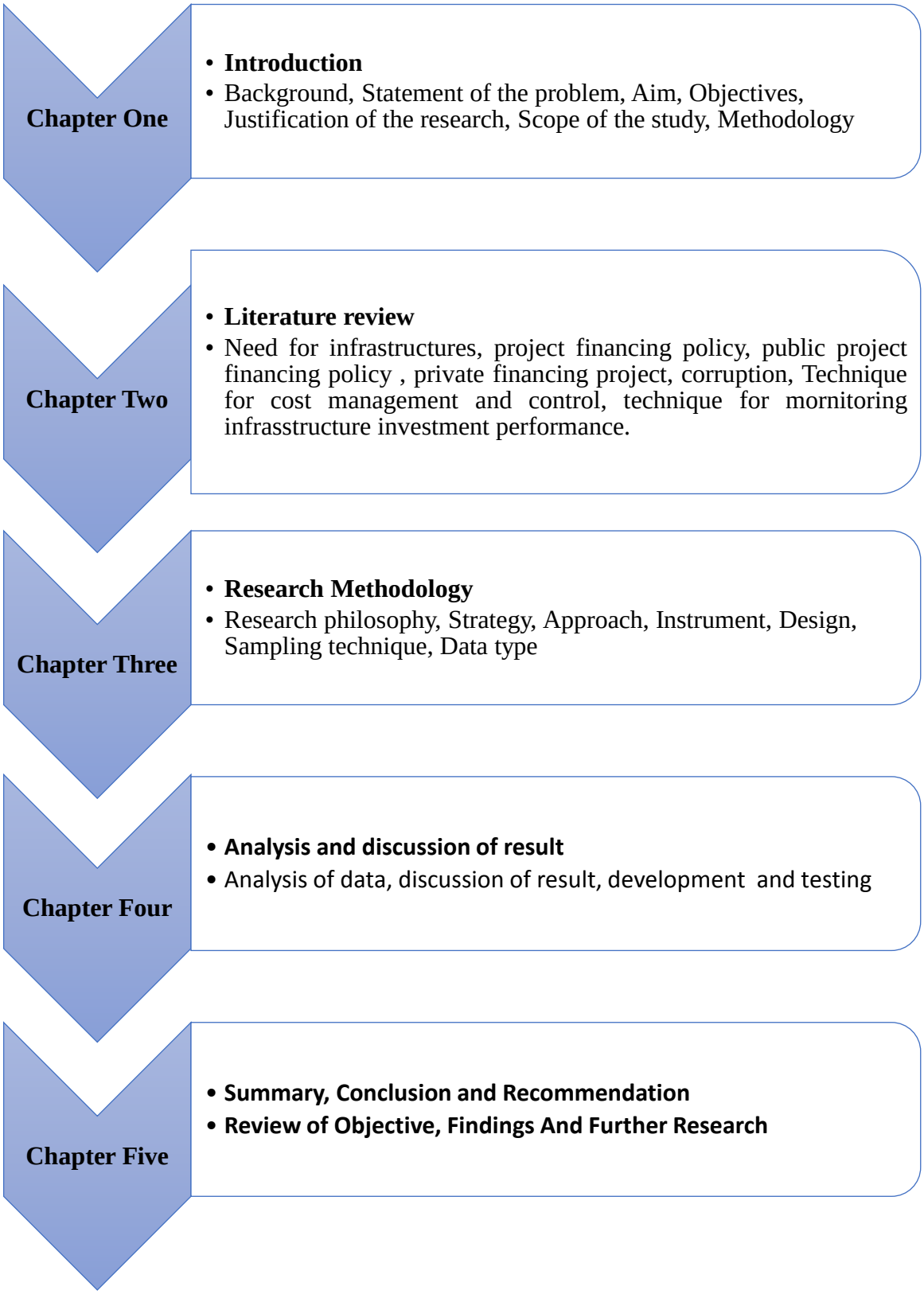


FIGURE 1.1: OUTLINE OF THE RESEARCH STUDY PROCESS

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

The study will review the literature on the need for infrastructures, project financing policy, public project financing policy, private financing project, corruption, technique for cost management and control, technique for monitoring infrastructure investment performance and scientific research processes

2.2 NEED FOR INFRASTRUCTURES

The rapid increase in population in Ghana has resulted in a large housing deficit, especially in urban areas. It is projected that the country needs at least 1million housing units annually while supply is estimated at 35% of the total number of housing required. Studies by other researchers put the country's overall annual deficits between 70,000 and 120,000 housing units with only 35% maximum of the annual estimated requirement being supplied (Nyarko et al., 2014) from (Ackah et al., 2014).

Though Ghana lacks a comprehensive housing policy, it is possible to distil distinct policy focus on housing in line with global development over the years (Nyarko et al., 2014). Ghana housing deficit is in short supply of about 1.7 million and it is projected to go up 2 million units in 2018. This required the introduction of pragmatic policies and private sector motivation techniques closed the gap (Denyansah, 2017). One of the most common challenges African faces is a shortage of affordable housing and high price of construction.

2.3 PROJECT FINANCING POLICY

In 2003, the Government of Ghana enacted the Public Procurement Act, 2003 (Act 663) to address the inadequacies in the public financial system. A ground-breaking procurement tactic which proposes worthy projections for the future of the over-all construction sector is a partnership between the state and individuals. Elements backing the efficacious putting into practice the PPP since the introduction in the Ghanaian construction sector or industry (GCI) since 2004; have not yet been effusively acknowledged. In the execution of the Asutsuare Water Treatment Plant Project and the Kojokrom Market Development Project, the perilous attainment dynamics for the Ghanaian construction sector was explore by a study through reviewing and analyzing the two successful projects which was a partnership between the government and individuals: and these end up giving these need: strong community support, constant communication, government commitment and support, relationship, project profitability openness and capable private partner. The familiarities in the case studies are additionally equated with worldwide practice. To expedite the application in GCI the PPP policy, management and concrete inferences are delivered. To make dispassionate generality and appraisal with other nation's empirical surveys should be embraced by future research (Osei-Kyei & Chan 2017). Inappropriate project choice, high prices, poor quality, excessive time and cost overruns, inadequate maintenance, and low returns, among other challenges, impact negatively on economic growth and poverty alleviation (Wells, 2015).

The thing that is preventing the growth of infrastructure investment, despite the fact genuinely extended period interest rates are small is possibly the resource of extended time finance. The reply of issues to strategy makers, because infrastructure is a key

determinant of the growth possibility of an economy. This paper identifies a portion of vital obstacles for finer and more excellent infrastructure finance and investment. Particular case such impediment is the absence of investable undertakings. Often, developments are not legitimately outlined and contractual agreements imply a sharing of risks and returns that create the wrong incentives among the various partners. The more stupendous inclusion of private moguls and the outline of economically rational financing structures could relieve such issues. They likewise enhance the effectiveness and fruition of infrastructure developments. A pipeline of investable undertakings might permit huge moguls to submit a more amazing offer of their financial assets to infrastructure. Tapping the limitless assets of capital markets, which so far have been under exploited, could significantly boost infrastructure finance. To make infrastructure more appealing for investors and permit a better diversification of risks, a grander diversity of financial monitoring modus operandi for infrastructure finance would help (Ehlers, 2014). Value Management is a philosophy, set of principles and management methodology for improving organizational decision making and value for money (Kelly et al., 2014)

2.4 MONITOR YOUR INVESTMENTS

Willis (2018) and Cecutto (2018) stated ways to monitor your investments, as: assess your portfolio's performance**,** evaluate your asset allocation**,** review your individual funds**,** and review your future goals.

2.5 FIVE STRATEGIES OF A SUCCESSFUL CONSTRUCTION PROJECT

Leslie (2015) mention five strategies of a successful construction project manager that are: create a flow of communication, make a habit of continuous planning, observe and ask questions, use tools to monitor costs and budgets, and implement automated reporting systems. (Leslie, 2015) said the five strategies go beyond project management basics to prepare you for the intricacies of the role and direct your efforts toward success.

2.6 TOOLS AND TECHNIQUES USED TO MONITOR PROJECT PERFORMANCE AND INVESTMENT PERFORMANCE IN THE CONSTRUCTION INDUSTRY

There are many available tools and techniques used to monitor project performance or investment performance, but it depend on the type of investment, in the construction industry the common ones used are:

2.7 KEY PERFORMANCE INDICATORS FOR CONSTRUCTION FIRMS

Bassioni et al. (2008) tabled some of the key performance indicators for construction firm which was group in to two, the project performance and company performance. The project performance was including construction cost, construction time, predictability-cost, predictability time, defects, client satisfaction product, and client satisfaction service. On the other hand, company performance was interested with safety, profitability and productivity. Looking at this two performance, how will the client be assured that the investment he/she entered in is safe know matter the implication.

2.8 TECHNIQUES USED TO MANAGE PROJECT IN THE CONSTRUCTION INDUSTRY

Buyse et al. (2010) mention methods that every effective project manager should have at his disposal, methods that includes: Critical Path Method Scheduling, Work Breakdown Structure, Earned Value Management and Value Management or Risk Management

2.9 PROJECT MANAGEMENT TOOLS

Maserang (2002) project management is a challenging task with many complex responsibilities. Fortunately, Project managers should choose a project management tool that best suits their management style. Program Evaluation Review Technique (PERT) and Gantt Charts are two of the most commonly used project management tools and are described below. Both of these project management tools can be produced manually or with commercially available project management software

2.10 KEY PERFORMANCE INDICATORS (KPI'S)

Performance measurement criteria vary from project to project. Despite much work on the subject, there is no commonly agreed tool or technique for performance measurement on projects. To bridge this gap, a research targeted to investigate the perception of the key performance indicators (KPIs) in the context of a large construction project in Thailand. The study indicates key performance indicators in perspective of various construction stakeholders (client, consultants, and contractors). Findings indicate that the traditional measures of the iron triangle are no more efficient to use Ogunlana (2010).

2.11 INTEGRATED PERFORMANCE INDEX

Integrated Performance Index was developed for performance measurement of projects, based on their experiences of working on the management system. The model identified three project phases and dealt with performance elements such as performance indicators or key factors associated with each phase; the stakeholders; and the performance measurements. The three project phases identified are the project selection phase, the project execution phase and the implementation phase Pillai et al. (2002)

2.12 CONSTRUCTION PRODUCTIVITY MEASUREMENT MODEL

Computerized activity sampling-CALIBRE approach is a Construction Productivity Measurement Model One tool for construction productivity measurement of on-site performance (Winch and Carr, 2001). A hypothetically major component in the financial plan and plan of any construction development is the structural concrete component of which this model pays attention to. Established on activity, founded on a recognized operative on a specific job, at a particular place, at a period in time, performance is measured.

2.13 PROJECT VIABILITY MEASUREMENT MODEL

The Analytical Hierarchy Process (AHP) was advanced to measure project feasibility performance by Project Viability Measurement Model one model according to Saaty (1980). To define the weights and urgencies of innumerable dynamics relative to projects, AHP has been broadly used for a multi objective decision-making approach that employs pair-wise comparison as such. Project attainment can also be measured by this skill (Chua et al., 1999) and the original feasibility of projects for investment opportunity (Alidi, 1996).

2.14 PROJECT QUALITY MEASUREMENT MODELS

Project quality performance model, founded on vital implements advanced by Chan (2001), three models for assessing construction project quality exist being blueprint by the Quality Performance Measurement Task Force (QPMTF) of the Construction Industry Institute (CII) for determining quality execution of works on engineer-procure construct (EPC) projects in the United States (Glagola et al., 1992; Stevens, 1996); and Quality Assessment System in Construction (QLASSIC) model developed by the Construction Industry Development Board of Malaysia to ascertain the contractor's performance in terms of quality of the finished product (CIDB, 2001b).

2.15 EX ANTE DISTRIBUTIONAL ANALYSIS

For fresh or remodelled plans deficient or restricted in examination of target populations and other stakeholders, this technique is in specifically worthwhile. The allowance for the modification and enhancement of programs before employment, due to the fact that programs are possibly to be better targeted as a result, despite its upfront costs, investment in this method can be very cost proficient in the long run. Instrumental evidence about the political significances of first-hand programs can be delivered by Distributional analysis as well (Gita et al., 2007).

2.16 COST-BENEFIT ANALYSIS

Infrastructure or agricultural investment projects where benefits and costs can be certainly articulated as a fiscal value often uses this method. Nevertheless there have been many novelties in cost-benefit analysis to solve this concern. Expectations and anticipating is profoundly depended upon by Cost-benefit analysis even though less

appropriate for programs premeditated to be functioning in environments which are unsteady (Gita et al., 2007).

2.17 CAUSALITY FRAMEWORKS

This technique is appropriate for all programs; the growth of a good causality framework is a vivacious base for good program strategy and M&E. The practice underlying the growth of the causality framework is imperative and regularly involves multiple stakeholders in discussions and training of program staff if they are not familiar with the method. Therefore developing good causality frameworks can be time and labour demanding (Gita et al., 2007).

2.18 BENCHMARKING

For programs that depend on execution pointers to guide management decisions, benchmarking is the most appropriate tool. It is habitually used by higher-level policymakers to ascertain thriving and ailing programs that are proper for appraisal. Benchmarking backs the implementation of genuine and perplexing objects in programs. It can be problematic to discover correct benchmarks since of data restrictions or absence of collaboration from affected programs (Gita et al., 2007).

2.19 PROCESS EVALUATIONS

Building resolutions mutually at the operation and observing stages of the strategy sequence is informed by this method. Applying this technique can include extraordinary costs in emerging an apt strategy and warranting quality deprived of acknowledged criteria of excellence and its indispensable circumstantial way (actions contrast in each

setting). The minute excellence is warranted and can deliver admirable worth-for-money data process evaluations be likely to be very reasonably priced (Gita et al., 2007).

2.20 EXECUTIVE EVALUATIONS

Compelled by principal organisations, like the planning department agency or finance office, this technique is seemly right in the background of superior assessment resourcefulness, when these for illustration have a craving (i) make available all-inclusive execution information to parties to contract as against those openly part of a program like the public, parliament and budget offices and (ii) to supplement other additionally concentrated and in depth assessments used in the state with a swift appraisal manner (Gita et al., 2007).

2.21 IMPACT EVALUATIONS

This method is acknowledged to have been contributory in transmitting information all over the world and yield very consistent algebraic outcomes. Concerns have been deliberated of the principled and governmental magnitudes of utilizing randomized trials. Evaluations have need of a substantial period and resource investment but budget constrictions are each time a drawback to the utilization of this method. As such the method is most fit for purpose in terms of grander courses with high attention (Gita et al., 2007).

2.22 ASSESSMENT OF INDICATORS & ASSESSMENT OF EVALUATIONS

Facilitating specifically the augmentation of M&E aptitude in establishments plus warrant sustainability of M&E ingenuities, these methods can be very cost operational. In the setting of inadequate financial plan there is often diminutive money left for M&E

excellence mechanism after assessments have been finalized which is an obstruction to the use of these methods (Gita et al., 2007).

2.23 COMPETITIVE STRATEGY WHEEL

Porter (2008) develop the wheel of competitive strategy in their wheel, he factored Target market, marketing, scale, distribution, manufacturing, labour, purchasing, research and development, finance and control, and product line. From this competitive wheel, it factor enterprise environment factors in competitive decision. Why earned vale management is only interested in planned value, earned vale and actual cost for cost performance management. Note that if earned value and actual cost is used to manage a cost performance of a project, and the project is successfully completed it these not mean the owner or the investor will get profit or even the money invested in the project.

2.24 BUILDING A CONCEPTUAL FRAMEWORK FOR MEASURING BUSINESS PERFORMANCE IN CONSTRUCTION: AN EMPIRICAL EVALUATION

Accounting for deliberate work done and accounting for overall trade strength as Bassioni et al. (2004) posit are the two basic tenacities in construction businesses, as per the conclusions of a survey and in line with business literature that business performance measurement has been labelled to address. By observing the literature there is clear indication that most tools and technique available is much interested in meeting what have being planned, without considering in details if there is viability for the project.

2.25 PROJECT COMPLETION

Harris and McCaffer (2013) develops most techniques used to manage project from pre-contract to construction to post construction, this book method used to manage construction project were stated as total quality management, network diagram, Gantt-chart etc.

2.26 PROJECT MONITORING SYSTEM MONITORING SYSTEMS

Al-Jibouri (2003) this paper reports on a research to investigate the effectiveness of some commonly used monitoring systems, in detecting deviations from the planned cost and performance. The monitoring systems used in this work are: Leading parameter technique, Variances method and Activity based ratios technique.

Hayford (2013) the report present the findings of a study based on administering of questionnaires to project personnel drawn from SMEs operating in the construction sector of Ghana. The response data were analysed to identify the techniques and tools which are most utilized. The findings showed that top three risks faced by SMEs in construction project are price fluctuation, inflation and delays in payment or lack of funds. Checklist, brainstorming and benchmarking were the top three tools utilized in project risk management.

According to Lukas and PECCE (2008), a quantitative project management technique for forecasting ultimate project outcomes and appraising execution of project, based on matching the budget of work packages to real costs and scheduled to progress is known as Earned Value Analysis (EVA).

2.27 EARNED VALUE MANAGEMENT (EVM)

To control a development which depends on measurement of the execution of work resorting to a Work Breakdown Structure (WBS) is a project management methodology known as Earned Value Management (EVM) and this consist of an incorporated schedule and budget based on the project WBS. Earned Value Management System (EVMS) – the procedures, templates, process and tools used by an institution to perform earned value management. Except the earned value management in use on your project have been concluded, it will be enormously difficult to obtain accurate results that you can do earned value analysis calculations for any project. An earned value management system in place is a requirement to easily use Earned Value Management for every institution. Based on the Lukas and PE CCE (2008) experiences, listed below are the top 10 motives why Earned Valve Analysis doesn't work: Incomplete requirements, No documented requirements, WBS incomplete, WBS not used or not accepted, integrated (WBS-Schedule-Budget), Change management not used or ineffective, Plan not, Schedule and/or budget incorrect, Management influence and/or control, Incorrect progress and Inadequate cost collection system.

2.28 ADVANTAGE AND DISADVANTAGE OF EARNED VALUE MANAGEMENT

Management's ability to see whether the project is on track in terms of work progress or work done per Parikh (2017) first and foremost advantage earned value management. The analysis of which project is running the best compared to others and reasons for its performance in instances of the company running multiple projects then earned value management can be an effective tool in comparing the performance of different projects.

2.29 DISADVANTAGE OF EARNED VALUE MANAGEMENT

The quality of the work can only be seen once the project is completed since earned value management does not have a check system for quality of work but only checks whether the work is within budget and on time so the project may be completed within budget and on time but quality could be evaded in the end. There are benefits as well as limitations of earned value management as posited above and before any company implants earned value management for the project, a careful analysis of both benefits and limitations must be considered before taking any decision (Parikh, 2017)

2.30 CONTROVERSIAL TOOL

The provision of a dispassionate accounting of project presentation in terms of its, budget, schedule and scope is the use of Earned Value Analysis which is favorited yet contentious implement for project management. How much of the period and cash planned for a project is earned is measured by Earned Value Analysis as claimed supporters. Its critics say Earned Value Analysis can falsify accurate project standing in both expenditures and schedule (Usmani, 2012).

2.31 EARNED VALUE ANALYSIS

In the development of the three tenets that point toward the comparative strength of an undertaking, Earned Value Analysis utilizes the financial plan and premeditated timetable alongside what has essentially transpired. These values are: Earned Value, which is the total budgeted cost of complete tasks; Actual Cost, which is the total expenditures to-date and Planned Value, which is the budgeted cost of tasks that should be complete (Usmani, 2012).

2.32 EARNED VALUE MANAGEMENT

PMBOK (2017) explained that Earned value analysis is used for analysis the performance of a project in many ways, this includes: cost variance, schedule variance, variance at completion, cost performance index, schedule performance index, estimate at completion, estimate to complete, and to complete performance index.

Cost variance is equal to earned value minus actual cost and the result is interpreted positive means under planned cost, neutral means on planned cost, and negative means over planned cost. Schedule variance is equal to earned value minus planned value and the result will be interpreted, positive means ahead of schedule, neutral means on schedule and negative means behind schedule. Variance at completion is equal to budget at completion minus estimate at completion and the result will be interpreted, positive means under planned cost, neutral means on planned cost. Cost performance index is the earned value divided by actual cost and the result is interpreted, greater than one is under planned cost, exactly one is on planned cost, less than one is over planned cost.

Schedule performance index is equal to earned value divided by planned value; the result is interpreted greater than one means ahead of schedule, exactly one means on schedule, less than one means behind schedule. Estimate at completion is equal to budget at completion divided by cost performance index or actual cost plus budget at completion minus earned value or actual cost plus bottom-up estimate to completion or actual cost plus (budget at completion minus earned value) divided by (cost performance index multiply by schedule performance index). Estimate to complete is equal to estimate at completion minus actual cost. Estimate to complete is also called re-estimate.

To complete performance index is equal to (budget at completion minus earned value) divided by (budget at completion minus actual cost) or (budget at completion minus earned value) divided by (estimate at completion minus actual cost). The result will be interpreted greater than one means header to complete, exactly on means same to complete, less than one means easier to complete. The lexicon definition define cost performance index as a measure of the cost efficiency of budget resource expressed as the ration of earned value to actual cost.

2.33 COST AND SCHEDULE PERFORMANCE INDEX

Cost Performance Index: Represents the amount of work being completed on a project for every unit of cost spent. Schedule Performance Index: Represents how close actual work is being completed compared to the schedule. SPI is computed by Earned Value / Planned Value. A value of above one means that the project is doing well against the schedule (Sharma, 2015).

From the above two definitions cost performance index will for all intents and purposes be the unchanged for the remains of the development as soon as a development is terminated/or low-priced, unless earned value or actual cost deviates ominously.

2.34 COST PERFORMANCE INDEX CAN BE UNRELIABLE

Cost performance index is reliant on actual cost for exactitude. If actual cost hardly ensures the inclusion of all fitting prices and expenses, Cost Performance Index can be erratic (Price, 2017).

2.35 DIFFICULT TO COMPARE PROJECTS OF DIFFERENT SIZES

The problem with cost performance index method is that it is difficult to compare projects of different sizes to one another. It would be better to have a measure that gave the health of the project regardless of its size. pmtips.net/blog-new/earned-reporting-cost-performance-index.

From the PMBOK (2017) lexicon definition, the earned value is the measure of work performed expressed in terms of the budget authorized for that work. From the above definitions, force sale value, market value, reserve price, time value of money, auction value, risk and quality were not considered in the analysis, only the earned value, planned value and actual value for completed work was considered.

2.36 ENTERPRISE ENVIRONMENTAL FACTORS

Despite the used of earned value and actual cost of a project, to analyse the cost performance of a project , there are other factor that affect the performance of the investor capital at every second of the project. This include**:** force sale value, market value, demand and supply, advance in technology, change in technology, global needs, accepted standard or quality, and percentage of risk.

2.37 MARKET VALUE

Market value is the estimated amount for which a property should exchange on the date of valuation between a willing buyer and a willing seller in an arm's-length transaction after proper marketing wherein the parties had each acted knowledgeably, prudently and without compulsion (assetvaluations.com.au).

2.38 FORCED SALE VALUE

Force sale value is a strategy used by some business expert people, if they fund out any either minute spend on an investment will amount to negative result due to environmental factors. Under involuntary auction situations that do not satisfy all the benchmarks of a standard market deal the amount that may realistically be expected from the trade of an asset is forced Sale Value. Replicating customarily a scanty promotion period deprived of evenhanded marketing, it is a price which rises from outlook under unexpected or characteristic circumstances.

Forced Sale is an incongruous manner of sale replicating a disinclined vendor circumstance and/or discarding under coercion or force. Founded on the expectations that the discarding of the possession is accomplished in a style replicating the status of a reluctant seller under situations of coercion or threat, the commended Forced Sale Value is arrived although devoid of an ample time of advertising for the trade of such possessions. The Forced Sale Value Basis is used in the event of determining what a person (s) expectation would be on auction. Also, the type of persons or company needing this information would be: Liquidation Companies, Insurance Companies, Banks, Business Owners and The general public (assetvaluations.com.au).

2.39 RESERVE PRICE

Reserve Price is the minimum price at which a property will be sold at a Public Auction. Relevant Sections of the National Land Code (Act 56 of 1965) state that the Reserve Price is equal to the Estimated Market Value of the property in question (Memon et al., 2012).

2.40 AUCTION VALUE

Auction Value (The Forced Sale Value) is determined through industry experience, by selling assets at an auction. The values at The Asset Valuations Group are all registered auctioneers, who work closely with the above companies. Moreover, the second way this Value is achieved, is dividing the Market Value Price by 25%. That usually gives us an accurate estimation (assetvaluations.com.au).

2.41 MANAGING CONSTRUCTION PROJECTS WITH EARNED VALUE MANAGEMENT

The problem of implementing earned value management Buyse et al. (2010) said "If earned value management is so good why is not earned value management used on all projects?" is the title of an article by the guru's Buyse et al (2010) cited from Fleming and Koppelman (2004)

Buyse et al. (2010) discuss problems of earned value management: external causes as (Scepticism, and unwillingness to know full cost in advance) and internal problems causes (terminology, and original purpose either big, or long term project). This shows that there is a problem with earned value management.

2.42 MUSTS TO IMPLEMENT EARNED VALUE ON ALL PROJECTS

In (Fleming and Koppelman, 2016) the contest it shows that you must define 100 percent of the Project's work scope using a work breakdown structure work breakdown structure (WBS) and feather says the most critical and most challenging requisite to employing earned value is to define the project's total work scope. This is a difficult task for any project, and particularly so for software projects. Yet, if you do not define what constitutes 100 percent of the assumed work, how can you measure the project's

performance in a definitive way? Without a 100% reference point, how can anyone ascertain whether you have completed 10%, 20%, or 25% of a job? Realistically, no one can define a new job with absolute precision. By above authority note; I can say emphatically that there is known way a construction project for medium and large project, the scope can be defined 100%. If it can be define why the need for contingency and management reserve.

Also note that construction project have it base on earth and there is no way you can predict 100% what the earth contains. So analysing project cost performance base on initial planned or rate and actual cost is not effective when doing underground construction or investing in construction.

2.43 EARNED VALUE MANAGEMENT PRACTICE IN EUROPE

De Marco and Narbaev (2013) ‘’earned value management practice in the European construction industry is found to be lagging behind other experienced countries and industries, despite earned value management having been found to be applicable’’. *Why European construction is lagging behind the used of earned value management.

2.44 EARNED VALUE (EV) = BUDGETED COST OF WORK PERFORMED (BCWP)

Buyse et al. (2010) said Earned Value (EV) = (BCWP) Budgeted Cost of Work Performed: this means that if the work is done as agreed , it will be pay as budgeted, the client have no stand to avoid payment even if the project is not viable due to enterprise environmental factors. So using earned value divided by actual cost can give you good cost performance index, but it does not mean the investor will benefit from his /him investment at the end of the project.

2.45 EARNED VALUE ANALYSIS PROVIDES THE MEANS FOR INTEGRATED MANAGEMENT

Valle & Soares (2006) EVA provides the means for integrated management of schedule, progress and cost based on 3 variables: Planned Value (PV), Earned Value (EV) and Actual Costs (AC), as well as the related indexes Schedule Performance Index (SPI) and Cost Performance Index (CPI). Note that over cost budget or under budget can contribute in efficient use of earned value for project performance.

2.46 IMPORTANCE OF A STABLE. CPI

Payne (1990) said there are numerous capacities where an unwavering CPI plays a significant role in the exploration of contractor data. First, the CPI can be applied to point toward the strength of the management system used by the contractor. In this part the CPI make available confirmation that the contractor is or is not proficiently applying his management system. A steady CPI affords "proof that (the contractor's], scheduling, planning, estimating, accounting systems and financial plan are still all employed collectively". An unsound CPI would specify that the contractor is not using his system in agreement with the contract stipulations. This support the argument that cost performance index favor contractor more than investor.

2.47 MODIFICATION OF EVM BY ADDITIONAL APPROACHES

Czemplik (2014) fundamental theory of the EVM is of deterministic manner. To model the construction activities in probabilistic manner, several writers recommended a few further tactics. More often, the Monte-Carlo mock-up has been utilized to create the three shapes of the elementary EVM curves, referring to: extreme, most probable and least possible. Construction site managers utilize prevailing computers in their routine

exercise, but spot-on usage of the Monte-Carlo mock-up and utilize of function of distribution of prospect which is acceptable for certain construction activities. This means there is a need to modify the EVM tools for construction purpose.

2.48 EVM DOES PREDICT FUTURE PERFORMANCE

According to EVM, Andrzej et al (2014), even the account of SV (schedule variance), which is used to designate the schedule efficiency, is articulated in a monetary units. Moreover, the Grounded on preceding execution status period, EVM does forecast future routine of the contractor. On the other hand, outstanding activities of the construction project should not be documented before the status control date but can be exposed to new risks. So, the EVM modification should lookout for imminent risks, in order to be efficaciously utilized for managing the time of a project.

Jonathan and Gayek (2012) this paper investigates space-system related contracts associated with U.S. Department of Defense Acquisition Category I (ACAT I) programs, the stability of the cost performance index, and an estimate-at-completion based on the schedule-cost performance index. It is shown that, for this class of contracts, stability of both quantities exists, but that the point at which this stability occurs is much later in the contract than for data sets previously considered in the literature. The results are valid for four subsets of the data, as well: (1) contracts with stable baselines, (2) contracts with full reporting history, (3) the collection of contracts for spacecraft, payloads, user equipment terminals, engineering models, software, and upgrades, and (4) contracts having a fixed total quantity''.

2.49 FACTORS AFFECTING COST PERFORMANCE: EVIDENCE FROM INDIAN CONSTRUCTION PROJECTS

Iyer and Jha (2005) Project manager's competence; top management support; project manager's coordinating and leadership skill; monitoring and feedback by the participants; coordination among project participants; and owners' competence and favourable climatic condition.

Hayes (2001) define cost performance index as '' the indicator for the aptitude of the contractor to regulate expenses and link the financial plan for those activities that have been consummated with the authentic expense at which the activities can be undertaken. It means cost performance index favour's contractor more than client.

2.50 PROFIT MARGINS

Fairley (1979) said Profit margin, net margin, net profit margin or net profit ratio is a measure of profitability. It is calculated by finding the net profit as a percentage of the revenue. Net profit is revenue minus cost.

Any person that invests in the construction industry is with the aim of getting project either the project is completed or note. So if cost performance index favour contractor to manage his actual cost as against earned value, then there is need to develop a technique for the client to also manage the profit margin during and after the project.

2.51 VALUE ENGINEERING IN CONSTRUCTION

Dell'Isola (1966) Value engineering is basically an organized approach to get more for every dollar spent. This research still stands by its objective to design a technique that will help to determine the value for money also improve value engineering. Cheah and

Ting (2005) in the conclusion its feather recommended the expansion of value engineering, which is also part of the objective of this research.

2.52 PROJECT RISK

Pollock et al. (2002) indicate that project risk can be sheared or transfer, depending on the type of risk. Since the research aim at development, it goes with risk and that risk need to be shared or transfer between the contractor and the investor depending on the magnitude of the risk.

Wee and Law (2001) a deteriorating inventory model taking into account the time-value of money is developed for a deterministic inventory system with price-dependent demand. This study applies the discounted cash flows (DCF) approach for problem analysis.

2.53 FORCE SALE VALUE

Campbell (2011) this paper uses data on more than 1.8 million house transactions in Massachusetts to show that houses sold after foreclosure, or close in time to the death or bankruptcy of at least one seller, are sold at lower prices than other houses. The discount is particularly large for foreclosures, 27% of a house's value on average. It is smaller for death-related sales at 5-7% of value and smaller again for bankruptcy-related sales at 3% of value (Canesi et al., 2016) analyzes Forced sale values vs. market values in Italy. Note that force sale value plays a major role in the investment performance.

2.54 ASKING PRICE IN HOUSING TRANSACTIONS

Han and Strange (2016) paper has considered, both theoretically and empirically, the role of the asking price in housing transactions. The motivation is that houses sell for less than asking price and for more than asking price. This suggests that asking price might not matter. However, a nontrivial share of housing transactions also involve a price equal to asking price, which would not be likely if housing transactions were simply auctions, with asking price simply serving as an empty description of the house.

2.55 CASE STUDY

Yin (2011) case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident.

Payne (1990) Case study is the field in depth study, is best method for testing weather the models, formula can be applies to the phenomena and give accuracy results (Magigi, 2015:54). The selected on-going project will take as sample for case study. The information will be gathered from a tender document, bill of quantities, contract documents, progress report and abstract sheets in support of provides necessary data for project cost and scheduling activities which will use to make suggestion toward the application of EVMS. This design is in line with objective one

2.56 STUDY AREA

Chaki (2016) description of the study area is very important detail of the study area Tserng (2015) case Information Considering real cases of construction supervision projects, this study analysed and studied various performance indicators, summarized the case developmental trend and project performance trend, and established a standard case

database. It's difficult to collect complete data for project. To investigate multifaceted occurrences within their perspectives, qualitative case study procedure offers implements for examination. When the method is utilized decorously, it becomes an appreciated method for science exploration to advance theory, develop interventions and evaluate programs. Applying qualitative case study research projects detecting the vital components for designing as a guide to the novice researcher is the he purpose of this paper at hand. An impression of the types of case study designs is provided along with general sanctions for writing the research questions, determining the "case" under study, developing propositions, a discussion of data sources and triangulation and binding the case. Study propositions, clear examples of research questions, dissimilar brands of case study designs to expedite bid of these philosophies are delivered.

2.57 CHAPTER CONCLUSION

There a many tools and technique available in the literature and each have its own advantage and disadvantage, example; investment appraisal techniques are much interested in selected the best investment (Fugar, 2009) where the other tools are interested in project completion.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 INTRODUCTION

The chapter three of the study detail the research methodology processes follow to achieve the aim and objective of the research, that include research philosophy, the strategy, approach, design, sampling technique, data type, data collection instrument, data analysis techniques, develop frank inflated cost monitoring technique, case study for the technique validation and testing and conclusion and recommendation.

3.2 PHILOSOPHICAL CONSIDERATION

The research philosophy adopted was pragmatic research philosophy approach because of its ability to combine both, the positivist and interpretivism positions within the scope of a single research and the nature of objectives with existentialism philosophy adopted. Pragmatism allow a deconstructivism paradigm that advocates the use of mixed methods in research and mono-methodology position Andrew (2007) and Tashakkori and Teddlie (1998, 2002).

3.3 PRAGMATISM PHILOSOPHY

Pragmatism philosophy has been referred by various literatures as instrumentalism, empiricism, experimentalism and utilitarianism; all these are fundamentally an epistemological identified by its theory of truth and meaning. The theory explains that truth can be known only through its practical consequence and is thus an individual or a social matter rather than an absolute reality in this point the study will follow the practical approach to collect and analyze data Oti-Agyen (2017).

3.4 INSTRUMENTALISM

Oti-Agyen (2017) explain that instrumental theory of value is based on the belief that our moral values are not external and objective but they are subjective in the sense that they are the product of society, these values are acquired through human experience, need and desires. The worth of any moral value is subject to test or verified by human experience through qualitative analysis.

3.5 EMPIRICISM

The word empirical is derived from the Greek noun empeira, meaning experience; this knowledge is acquired through observation of things around us with our senses. It further accepts that knowledge is obtained only from experience ((Oti-Agyen, 2017 cited from Schofield & Crum (1972).) said empirical or scientific knowledge that fall under empiricism portray human experience.

3.6 EXPERIMENTALISM

The experimentalism philosophers belief that truth is acquired through experiments and empiricism, it also support the argument that that truth should be evaluated base upon its demonstrated usefulness, also reconstruction or reorganization of experience is really just a way of saying that one must learn from one's experience in a work that avoids repeating mistakes and that contributes to one's ability to make more informed decisions in the future Hlebowitsh (2006).

3.7 UTILITARIANISM

Is generally held to be the view that the morally right action is the action that produces the most good. There are many ways to spell out this general claim. One thing to note is that the theory is a form of consequentialism: the right action is understood entirely in terms of consequences produced. What distinguishes utilitarianism from egoism has to do with the scope of the relevant consequences. On the utilitarian view one ought to maximize the overall good that is, consider the good of others as well as one's own good Driver J. (2014).

3.8 EXISTENTIALISM PHILOSOPHY

Existentialism means existence precedes essence (Oti-Agyen, 2017) it concerned with structure in their concrete existence. This support the use of structured question to collect data from existence precedes information.

3.9 EPISTEMOLOGICAL

Epistemology is also called Gnosiology it's derived from the Greek word 'episteme' which means theory of knowledge, which deals with critical examination of nature, the scope, the limit and the criteria of knowledge. Epistemology in research accepts two paradigms of philosophy that is positivist and interpretivism Fordjour (2015). The positivist approach to scientific investigation is based on acceptance as fact that the world around us is real, and that we can find out about these realities.

There is an order made up of atomistic, discrete and observable events. Knowledge is derived using scientific method and based on sensory experience gained through experiments or comparative analysis, its follows mathematical models and quantitative analysis to validate, reject or refine hypotheses while positivist approach is the surveys

and observations with qualitative analysis to seek meaningful relationships and the consequences of their interactions, it is more subjective by using inductive methods and value data Walliman (2011) and Farrell et al., (2011). The data will be given inductive and deductive analyze by inductive metaphysis approach to look in to the cosmology, theology, anthropology and ontology of the date and finally epistemologically exam the result of quantitative and qualitative for the development of the fourth objective Oti-Agyen (2017).

3.10 PHILOSOPHICAL POSITION

This case study stands in the position of pragmatism school of philosophy what accept that, truth can be known through its practical consequence. Therefore it allows developing knowledge through critical examination on practical work and experience acquired on it. Oti-Agyen (2017) pragmatism view on epistemology follows identification of problem, refinement of problem, formation of hypothesis or tentative solution, the consideration of the consequence of the activities and testing of solution under practical condition. This was the philosophical methodology follow by this research and also pragmatism allow for positivist and interpretivism principles which ensure objective and subjective data analysis to ensure proper development of frank investment cost monitoring performance technique. Pragmatism is not committed to anyone system of philosophy and reality it allow researchers to have freedom of choice.

They are free to choose the methods, techniques, and procedures of research that best meet their needs and purposes Lewis (2015). To ensure research experience, the subjective part of this research looks beyond the physical quantitative data; it's also analyzing the qualitative aspect of the data to cover all categories of metaphysis namely, cosmology, theology, anthropology, and ontology. Cosmology deal with investment

type, theology consider nature of research, anthropology philosophy encompass the development of the technique, and ontology aspect of metaphysis will hammers the nature of existence of technique Oti-Agyen (2017).

3.11 RESEARCH STRATEGY

The strategy adopted for this stage is the mixed method, the term mixed methods (Creswell & Plano, 2011) refers to an emergent methodology of research that advances the systematic integration of quantitative and qualitative data within a single investigation or sustained Johnson et al., (2007). It combines elements of qualitative and quantitative approaches for the purpose of breadth and depth of understanding and corroboration. Quantitative research is generally objective in nature well Creswell (1994) defines quantitative research as an enquiry into social or human problem based on testing a hypothesis or a theory composed of variables, measured with numbers, and analyzed with statistical procedures in order to determine whether the hypothesis holds true. Qualitative research on the other hand is subjective in nature and mainly concentrates on opinions and perceptions rather than hard measurable data.

Types of qualitative research methods include, but are not limited to, literature review, questionnaires etc. this allowed for used of secondary data in research Ukessays (2015). The mixed method was adopted because it's allowed for the application of quantitative and qualitative date analysis; qualitative method will deal with the closed ended questions to ensure scientific logic of deduction (Snieder and Larner, 2009). Questionnaires with summated ordinal scale was used, while the qualitative strategy adopted was based on open ended question and the secondary data from the project document from our lady of Grace Senior High School was used for the betterment of

inductive development of new technique for monitoring the investment performance in the construction industry Creswell (2003).

3.12 RESEARCH APPROACH

The research approach adopted for the study was both deduction and induction because of the mixed research strategy adopted for the study, qualitative method will deal with the closed ended questions, to ensure scientific logic of deduction (Snieder and Larner, 2009) while the qualitative strategy adopted will emphasize on the secondary data from the project document of our lady of Grace Senior High School for the betterment of inductive development of new technique for monitoring the investment performance in the construction industry Cresswell (2003).

(Soiferman, 2010 cited from Trochim 2006) refers to two "broad methods of reasoning as the inductive and deductive approaches. It was defines induction as moving from the specific to the general, while deduction begins with the general and ends with the specific; arguments based on experience or observation are best expressed inductively (Creswell and Plano, 2007) say that the deductive researcher "works from the 'top down', from a theory to hypotheses to data to add to or contradict the theory. In contrast, they define the inductive researcher as someone who works from the bottom-up using the participants views to build broader themes and generate a theory interconnecting the themes. The two main types of analysis typically used are quantitative (deductive) and qualitative (inductive).

3.13 RESAERCH DESIGN

A research design is a framework that has been outline to find answer to research problems. A research design according to (Kirumbi, 2018) is the set of methods and procedures used in collecting and analyzing measures of the variables specified in the research problem. The research design of this study has a handle on the philosophical position, the research strategy and the research approach adopted, that will be guided by pragmatic philosophical principles Creswell and Creswell (2017).

A research design used was a case study (Yin, 2003) defined case study as an "empirical inquiry that investigates a contemporary phenomenon within its real-life context to ensure qualitative and quantitative strategy analysis which is used for both methods of analysis and a specific research design for examining a problem, both of which are used in most circumstances to generalize across populations (Mills et al. 2010). To avoid repetition of knowledge and ensure professional experience from expect a survey was used to collect primary data and OLAG Document was used as a secondary data Yin (2009). The case study method adopted often involves simply observing what happens to group of individuals such as a school class or a specific social group McLeod (2008). Qualitative case study methodology provides tools for researchers to study complex phenomena within their contexts. When the approach is applied correctly, it becomes a valuable method for science research to develop theory, evaluate programs, and develop interventions Baxter and Jack (2008). Most used qualitative data from interviews and observations but researcher might collect numerical data as well McLeod (2008). This support the ideal of mixed method research to avoid the repetition of existing theories Creswell (2003).

3.14 DATA COLLECTION

This section discusses the population for the study, sampling technique, data type, data collection instrument, data analysis technique, and validity test.

3.15 POPULATION FOR THE STUDY

Polit and Hungler (1999) refer to the population as an aggregate or totality of all the objects, subjects or members that conform to a set of specifications. A research population is generally a large collection of individuals or objects that is the main focus of a scientific query Explorable (2009).

The target population for this study is the forty professionals that are working on Our Lady of Grace Senior high School projects that includes: project management professional (PMP), Ghana Institute of surveyors (Land survey, Quantity Survey, Valuation and Estate Survey), Ghana Institute of Construction (GIOC), cost engineers and sponsors of Our Lady of Grace Senior High School projects.

3.16 SAMPLING TECHNIQUES

The sampling technique used was classified under non-probability sampling and the method of sampling used was a purposive sampling, the study used purposive due to the heterogeneous nature of construction projects and the most technique used for research in the field of construction because of it unlimited construction geographical area Marshall (1996) and (Saundersetal.2009). According to (Walliman, 2005) purposive sampling is a useful sampling method which allows a researcher to get information from a sample of the population that one thinks knows most about the subject matter.

3.17 SAMPLE SIZE

The sample size was determined by number of professionals identify on our lady of grace projects as (Creswell, 2002) accepted the sample size of 3 to 6 focus groups. Because the accessible population on the project involved local and foreign professional (Yin, 2009) support purposive sample size within the case setting. To ensure accuracy in the analysis of the questionnaire, all the professionals were purposively selected from five Professional associations which ten subgroup were at least four questionnaires administered to each subgroup making up total sample size of forty (40) (Onwuegbuzie & Collins, 2007) and Creswell (2002).

3.18 DATA TYPE

The data for the study was both primary and secondary. The primary data was a field Survey and the secondary date was a data from the document of our Lady of grace senior high School construction projects.

3.19 DATA COLLECTION INSTRUMENTS

The data collection instrument used for the primary data was questionnaires. The questionnaire used was in five sections. section 'A' was consisted of the background of the respondent, section 'B' was to identify the existing tools and techniques used to monitor investment performance in the construction industry, section 'C' was to determine the effect of value for money on the pricing of physical infrastructure, section 'D' exam the relationship between market value and earned value, and section 'E' was to determine the percentage (%) discount on the market price, when determine forced sale value, auction value, and cross price. And the secondary data was collected from internal source.

3.20 DATA ANALYSIS

To make proper analysis of the result SPSS V20 Statistical Package for the Social Sciences (SPSS) was applied to test the variables with the help of relative important index to analyse the data. The values will be rank with relative important index (RII) as used by many researchers to determine the influence of values and the impact of variables and trend analysis was used to analyse the secondary data and present it in bar chart and histogram to make the date simple for public understanding and proper formulation of the new technique to monitor investment performance in the construction industry. The final data gathered from the survey was analysed using the Statistical Package for Social Sciences (SPSS). Formula RII=$\sum^{W}/_{AN}$ were $\sum W$ =summation of the weighing given to each variable by the respondents. A= the highest weight

N=total no of sample.

3.21 PROCEDURE USED TO DESIGN THE NEW TECHNIQUE

Technique to monitor investment performance (FT- MIP) was in four stages: introduction document review, definition of terms and technique to monitor investment performance framework.

3.22 TESTING OF THE TECHNIQUE

The document review result was used to test the technique. First, the theory was tested by the use of our lady of grace project documents and the principles used for the pricing of the project physical infrastructure. Second the theory was expanded and finally conclusion of the theory was documented.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 INTRODUCTION

In this chapter the data collected from the questionnaire surveys and our lady of grace document was presented, discuss and base on that to develop the new technique. The primary data were analyzed by using relative important index (RII) for each variable either to accept or reject. Variable was accepted if it meets the mean value of 0.5 and reject if it fall below 0.5.

4.2 BACKGROUND OF THE RESPONDENTS

The background of the respondent was based on the professional on our lady of grace projects.

4.3 PROFESSIONAL ASSOCIATION OF THE RESPONDENTS

The professional association of the respondent for this study was very vital because of the objectives and the questions on set for the study.

Table 4.1 BELOW SHOWS THE PROFESSIONAL ASSOCIATION OF THE RESPONDENTS

Association	**Frequency**	**Percentage (%)**
Ghana Institute of Surveyors (GHIS)	15	37
Ghana Institute of Construction (GIOC)	12	30
Our Lady of Grace-'donors' (OLAG)	8	20
Project Management Professionals (PMP)	3	8
Others	2	5

Source: **Field Survey, 2018**

Table 4.1 above shows the professional association of the respondents. Out of the forty respondent who participated, 37% were members of Ghana institute surveyors (GHIS), 30% were members of Ghana Institute of Construction (GIOC), 20% were members of Our Lady of Grace-'donors' (OLAG) , 8% were members of Project Management professionals (PMP), 5% were others which are the members from Architects, engineers, and charted accountants institutes. It is crystal clear from the above that Ghana institute of surveyors were mostly contacted due to availability of Ghana institute of surveyors member's.

4.4 AREA OF SPECIALIZATION AT WHICH THE RESPONDENTS ARE PRACTICING

The respondent was summarized according to their area of specialization within their professional associations. Table 4.2 area of specialisation of the respondents

TABLE 4.2 AREA OF SPECIALISATION OF THE RESPONDENTS

Area specialised	**Frequency**	**Percentage (%)**
Building construction or management	13	32
Valuation	6	15
Quantity Surveying	5	12
Consultancy service	4	10
Land Surveying	3	7
Project management	3	7
Cost Engineers	2	5
Estate Survey	1	3
Monitoring and Evaluation	1	3
Project financing	1	3
Other	1	3

Source: **Field Survey, 2018**

From table 4.2 above it are evident that all the respondents are technocrat in the construction industry or financing sector. This is important for the study because the respondents were of persons with in deep knowledge in the construction industry. The majority of the respondents from the above table indicate that they understand the

physical infrastructural financing. From the pie chart above, 32 % of the respondents were practicing building construction or management. 15% were practicing valuation of properties, 12% were quantity surveyors, 10% were in the consultancy service, 7% were practicing land surveying, 7% were practicing as professional project management, and 5% were practicing cost engineering, 3% were into estate survey, 3% were into monitoring and evaluation, 3% were into project financing, and 3% were into other professions.

4.5 TOOLS AND TECHNIQUES USED TO MONITOR INVESTMENT PERFORMANCE IN THE CONSTRUCTION INDUSTRY

There are many available tools and technique used to monitor investment performance in the literature, which have being confirmed by the study in table 4.3.

TABLE 4.3 TOOLS AND TECHNIQUES USED TO MONITOR INVESTMENT PERFORMANCE IN THE CONSTRUCTION INDUSTRY

Tools and Techniques used to monitor investment performance.	**Tally (Strongly disagreed to Strongly agree)**					**Total of each tally (A=5)**					**Total** ΣW	**(RII= $\Sigma^{W}/_{AN}$)** N=Total sample	**Rank**
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**			
Earned value analysis (EVA)	0	0	0	1	39	0	0	0	4	195	199	**0.995**	**1ST**
Trend analysis	0	0	0	2	38	0	0	0	8	190	198	**0.990**	**2ND**
Earned value management	0	0	1	1	38	0	0	3	4	190	197	**0.985**	**3RD**
Financial Analysis	0	0	0	4	36	0	0	0	16	180	196	**0.980**	**4TH**
Cost-Benefit Analysis	0	0	1	3	36	0	0	3	12	180	195	**0.975**	**5TH**
Program evaluation and review technique (PERT) and PERT-COST)	0	0	1	4	35	0	0	3	16	175	194	**0.970**	**6TH**
Key performance indicators (KPI's)	0	0	2	3	35	0	0	6	12	175	193	**0.965**	**7TH**
Budget monitoring	0	1	1	3	35	0	2	3	12	175	192	**0.960**	**8TH**
Expert judgment	0	0	2	4	34	0	0	3	16	170	189	**0.945**	**9TH**
Benchmarking	0	2	2	3	33	0	4	6	12	165	187	**0.935**	**10TH**
Process Evaluations	1	3	3	3	30	1	6	9	12	150	178	**0.890**	**11TH**
Variance analysis	2	2	3	3	30	2	4	9	12	150	177	**0.885**	**12TH**
Reserve analysis	3	1	3	3	30	3	2	9	12	150	176	**0.880**	**13TH**
Profitability index	4	1	2	3	29	4	2	6	12	145	169	**0.845**	**14TH**
Internal rate of returns	6	1	1	2	29	6	2	3	8	145	164	**0.820**	**15TH**
Computerized activity sampling (CALIBRE approach)	7	3	2	1	27	7	6	6	4	135	154	**0.770**	**16TH**
Integrated performance index	9	2	2	1	26	9	4	6	4	130	153	**0.765**	**17TH**

Impact Evaluations	5	1	5	2	24	5	2	15	8	120	150	**0.750**	**18TH**
Assessment of Indicators	9	2	3	3	23	9	4	9	12	115	149	**0.745**	**19TH**
To-completion performance	9	2	3	4	22	9	4	9	16	110	148	**0.740**	**20TH**
Project management information system	9	2	3	4	22	9	4	9	16	110	148	**0.740**	**20TH**
Cost effectiveness analysis	9	2	3	4	22	9	4	9	16	110	148	**0.740**	**20TH**
Assessment of Evaluations	12	2	2	3	21	12	4	6	16	105	143	**0.715**	**23RD**
Threshold analysis	12	2	2	3	21	12	4	6	16	105	143	**0.715**	**23RD**
Net present value	10	3	2	3	21	10	6	6	16	105	143	**0.715**	**23RD**
Payback	9	6	2	5	19	9	12	6	20	95	142	**0.710**	**26TH**
Average rate of return	9	6	2	5	19	9	12	6	20	95	142	**0.710**	**26TH**
Line of balance	9	6	2	5	19	9	12	6	20	95	142	**0.710**	**26TH**
Annual equivalent	9	6	2	5	19	9	12	6	20	95	142	**0.710**	**26TH**
Ex Ante Distributional Analysis	10	3	4	6	17	10	6	12	24	85	137	**0.685**	**30TH**
Project quality performance model	10	3	4	6	17	10	6	12	24	85	137	**0.685**	**30TH**
Activity based ratios technique	12	2	6	4	16	12	4	18	12	80	126	**0.630**	**32TH**
Forecasting	12	2	6	4	16	12	4	18	12	80	126	**0.630**	**32TH**
Quality assessment system in construction (QLASSIC) model	12	2	6	4	16	12	4	18	12	80	126	**0.630**	**32TH**
Analytical Hierarchy Process (AHP)	12	2	6	4	16	12	4	18	12	80	126	**0.630**	**32TH**
Critical path method	12	2	6	4	16	12	4	18	12	80	126	**0.630**	**32TH**
Leading parameter technique	14	3	4	5	14	14	6	12	20	70	122	**0.610**	**37TH**

Causality Frameworks	25	4	3	7	1	25	8	9	32	5	79	**0.395**	**38TH**
Amalgamated-model of measurement	26	3	3	7	1	26	6	9	32	5	78	**0.390**	**39TH**
Multidimensional project control system (MPCS)	30	2	3	5	0	30	4	9	20	0	63	**0.315**	**40TH**
Critical Variables	32	5	3	0	0	32	10	9	0	0	51	**0.255**	**41TH**
Blue Print	39	1	0	0	0	39	2	0	0	0	41	**0.205**	**42ND**

Source: **Field Survey, 2018**

From table 4.3 represent tools and techniques used to monitor investment performance in the construction industry, which was similarly tabled by Buyse et al. (2010) and PMBOK (2017). This study confirm that, they are available tools and techniques used to monitor investment performance that include: earned value analysis, trend analysis, earned value management, financial analysis, cost-benefit analysis, program evaluation and review technique and PERT-Cost), key performance indicators, budget monitoring, expert judgment, benchmarking, process evaluations, variance analysis, reserve analysis, profitability index, internal rate of returns, computerized activity sampling (calibre approach), integrated performance index, impact evaluations, assessment of indicators, to-completion performance, project management information system, cost effectiveness analysis, assessment of evaluations, threshold analysis, net present value, average rate of return, line of balance, annual equivalent, ex ante distributional analysis, project quality performance model, activity based ratios technique, forecasting, quality assessment system in construction model, analytical hierarchy process , critical path method, and leading parameter technique buttress by Glagola et al. (1992), Saaty (1980), Chua et al. (1999), Winch and Carr (2001), Gita B et al., (2007) and Harris and McCaffer (2013)

Tools and techniques listed was accepted because, it meet the relative important index mean value and the tools rejected was causality frameworks, amalgamated-model of measurement, multidimensional project control system (MPCS), critical variables, and blue print it was rejected because, it was below the mean value of the relative important index.

Looking at the accepted variables qualitatively, they are many reasons why there is a need for another technique: first, some of the tools and techniques are much interested in selecting best projects. Second, others are interested in project completion which limits the important of value for money. Third, almost all the techniques fail to detect if the project cost has been inflated, high budget or high price Wells (2015). Finally, corruption cannot be properly being control by this techniques Anvuur et al., (2006) and Memon et al., (2012).

4.6 THE COMPONET OF VALUE FOR MONEY ON THE PRICING OF PHYSICAL INFRASTRUCTURE

The components of value for money on the pricing of physical infrastructure have being confirmed by the study under the three major components of value for money as economic, efficiency and effectiveness in table 4.4.

TABLE 4.4 THE EFFECT OF VALUE FOR MONEY ON THE PRICING OF PHYSICAL INFRASTRUCTURE

	Tally (Less significant to Very significant)					**Total of each tally (A=5)**					**Total** ΣW	**(RII= $\Sigma^{W}/_{AN}$)** N=Total sample	**Rank**
The effect of value for money on the pricing of physical infrastructure	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**		**Relative important index**	
Market value	0	0	2	4	34	0	0	3	16	170	189	**0.945**	**1ST**
Actual cost	1	3	3	3	30	1	6	9	12	150	178	**0.890**	**2ND**
Earned value	2	2	3	3	30	2	4	9	12	150	177	**0.885**	**3RD**
Cross price	3	1	3	3	30	3	2	9	12	150	176	**0.880**	**4TH**
Customer satisfaction	4	1	2	3	29	4	2	6	12	145	169	**0.845**	**5TH**
Force sale value	6	1	1	2	29	6	2	3	8	145	164	**0.820**	**6TH**
Fit for use	0	6	2	3	25	0	12	6	12	125	155	**0.775**	**7TH**
Planned value	9	2	2	1	26	9	4	6	4	130	153	**0.765**	**8TH**
Fit for demand	9	2	3	4	22	9	4	9	16	110	148	**0.740**	**9TH**
Fit for purpose	12	2	2	3	21	12	4	6	16	105	143	**0.715**	**10TH**
Auction value	6	2	2	20	0	6	4	6	80	0	96	**0.48**	**11TH**

Source: **Field Survey, 2018**

From table 4.4 there is clear evidence that, they are many external components in the pricing of physical infrastructure that range from: Market value, Actual cost, Earned value, Cross price, Customer satisfaction, Force sale value, Fit for use, Planned value, Fit for demand, and Fit for purpose. The accepted variables support the fact that, to ensure effective and efficient value for money on the pricing of physical infrastructure there is a need for major consideration on the market value, cross price and forced sale value which was neglected in the earned value analysis (PMBOK, 2017 pp.267). From this

study, there is an indication that value for money can be obtained on physical infrastructural project, if the market values, cross price and force sale value are compared to the contract sum without putting trust in the project cost control mechanisms available only.

Parikh (2017) point out many disadvantage in in the used of cost performance index as a means of cost control technique. This called for the case study to look into practical projects to detect high inflated projects and make vital consideration on development of new technique to monitor construction project performance.

4.7 WHAT GOES INTO MARKET VALUE AND EARNED VALUE WHEN DETERMINE PERFORMANCE.

Table 4.5 indicate the major variables that goes into market value and earned value when determine the performance of investment in the construction industry.

TABLE 4.5 WHAT GOES IN MARKET VALUE AND EARNED VALUE WHEN DETERMINE PERFORMANCE

The relationship between market value and earned value	**Tally (Strongly disagreed to Strongly agree)**					**Total of each tally (A=5)**					**Total** ΣW	**(RII= $\Sigma^{W}/_{AN}$)** N=Total sample	**Rank**
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**		**Relative important index**	
Value for money	2	2	3	3	30	2	4	9	12	150	177	**0.885**	**1ST**
Cost	3	1	3	3	30	3	2	9	12	150	176	**0.880**	**2ND**
Production cost	4	1	2	3	29	4	2	6	12	145	169	**0.845**	**3RD**
Actual cost	6	1	1	2	29	6	2	3	8	145	164	**0.820**	**4TH**
Cross price	0	6	2	3	25	0	12	6	12	125	155	**0.775**	**5TH**
Planned value	9	2	2	1	26	9	4	6	4	130	153	**0.765**	**6TH**
Quality	9	2	3	4	22	9	4	9	16	110	148	**0.740**	**7TH**
Demand	14	2	2	2	20	14	4	6	8	100	137	**0.685**	**8TH**
Risk	16	1	2	2	19	16	2	6	8	95	127	**0.635**	**9TH**
Time	14	2	2	20	0	14	4	6	80	0	104	**0.52**	**10TH**
Auction value	16	1	2	19	0	16	2	6	76	0	100	**0.500**	**11TH**
Quantity	20	1	3	16	0	20	2	9	64	0	95	**0.475**	**12TH**
Scarcity	20	2	3	15	0	20	4	9	60	0	93	**0.465**	**13TH**
Transferability	27	3	6	4	0	27	6	18	16	0	67	**0.335**	**14TH**
Utility	27	13	0	0	0	27	26	0	0	0	53	**0.265**	**15TH**

Source: **Field Survey, 2018**

From table 4.5 shows that market value and earned value have something in common, because what goes on when using earned value is similar to market value, this similarity range from: value for money, cost, production cost, actual cost, cross price, planned value, quality, demand, risk, time, and auction value as indicate in 4.5 Therefore the pragmatic view on epistemology shows clear that if, in the analysis of cost performance index is equal to earned value over actual cost as a means of cost control, then market value should also be divided be actual cost to ensure value for money on any amount spend on physical infrastructure project.

4.8 WHAT IS THE PERCENTAGE (%) DISCOUNT ON THE MARKET PRICE, WHEN DETERMINE FORCED SALE VALUE, AUCTION VALUE, CROSS PRICE

The study has confirmed the forced sale value 27% decreased of the market price, this was supported by (Campbell, 2011) and also cross price and auction value decreased or increased depending on the market value. Table 4.6

TABLE 4.6 THE PERCENTAGE (%) DISCOUNT ON THE MARKET PRICE, WHEN DETERMINE FORCED SALE VALUE, AUCTION VALUE, CROSS PRICE

Percentage (%) discount on the market price, when determine forced sale value, auction value, cross price	**Tally (Strongly disagreed to Strongly agree)**					**Total of each tally (A=5)**					**Total** ΣW	**(RII= $\Sigma^{W}/_{AN}$)** N=Total sample	**Rank**
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**		**Relative important index**	
Forced sale value-% of market price													
27 decrease of market price	6	1	1	2	29	6	2	3	8	145	164	**0.820**	**1ST**
30 decrease of market price	20	2	3	15	0	20	4	9	60	0	93	**0.465**	**2ND**
25 decrease of market price	27	3	6	4	0	27	6	18	16	0	67	**0.335**	**3RD**
Cross price-% degrees in demand to % increase in price (vice vise)													
10 decrease 15 increase	9	2	2	1	26	9	4	6	4	130	153	**0.765**	**1ST**
15 decrease 20 increase	9	2	3	4	22	9	4	9	16	110	148	**0.740**	**2ND**
20 decrease 25 increase	14	2	2	2	20	14	4	6	8	100	137	**0.685**	**3RD**
Auction Value Or Reserve Price Or Resale Value – Decrease In Market Price (%)													
75 decrease on market price	14	2	2	2	20	14	4	6	8	100	137	**0.685**	**1ST**
85 decrease on market price	20	2	3	15	0	20	4	9	60	0	93	**0.465**	**2ND**
50 decrease on market price	27	3	6	4	0	27	6	18	16	0	67	**0.335**	**3RD**

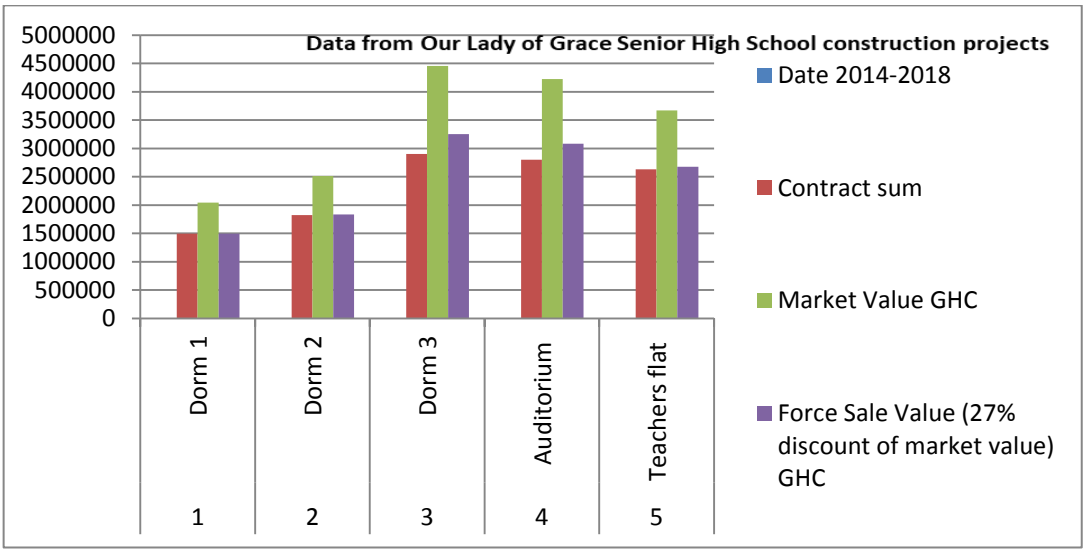
Source: **Field Survey, 2018**

From table 4.6 the study indicate that force sale value is 27 percentage (%) decrease of the market price, that was buttress by (Campbell, 2011) when determine forced sale

value, it feather indicate that, cross price when 10% decrease of market value it will affect demand by 15%, when 15% decrease it will affect demand by 20% increase and when 20% decrease it will affect demand by 25 increase. In this contest cross price is referring amount at which customer is ready to accept goods. The study accepts the fact that auction value is 75% decrease on market price that was supported by Asset-valuations (2017).

4.9 SECONDARY DATA FROM OUR LADY OF GRACE SENIOR HIGH SCHOOL CONSTRUCTION PROJECT 2014 TO 2018

Figure 4.1 is a secondary data from Our Lady of Grace Senior High School construction projects compering contract sum, market value and Forced sale value.



Source: **Field Survey, 2018**

FIGURE 4.1 DATA FROM OUR LADY OF GRACE SENIOR HIGH SCHOOL CONSTRUCTION

The secondary data from figure 4.7 represent dorm 1, that was constructed 2014, the contract sum was almost equal to forced sale value, but it is 0.13% higher than the Forced sale value. It means that if it comes to a point of retrieving the amount invested in the construction of the dorm 1, the capital invested at the point of project completion will be 0.13% less, unless there is ample time to sale the property at it market price. From figure 4.6.1 market value will be less do to cross price that range between 10 to 25 % of the market value. Dorm 2 indicate similar trend of dorm 1, but the was an improvement in the contract sum because the forced sale value was 0.5% higher than the contract sum. This indicates that, if the investment is force closed, the investor will obtained 0.5% interest on the investment at the point of completion. It is clear that there is a relationship between contract sum and forced sale value.

By following the policy plan of project pricing for Our Lady of Grace Senior High School projects dorm 3, contract sum shows much better improvement of investment performance because if project is forced closed or completed it will yield 12% interest on the investment at the point of completion. Auditorium and teachers flat will also indicate 10.2% and 2% respectively at it completion stage. To ensure value for money, market value and forces values are very important in managing the planned value, earned value and actuals in all physical infrastructural projects in other to avoid inflated cost, high price and high budget.

4.10 DEVELOPMENT OF TECHNIQUE TO MONITOR INVESTMENT PERFORMANCE (FT-MIP)

Development of technique to monitor investment performance is named (FT-MIP). It is inductively develop base on earned value analysis.

4.11 INTRODUCTION

From the result obtained from the field surveyor a technique can be developed to monitor investment performance. Named (FT- MIP), is a strategy develops to monitor and control investment performance in the construction industry base on the policy adopted by our lady of grace project stakeholders , with the aim of: first, indicates if there is value for money on about to start physical infrastructural project, ongoing project or completed project. Second, it indicates if cost and benefit on the investment are on track. Thirdly, it served as a guide to control over budget, and high price projects. Fourthly, it helps to determine the profit margin at every stage in the infrastructural investment. Finally it served as a strategy to monitor and control investment performance.

4.12 SEVEN PRINCIPLES ADOPTED BY OUR LADY OF GRACE TO MONITOR INVESTMENT PERFORMANCE

To make technique for monitoring investment performance works effectively and efficiently on a physical infrastructural project at our lady of grace projects, it was mandated to make management plans for the following; Scope of works, Claim management, Specification of work, Site and Soil investigation, Drawings, Bills of Quantities and Market value estimate from valuation officer on all projects.

4.13 DEFINITION OF TERMS

Is referring to the context at which a specific term was used in the development of the technique. Market value (MV) is the amount at which the project (Physical structure) can be sold at the market. Contract sum (CS) is the agreed amount in the contract at which the client must pay if the project is done. Forced sale value (FSV) is referring to amount at which a project (Physical structure) when forced closed can be sold at the

competitive market. Actual cost is the realized cost incurred for the work performed on an activity during a specific period PMBOK (2017). Earned value is the measure of work performed expressed in terms of the budget authorized for the work PMBOK (2017). And Cross price is the amount at which a customer is ready to pay for the project (Physical structure) if on sale.

4.14 TECHNIQUE TO MONITOR INVESTMENT PERFORMANCE (FT- MIP)

The FT-MIP frame work covers the technique, abbreviation, definition, application, equation, and interpretation.

TABLE 4.8 FT- MIP FRAMEWORK

Technique	Abbreviation	Definition	Application	Equation	Interpretation of result
Investment cost performance index	ICPI	The value at which the investment is performing in the open market.	Market value divided by Contract sum	**MV÷CS**	Above one (1) to indicate profit.
Investment Net performance index	INPI	The point at which the investment yield zero profit and generate equal investment capital.	Forced sale value divided by Contract sum	**FSV÷CS**	One (1) means there is no profit on the investment and below one is a lost
Investment interest performance index	IIPI	It indicate the profit margin on the investment	Cross price divided Contract sum	**CP÷FSV**	One (1) is a perfect investment.
Forced closed investment performance index	FSVI	It ensured that the cost incurred by the investment if forced closed	Forced sale value divided Actual cost	**FSV÷AC**	More than one (1) is a profit , below one (1) means lost when investment is forced closed
Interest indicator index	III	It represent the profit margin on the project, if complete and sold within the normal market value	Market value divided Earned value	**MV÷EV**	Above one (1) to indicate profit when project is ongoing
Note: At least minimum of three indexes must be one to ensure good investment.					

4.15 THEORIES AT WHICH FRANK TECHNIQUE TO MONITOR INVESTMENT PERFORMANCE WAS BASED

Theories at which the technique to monitor investment performance was based: cost performance index, benchmarking, Investment appraisal techniques and Tools and techniques for cost controls.

TABLE 4.9 THEORIES AND WEAKNESS

NO.	Theory	Explanation	Reasons
1	Cost performance index	A measure of the cost efficiency of budget resources express as the ration of earned value to actual	*That it only checks whether the work is on time and within budget (Parikh, 2017) *It favors contractors (Campbell, 2011).
2	Benchmarking	For programs that count on performance pointers to direct management choices, this method is suitable.	Difficult to find appropriate benchmarks (Gita B et al., 2007).
3.	Investment appraisal techniques	Investment appraisals technique are mechanisms used to select best investment	All available techniques are interested in selecting best project and other disadvantages was listed by (Fugar, 2009)
4	Tools and techniques for cost controls	Tools and techniques for cost controls in the PMBOOK guide 2017	Interest in project management from initiation to closing without making the market value count at every stage of the project life cycle (PMBOK, 2017).

4.16 CONCLUSION DEVELOPMENT OF (FT-MIP)

Technique to monitor investment performance (FT- MIP) is an investment technique that based in market value and customer price (cross price) for ensuring value for money.

4.17 TESTING THE TECHNIQUE FOR MONITOR INVESTMENT PERFORMANCE (FT-MIP)

Testing the technique for monitor investment performance (FT-MIP) was done on projects at Our Lady of grace senior high School.

4.18 INTRODUCTION TO (FT-MIP) TEST

Technique for monitor investment performance (FT-MIP) was tested and validated on physical infrastructural projects at Our Lady of grace senior high School Manponteng Ashanti.

4.19 TESTING OF THE TECHNIQUE

The technique for monitor investment performance was tested on the at Our Lady of Grace Senior High School physical infrastructural project and policy adopted as documented some secondary information in table 4.10

TABLE 4.10 DATA FROM OLAG

No.	Building Type	Date	Contract Sum GH₵	Market Value GH₵	Forced Sale Value (27% discount of market value) GH₵	From table 4.6.1 cross Price is set at 90% of Forced sale value
001	Dorm 1	2014	1,495,342.40	2,045,750.00	1,493,397.50	1,344,057.75
002	Dorm 2	2015	1,824,492.32	2,511,740.00	1,833,570.00	1,650,213.00
003	Dorm 3	2018	2,904,861.31	4,456,750.00	3,253,427.50	2,928,084.75
004	Auditorium	2016/2017	2,797,989.95	4,222,042.00	3,082,090.66	2,773,881.59
005	Teachers flat	2018	2,629,734.40	3,670,001.00	2,679,100.73	2,411,190.65

Source: secondary data from OLAG

TABLE 4.11 TESTING OF DORM 1 AT OLAG

Testing of dorm 1				
Name	**Equation**	**Calculation GH₵**	**Result**	**Interpretation of result**
Investment cost performance index	MV÷CS	2,045,750.00÷1,495,342.40	1.4	Above one (1) to indicate profit.
Investment Net performance Index	FSV÷CS	1,493,397.50÷1,495,342.40	1	One (1) means there is no profit on the investment and below one is a lost
Investment interest performance index	CP÷FSV	1,344,057.75÷1,495,342.40	0.9	One (1) is a perfect investment.
Forced closed investment performance index	FSV÷AC	1,493,397.50÷1,495,342.40	1	More than one (1) is a profit , below one (1) means lost when investment is forced closed
Interest indicator index	MV÷EV	2,045,750.00÷1,495,342.40	1.4	Above one (1) to indicate profit when project is ongoing
The mount invested on dorm 1 was within range				

TABLE 4.12 TESTING OF DORM 2 AT OLAG

Testing of dorm 2				
Name	**Equation**	**Calculation GH₵**	**Result**	**Interpretation of result**
Investment cost performance index	**MV÷CS**	2,511,740.00÷1,824,492.32	1.4	Above one (1) to indicate profit.
Investment Net performance Index	**FSV÷CS**	1,833,570.00÷1,824,492.32	1	One (1) means there is no profit on the investment and below one is a lost
Investment interest performance index	CP÷FSV	1,650,213.00÷1,833,570.00	0.9	One (1) is a perfect investment.
Forced closed investment performance index	**FSV÷AC**	1,833,570.00÷1,824,492.32	1	More than one (1) is a profit , below one (1) means lost when investment is forced closed
Interest indicator index	**MV÷EV**	2,511,740.00÷1,824,492.32	1.4	Above one (1) to indicate profit when project is ongoing
The mount invested on dorm 1 was within range				

TABLE 4.13 TESTING OF DORM 3 AT OLAG

Testing of dorm 3				
Name	**Equation**	**Calculation GH₵**	**Result**	**Interpretation of result**
Investment cost performance index	**MV÷CS**	4,456,750.00÷2, 904,861.31	1.5	Above one (1) to indicate profit.
Investment Net performance index	**FSV÷CS**	3,253,427.50÷2, 904,861.31	1.1	One (1) means there is no profit on the investment and below one is a lost
Investment interest performance index	CP÷FSV	2,928,084.75÷3, 253,427.50	0.9	One (1) is a perfect investment.
Forced closed investment performance index	**FSV÷AC**	3,253,427.50 ÷ *	*project is ongoing stage	More than one (1) is a profit , below one (1) means lost when investment is forced closed
Interest indicator index	**MV÷EV**	4,456,750.00÷2, 904,861.31	1.5	Above one (1) to indicate profit when project is ongoing
The mount invested on dorm 3 was performing				

TABLE 4.14 TESTING OF AUDITORIUM PROJECT AT OLAG

Testing of Auditorium				
Name	**Equation**	**Calculation GH₵**	**Result**	**Interpretation of result**
Investment cost performance index	**MV÷CS**	4,222,042.00÷2, 797,989.95	1.5	Above one (1) to indicate profit.
Investment Net performance index	**FSV÷CS**	3,082,090.66÷2, 797,989.95	1.1	One (1) means there is no profit on the investment and below one is a lost
Investment interest performance index	CP÷FSV	2,773,881.59÷3, 082,090.66	0.9	One (1) is a perfect investment.
Forced closed investment performance index	**FSV÷AC**	3,082,090.66÷2, 797,989.95	1.1	More than one (1) is a profit , below one (1) means lost when investment is forced closed
Interest indicator index	**MV÷EV**	4,222,042.00÷2, 797,989.95	1.5	Above one (1) to indicate profit when project is ongoing
The amount invested on auditorium was performing				

TABLE 4.15 TESTING OF TEACHERS FLAT PROJECT AT OLAG

Testing of Teachers flat				
Name	**Equation**	**Calculation GH₵**	**Result**	**Interpretation of result**
Investment cost performance index	**MV÷CS**	3,670,001.00÷2,629,734.40	1.3	Above one (1) to indicate profit.
Investment Net performance index	**FSV÷CS**	2,679,100.73÷2,411,190.65	1.1	One (1) means there is no profit on the investment and below one is a lost
Investment interest performance index	CP÷FSV	2,411,190.65÷2,679,100.73	0.9	One (1) is a perfect investment.
Forced closed investment performance index	**FSV÷AC**	2,679,100.73÷ *	*project is on the planning stage	More than one (1) is a profit , below one (1) means lost when investment is forced closed
Interest indicator index	**MV÷EV**	3,670,001.00÷*	*	Above one (1) to indicate profit when project is ongoing
The final test can be test if the contract is sign				

4.20 VALIDATION OF THE TECHNIQUE (FT-MIP)

To validate is to chuck if the project management plans are complete as required.

4.21 VALIDATION

Validate is the process of formalizing acceptance of the competed project deliverables (PMBOK 2017). In this context validation is a process of comparing the project policy plan to the principles of frank technique for monitor investment performance **(FT-MIP)** to make formal acceptance of the result.

4.22 VALIDATION CHECK FOR THE OLAG PROJECTS

Validation check follows principles for validation, test and evaluation document, yes or no, brief description of answer, and pass or fail.

TABLE 4.16 VALIDATION CHECK FOR THE OLAG PROJECTS

No.	Principles for validation	Test and evaluation document	Yes / No	Brief description of answer	Pass or Fail
5.2.1	Scope of works	Do the projects have scope management plan	Yes	Stakeholders requirement and scope statement document was available	Pass
5.2.2	Claim management	Do the project documents contain Claim management plan	Yes	All contracts is fixed contract to avoid unnecessary claims also change in scope are not allow.	Pass
5.2.3	Specification of work	Do project have material and workmanship specification	Yes	Specification of material and workmanship will documented	Pass
5.2.4	Site and Soil investigation	Soil test was conducted	Yes	Soil test result was available	Pass
5.2.5	Drawings	Is working drawing Perspectives drawing, 3D, and mockups available	Yes	Drawings was available except mockup was not part	Pass
5.2.6	Bills of Quantities	Do bill of quantity for part of the contract	Yes	Contractors price base on bills of quantities	Pass
5.2.7	Market value	Do project budget compare to market value	Yes	All building was valued by a professional valor	Pass
FT-MIP works perfect, if all seven document is check and validate at the time of monitoring					

4.23 GENERAL CONDITION FOR USING (FT-MIP) TO MONITOR INVESTMENT PERFORMANCE

The technique will work effectively if: First, the stakeholders of the investment allow for the market value or benchmark value of the project being estimated by independent valor alongside the bills of quantities. Second, used a pragmatic and marketing strategy to contact a potential buyers for cross price of the project or amount at which the customer is ready to accept as an exchange for the investment. Third, note that the market value needed for monitoring and evaluation when implementing the (FT-MIP) technique is not

the amount in the bills of quantities but amount set by the professional valor. Four, cross price can be higher or lower than the forced sale value depending on the demand and supply accepted in the study, examples 10% increase in demand affect price by 15% upward or 10% decrease in demand affect price by 15 downward. This means that cross price can be simple be calculated by the used of economics approved theories for cross price. Five, FT-MIP can be used at every stage of project or investment life cycles if only the market value of the work know or given by an expert or valor. Six, earned value and actual cost is based on similar procedure for cost performance index. Finally, if the earned value, Actual cost or contract sum exceed the market value it means that the project cost is high budget, high price and cost inflated.

4.24 CHAPTER CONCLUSION

Testing and validation is the major procedure for implementing FT-MIP technique, it will work effective and efficiently if the market value of a project is used as a parallel bill to the bill of quantity.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTIONS

The chapter five is the conclusion and recommendation of the study in other to review aims and objectives set for study, present findings and make recommendation for further research.

5.2 SUMMARY OF THE FINDINGS

Out of the forty respondent who participated, 37% were members of Ghana institute surveyors (GHIS), 30% were members of Ghana Institute of Construction (GIOC), 20% were members of Our Lady of Grace-'donors' (OLAG) , 8% were members of Project Management professionals (PMP), 5% were others which are the members from Architects, engineers, and charted accountants institutes.). This study confirmed that, there are available tools and techniques used to monitor investment performance. The study identified thirty-seven tools and techniques to be used to monitor investment performance. It also identify that the components in the pricing of physical infrastructure are, Market value, Actual cost, Earned value, Cross price, Customer satisfaction, Force sale value, Fit for use, Planned value, Fit for demand, and Fit for purpose that are minor component under economic, efficiency and effectiveness. The study identify what goes into earned value and market value as; value for money, cost, production cost, actual cost, cross price, planned value, quality, demand, risk, time, and auction value. The study identified forced sale value as 27 percentage (%) decrease of the market price, which was buttress by (Campbell, 2011). And finally FT-MIP framework was inductively developed to monitor investment performance in the construction industry which follows

three steps; FT-MIP frame work, FT-MIP testing, and FT-MIP validation. See table 5.1 FT-MIP frame work.

TABLE 5.1 FT- MIP FRAMEWORK

Technique	**Abbreviation**	**Definition**	**Application**	**Equation**	**Interpretation of result**
Investment cost performance index	ICPI	The value at which the investment is performing in the open market.	Market value divided by Contract sum	**MV÷CS**	Above one (1) to indicate profit.
Investment Net performance index	INPI	The point at which the investment yield zero profit and generate equal investment capital.	Forced sale value divided by Contract sum	**FSV÷CS**	One (1) means there is no profit on the investment and below one is a lost
Investment interest performance index	IIPI	It indicate the profit margin on the investment	Cross price divided Contract sum	**CP÷FSV**	One (1) is a perfect investment.
Forced closed investment performance index	FSVI	It ensured that the cost incurred by the investment if forced closed	Forced sale value divided Actual cost	**FSV÷AC**	More than one (1) is a profit , below one (1) means lost when investment is forced closed
Interest indicator index	III	It represent the profit margin on the project, if complete and sold within the normal market value	Market value divided Earned value	**MV÷EV**	Above one (1) to indicate profit when project is ongoing
Note: At least minimum of three indexes must be one to ensure good investment.					

5.3 CONCLUSION

The case study sought the views of respondents and adds secondary data from our lady of grace projects documents. 32 % of the respondents were in building construction or management, 15% were in valuation of properties, 12% were quantity surveyors, 10% were in the consultancy service, 7% were in land surveying, 7% were professional project managers, and 5% were cost engineers, 3% were into estate survey, 3% were into monitoring and evaluation, 3% were into project financing, and 3% were into other professions all from five professional associations. Forty questionnaires were sent to respondents and the primary date was analysed with relative important index (RII) and rank with spread sheet used Statistical Package for Social Sciences (SPSS). The objectives was reviews if aim of the study, in develop a technique to monitor investment performance as a means of detecting, high priced, high budget and cost inflated projects have being achieved .

Firs,t objective set aim at avoiding duplication of theories, it was set to conduct a critical scientific search on tools and techniques used to monitor investment performance in the construction industry and the study identify thirty seven techniques namely: earned value analysis, trend analysis, earned value management, financial analysis, cost-benefit analysis, program evaluation and review technique and PERT-Cost), key performance indicators, budget monitoring, expert judgment, benchmarking, process evaluations, variance analysis, reserve analysis, profitability index, internal rate of returns, computerized activity sampling (calibre approach), integrated performance index, impact evaluations, assessment of indicators, to-completion performance, project management information system, cost effectiveness analysis, assessment of evaluations, threshold analysis, net present value, average rate of return, line of balance, annual equivalent, ex

ante distributional analysis, project quality performance model, activity based ratios technique, forecasting, quality assessment system in construction model, analytical hierarchy process , critical path method, and leading parameter technique.

The second objective set toward the aim, was to identify the component of value for money on the pricing of physical infrastructure, that was based on economic input in pricing, output efficiency and quality effectiveness for customer satisfaction and the study identified: market value, actual cost, earned value, cross price, customer satisfaction, force sale value, fit for use, planned value, fit for demand, and fit for purpose as the major components value for money as a component in determine value for money.

The third objective was to identify what goes into market value and earned value when determine performance and the study identified: Value for money, Cost, Production cost, Actual cost, Cross price, planned value, Quality, Demand, Risk, Time, and Auction value as the component. And the final objective was to develop a technique to monitor investment performance in the construction industry, which deductively and inductively existing theories, result from the field survey, secondary data from our lady of grace projects. The technique for monitoring investment performance is named fit map **(FT-MIP)** that operate on first, management plans documents. Second, definition of terms. Third, (FT- MIP) framework. Fourth, theories and reasons for the development of (FT-MIP) as summarized in table 5.1

At the Fifth stage the frank technique for monitoring investment performance was tested on an ongoing five number projects and finally validated.

5.4 RECOMMENDATIONS

Based on findings and conclusions of this study, the following recommendations could be made in application of the frank technique for monitor investment performance in the construction industry.

- It is recommended that private or public organization that went to use the technique for monitoring investment performance (FT-MIP) to monitor investment performance in the construction industry must follow the consider project management plans for (FT-MIP).
- To use (FT-MIP) technique for monitor investment performance effectively and efficiently market value at the time of monitoring must be taken from expert valuation officer.
- To detect if a project cost have been high price or high budgeted, forced sale value must be used as, price ceiling.
- It is recommended to use all five techniques: investment cost performance index, investment net performance index, investment interest performance index, forced closed investment performance index, and interest indicator index as one unit to monitor investment performance index.
- It is very effective and efficient to used (FT-MIP) technique for monitoring investment performance in sole sourcing contract when there is the need to monitor high price and high budget projects

5.5 FURTHER RESEARCH

In this research effort was taken to develop a technique to monitor investment performance in the construction industry. Based on scope and limitation of this study, following directions can be noted for the researches to be carried out in future.

- Identifying the strength of frank technique for monitoring investment performance in the construction industry
- Further search is required to identify the weakness of frank technique for monitoring investment performance.
- Analyzed the advantages of frank technique for monitoring investment performance over earned value analysis
- Identify tools and techniques that are used to monitor project performance and investment performance at the same project.
- Compare the weakness of earned value analysis to the weakness of frank technique for monitoring investment performance.

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APPENDICES

Appendix 1. Detail of questionnaire

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

COLLEGE OF ART AND BUILT ENVIRONMENT

DEPARTMENT OF CONSTRUCTION TECHNOLOGY AND MANAGEMENT

SURVEY QUESTIONNAIRE

DEVELOPMENT OF A TECHNIQUE TO MONITOR INVESTMENT PERFORMANCE (CASE STUDY, CONSTRUCTION OF OUR LADY OF GRACE SENIOR HIGH SCHOOL, MANPONTENG -KUMASI)

Dear Sir/Madam,

I am MSc project management student in Kwame Nkrumah University of science and Technology, College of Built Environment, Department of Building Technology currently undertaking a research into the development of a technique to monitor investment performance in the construction industry and aim at detecting: high priced, high budget and cost inflated projects. The study is on-going under the supervision of Dr De graft Owusu -Manu, senior lecturer, KNUST.

The research requires a questionnaire survey to collect data from expert in: development financing, project management, monitoring and evaluation, Ghana Institute of surveyors (GHIS); (Land survey, Quantity Survey, Valuation and Estate Survey), Ghana Institute of Construction (GIOC), and Donors of Our Lady of Grace Senior High School.

Be aware of your busy schedule, I will plead to request for 15 minutes of your time to fill in the questionnaire as it means so much for the achievement of this research. All information you provided will be kept **strictly confidential** and for academic purpose.

Finding from this research will made available to you on request by (calling …….0242205535 or mail-amoahfrank2009@yahoo.com)

Yours sincerely,

……

Amoah Frank, MSc. Student KNUST.

Dr. De-Graft Owusu-Manu, Project Supervisor, Department of Building Technology (KNUST)

SECTION A:

BACKGROUND OF THE RESPONDENT

Please, kindly respond to the questions by ticking (√) the appropriate box for each item

1. Which of these professional associations do you belong?

No.	Association	Tick
i	Ghana Institute of Surveyors (GHIS)	
ii	Project Management Professional(PMP)	
iii	Ghana Institute of Construction (GIOC)	
iv	Our Lady of Grace-'donors' (OLAG)	
v	Any other……	

2. Which of this area of specialisation are you practicing

No.	**Area specialised**	**Tick**
i	Quantity Surveying	
ii	Land Surveying	
iii	Valuation	
iv	Estate Survey	
v	Project management	
vi	Monitoring and Evaluation	
vii	Cost Engineers	
viii	Building construction or management	
ix	Consultancy service	
x	Project financing	
xi	Any other…….	

SECTION B:

TOOLS AND TECHNIQUES USED TO MONITOR INVESTMENT PERFORMANCE IN THE CONSTRUCTION INDUSTRY.

3. Tick (√), the degree of acceptance from 1-5, ‘‘**1 = strongly disagree; 2 = disagree; 3 = slightly agree; 4 = agree; 5 = strongly agree”** if any of the technique below are used to monitor investment performance in the construction industry.

TECHNIQUES USED TO MONITOR INVESTMENT PERFORMANCE	1	2	3	4	5
Construction project performance measurement models					
1. Key performance indicators (KPI’s)					
2. Integrated performance index					
Construction productivity measurement model					
3. Computerized activity sampling (CALIBRE approach)					
Project viability measurement model					
4. Analytical Hierarchy Process (AHP)					
Project quality measurement model					
5. Project quality performance model					
6. Blue Print					
7. Quality assessment system in construction (QLASSIC) model					
Performance measurement system in construction					
8. Amalgamated-model of measurement					
M&E methodology and tools for project suitability					
9. Ex Ante Distributional Analysis					
10. Cost-Benefit Analysis					
11. Causality Frameworks					
12. Critical Variables					
13. Benchmarking					

14. Earned value analysis (EVA)					
15. Process Evaluations					
16. Impact Evaluations					
17. Assessment of Indicators					
18. Assessment of Evaluations					
Project management technique use manually in post contract and cost controlling					
19. Critical path method					
20. Program evaluation and review technique (PERT) and PERT-COST)					
21. Line of balance					
22. Activity based ratios technique					
23. Budget monitoring					
24. Leading parameter technique					
25. Variance analysis					
26. Earned value management					
27. Forecasting					
28. Multidimensional project control system (MPCS)					
29. Theory of constraint					
30. Expert judgment					
31. Reserve analysis					
32. Trend analysis					
33. Financial Analysis					
Investment appraisal technique					
34. Payback					
35. Net present value					
36. Annual equivalent					
37. Average rate of return					
38. Profitability index					
39. Internal rate of returns					
40. Threshold analysis					
41. Cost effectiveness analysis					
Add if any technique is omitted and rank …..					
Add if any other technique is omitted and rank …..					

SECTION: C

5. IDENTIFY THE COMPONENTS OF VALUE FOR MONEY ON THE PRICING OF PHYSICAL INFRASTRUCTURE PROJECTS.

4.

Tick (√), how significant value for money affect pricing of physical infrastructure. **[1=Not significant; 2=Less significant; 3=Moderately Significant; 4= Significant; 5=Very significant]**. Please tick (√) in the space provided.

No.	**VALUE FOR MONEY**	1	2	4	4	5
*	**Economy-input**					
1	Planned value					
2	Earned value					
3	Actual cost					
*	**Efficiency-output**					
4	Market value					
5	Force sale value					
6	Auction value					
7	Cross price					
*	**Effectiveness- quality**					
8	Fit for use					
9	Fit for purpose					
10	Fit for demand					
11	Customer satisfaction					
	Add if any……					

SECTION D:

WHAT GOES INTO MARKET VALUE AND EARNED VALUE, WHEN MONITORING THE COST PERFORMANCE?

5. Tick (√), the degree of acceptance, ‘‘**1 = strongly disagree; 2 = disagree; 3 = slightly agree; 4 = agree; 5 = strongly agree”** if the listed below are what goes into market value and earned value when monitoring cost performance.

	MARKET VALUE AND EARNED VALUE	1	2	3	4	5
1	Value for money					
2	Planned value					
3	Production cost					
4	Actual cost					
5	Auction value					
6	Cross price					
7	Demand					
8	Utility					
9	Scarcity					
10	Transferability					
11	Quality					
12	Cost					
13	Time					
14	Quantity					
15	Risk					
16	Add if any……..					
17	Add if any…….....					
17	Add if any……...					

SECTION E:

WHAT IS THE PERCENTAGE (%) DISCOUNT ON THE MARKET PRICE, WHEN DETERMINE FORCED SALE VALUE, AUCTION VALUE, CROSS PRICE

6. Tick (√), the degree of acceptance, ‘‘**1 = strongly disagree; 2 = disagree; 3 = slightly agree; 4 = agree; 5 = strongly agree”**

	PERCENTAGE (%) DISCOUNT ON THE MARKET PRICE, WHEN DETERMINE FORCED SALE VALUE, AUCTION VALUE, CROSS PRICE	1	2	3	4	5
*	**Forced sale value-% of market price**					
1	25 decrease of market price					
2	27 decrease of market price					
3	30 decrease of market price					
*	**Cross price-% degrees in demand to % increase in price (vice vise)**					
4	10 decrease 15 increase					
5	15 decrease 20 increase					
6	20 decrease 15 increase					
*	**Auction Value Or Reserve Price Or Resale Value – Decrease In Market Price (%)**					
1	50 decrease on market price					
2	75 decrease on market price					
	85 decrease on market price					

Thank you very much.