Addis Ababa University School of Commerce
Department of Project Management
Post Graduate Program

Evaluating Construction Project Performance: A Case Study on Pillars Engineering P.L.C.

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A Project Work Submitted to Addis Ababa University School of Commerce in Partial Fulfillment of the Requirements for the Award of Master of Arts Degree in Project Management

June, 2019
Addis Ababa, Ethiopia

Statement of Declaration

I, Israel Kibru Alemu, hereby declare that this thesis entitled "Evaluating construction project Performance: A Case Study on Pillars Engineering P.L.C." is my own paper work and that it has not been submitted before anywhere either at masters level or undergraduate for any award. Any information used from other works has been acknowledged.

Israel Kibru

Signature_____

Date _____

_____

Advisor: Wubishet Bekalu (Dr)

June, 2019

Addis Ababa, Ethiopia

Statement of Certification

This is to certify that **Isarel Kibru** has carried out his research work on the topic entitled "Evaluating construction project Performance: A Case Study on Pillars Engineering P.L.C." is his original work and is suitable for submission for the award of Master Degree in Project Management.

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June, 2019

Addis Ababa, Ethiopia

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Acknowledgement

Prior to all, I must give many tanks and glory to God for all things being done throughout my life. I would like to extend my special and respectful thanks to my advisor Dr. Wubeshet Bekalu for through reading of the paper, valuable comments, suggestion and his kind of full appreciation with devoting his valuable time and for all his professional advice from the starting to the completion of this work.

My warm thanks go to Pillar Engineering Company employees and managers, Gedeon Haddis and lee consulting companies and clients of those projects, for their cooperation in the process of data gathering and to the respondents who gave their valuable time filling the questionnaires and gave the obtainable documents.

My honor and love goes to my parents: My father Kibru Alemu, my Mother Ehite Shiferaw and my Sister Tsion Kibru. All of them have great share in any achievement I have made so far.

I am highly indebted to my dear friend Ruth Kindanewold, who have constantly been encouraging and supporting me throughout my personal life. I really owe you so many thanks again and God bless you in all of your life.

Last but not least, my thanks go to my manager, Edelawit Melaku, and my colleagues Gudeta Kuma and Biniyam Yeshitila for supporting me in doing this research.

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Acronyms

CPI = Cost Performance Index

CPSS= Construction Project Success Survey

KPI= Key Performance Indicators

PCP= Project Cost Performance

PCS= Project Client's Satisfaction

PPE= personal Protective Equipment

PPI= Project Performance Index

PQP= Project Quality Performance

Project A= Ware House Building Project

Project B = Factory Ware House and Demolishing Works Project

PSP= Project Safety Performance

PTP= Project Time Performance

Abstract

This study was trying to assess Pillar Engineering P.L.C's construction project performance in terms of time, cost, quality, Clint satisfaction and safety. In this case the paper tries to scientifically evaluate the performance of construction project based on five project performance indicator. Accordingly, in order to answer questions pertaining construction project performance, the study employed a descriptive research design using both qualitative and quantitative research approach. Subsequently the questionnaire was also distributed to the clients, consultants and contractors. From all responses, the findings demonstrate that the projects are poorly estimated in terms of cost and time ; unorganized data recording and retrieval system; low extent of management's commitment on safety issues; difficulties in overall company's management structure and working manuals establishment ; and week communication and accomplishment capacity. The study also revealed that there is much more significant problem in managing safety related practices of the projects. From those findings the research concluded that the performance status of project A had been poor performance in terms of schedule, cost and safety. Then again project B had poor project performance in terms of safety but has an average performance status on the rest of performance indicators. In another breadth, the study concludes that company's projects are not considerably efficient in using cost effective mechanisms and schedule management. Finally the research give recommended suggestions and replied what mechanisms are suitable to solve the stated problems concerning clients, consultants and contractors and how the problems can be solved in company's existing situation.

Key Words: Project Performnce Indicators, , Project Time Performnace , Project Cost Performnace, Project Quality Performnace, Poject Safety Performnace, Client Satisfaction

Chapter One: Introduction

1.1. Background of the Study

The word performance is widely used in all areas of management. According to Neely (2002), performance is accomplishing something with a specific intent and comparing a result, internally or externally, with some reference standards.

Performance can be considered as an evaluation of how well individuals, group of individuals, organizations or systems have done in pursuit of a specific objective (Mullins 2005). As specified by Mullins these objectives vary significantly, but from an organizational perspective, they generally revolve around satisfying the key stakeholders, notably customers, employees, shareholders, the various suppliers, government and society as a whole. Mullins (2005) also described performance as relating to such factors as increasing profitability, improved service delivery or obtaining the best results in important areas of organizational activities. According to Niven (2002) Performance measurement is used as a working tool for evaluating management performance, including human resources, and formulating corporative strategy.

Amaratunga and Baldry (2002), in a review of the subject of performance measurement, suggested that it was a topic which was often discussed but rarely defined. In that review, performance measurement was projected as the process of ensuring that an organization pursued strategies that led to the achievement of overall goals and objectives. More appropriately it has been defined as the process of quantifying the efficiency and effectiveness of an action taken (Neely, 1997), for instance by an organization. It has also been defined simply as the systematic assignment of numbers to entities or activities and the recording of business activity to provide a stimulus for action that would facilitate continuous improvement (Zairi, 1992).

When we can see performance issue in project context a number of issues are constitutes in performance identification. Projects, by their nature, are unique and many of the more interesting ones are complex. They frequently take place over an extended period of time and demand the engagement of a wide range of resources, including people, finance, facilities, materials and intellectual property. In most circumstances, projects have defined objectives or an end-state that provides those involved in the project with a clear vision and specification of their goal. Regarding achieving pre stated goals, measuring the performance of projects is a very critical

activity in any ways of program undertakings. As stated earlier project Performance measurement also is defined as the process of evaluating performance relative to a defined goal. It provides a sense of where we are and, more importantly, where we are going (Rose, 1995). Rose further stated that projects measurement can guide steady advancement toward established goals and identify shortfalls or stagnation. Willis and Willis (1996) maintained the importance of measuring project performance because it will indicate status and direction of a project.

In a construction project context, it is regarded as a systematic way of judging project performance by evaluating the inputs, outputs and final project outcomes (Takim, 2003). Ethiopia as a country also has witnessed a substantial increase in the number of stalled projects due to poor project performance management. There is evidence that the performance of the building construction in Ethiopia is poor as time, cost and quality performance of projects to the extent that over 70% of the projects initiated are likely to escalate with time with a magnitude of over 50% and over 50% of the projects likely to escalate in cost with a magnitude of over 20% (OIUD, 2007). (Kibuchi and Muchungu 2012) also discovered that even though the high quality of consultants and contractor, construction projects does not always meet their goals. This is manifested by myriad projects that have cost overrun, delayed completion period and poor quality resulting to collapsed buildings in various parts of the country, high maintenance costs, dissatisfied clients and even buildings which are not functional.

Despite the construction industry's significant contribution to the economy of developing countries and the critical role it plays in those countries' development, the performance of the industry still remains generally low. Generally, as Ofori, (2006) & Jekale, (2004) concluded, the construction industry in developing countries failed to meet expectations of governments, clients and society as a whole. As Idoko, (2008) also noted, many projects in developing countries encounter considerable time and cost overruns, fail to realize their intended benefit or even totally terminated and abandoned before or after their completion.

Since construction industry is an important contributor to the economy, despite its unstable nature and uncertain performance (Chan and Chan, 2004), critically measure the performance of projects are very crucial. Based on the criticality of the performance issue of projects, many systems and frameworks have emerged and developed to measure the performance of projects considering the financial and non-financial indicators. On overall basis, the concept of

performance measurement has been improved in three generations; the first generation designed the measures from financial dimensions only; the second generation considered strategies and success factors and deployed them in the process while the third generation linked the financial and non-financial dimensions (Neely 2003).

Performance in the construction context also approached from two perspectives; the first relating to the business performance of organizations and the second relating to project performance. The former is normally assessed using financial results and ratios, and productivity figures (Mbugua, 2000). Other more comprehensive self-assessment tools such as the balanced scorecard (Kaplan and Norton, 1992), pyramid of measures (Lynch and Cross, 1995) and the business performance measurement framework (Mbugua, 2000) are also available for use in assessing the business performance of construction organizations. In many cases, references to performance and research in this category have been focused on project performance (Soetanto, 2001; Xiao and Proverbs, 2003). Furthermore, project performance measurement plays an important role in enabling the construction industry and organizations to conduct benchmarking (Hwang, Tan &Sathish, 2013). Jung and Lim (2007) are also stating that it is essential to correctly categorize projects based on similar project criteria and characteristics with the aims of measuring and enhancing project performance. But, according to Neely (1995) performance measurement is a topic which is often discussed but rarely defined.

In another breadth, in modern project management thought, there has been a long-standing belief that post-project evaluation is beneficial. Anbari (1985) maintains that project evaluation needs to be implemented at various phases of the project life cycle. He further specifies the evaluation thought that during the termination phase, a post-project evaluation needs to be conducted to measure the success of the project in terms of its original and modified objectives. Accordingly this evaluation should contain explanations of major variances, lessons learned from the project and recommendations to support further success of future projects''. Cleland (1985) specifies that ''project evaluation consists of three types: (1) pre-project evaluation for the selection of the project that best suits the overall strategy of the enterprise; (2) ongoing evaluation of the project during its life cycle; and (3) a post-project evaluation for the assessment of the success and efficacy of the completed project, particularly to develop a profile of ''lessons learned'' that can help guide the management of projects in the future. Accordingly the need for participants

involved in construction project delivery to develop and use tools for performance measurement was emphasized in different countries (Robinson 2005). Several researchers also developed numerous parameters for measuring project performance (Ling and Chan, 2002; Josephson and Lindstrom, 2007).

All the underlined issue remains related with how post projects evaluation stays important to the overall project performing organization concentrated with altered organization objectives from different stakeholder's perspective. Seeing that measuring the performance of a project is essential in place of knowing the accomplishment level of project with respect to project objective. As mentioned in the above research findings, it is very essential to measure project performances and make an assessment of the success and efficacy level of the completed project. Explicitly it's very important to know about the real performance status of completed project according to project goals. So this research was tried to measure the performance of a construction projects based on specific project performance measurement parameters with respect to project objectives.

1.2. Statement of the problem

The construction industry also like any other production industry is faced with challenges that affect the performance and output of the endeavor. Moreover, there are many reasons and factors which attribute to this problem. Huemann and Anbari (2007) maintain that a post-project evaluation is a systematic inquiry concerning the merit of management and technical processes, and performance criteria. Subsequently performance evaluation is very helpful in identify root causes of success or failure and highlights improvement opportunities. In this regard evaluating project performance is very fundamental.

A further reason put forward by Cain (2004) for the lack of implementation of performance measurement was to the effect that the construction industry was unwilling to reveal the truth to itself by measuring its performance, finding it more convenient to bury its head in the sand like an ostrich.

Despite this situation, it should be said that some amount of performance measurement is undertaken in any ways, and traditionally within the construction industry, performance has been measured in terms of cost, time and quality (Xiao and Proverbs, 2003).

Bing and Hao (2008) agreed that this traditional evaluation system is no longer applicable to the needs of construction organizations' development. So the argument is being forward to in another dimension is that a project performance evaluation system should consider quality, degree of owner satisfaction and the health and safety. And as articulated by Guangshu and Ershi (2009) these factors are critical for evaluating the performance of construction projects (Guangshu and Ershi, 2009).

In this regard, this research was identified and analyzed the performance of Pillars Engineering P.L.C's projects with respect to time, cost, quality, safety and client's satisfaction. Hence, the performance of each of company's construction projects was evaluated according to project performance measurement model. The model clearly shows how a construction project performance measure in different parameters by identifying five performance parameters based on detail literature analysis.

In another breadth the purpose of a post completion evaluation is to evaluate how successfully the project objectives have been met and how effective the projects that were in keeping the objective from different dimensions. Then it examines the performance of a project and describing the key activities involved in performing each of major projects parameter. So, in this paper a project measurement model for construction projects was used to find out which of company's projects were successful after execution phase.

Thus, this research was tried to evaluate the performance of construction projects and factors' accounting for the specific project performance was assessed. The key requirement was also be used as a benchmark for measuring the performance and of an effective performance measurement also be used with particular emphasis on contractors, consultants and/or client's. Based on past experience, Pillars Engineering Company also do not measure and evaluate project performances in the manner they do for cost and schedule. So, this had led the researcher to study and assess by five project performance measurement parameters rather than cost and schedule, which will provide information on cost, schedule, quality, safety management and client's satisfaction at a specific case projects.

Research question

1. What is the overall performance status of company's projects with respect to five project performance parameters?

2. To what extent cost, time, quality and safety practice influence the overall performance status of the projects?

1.3. Objective of the study

This study has the following general and specific objectives it intends to achieve:

1.3.1. General objective

To assess Pillars Engineering P.L.C's projects overall performances status

1.3.2. Specific objective

The specific objectives of the study were:

- Assessing the overall performance status of company's projects with respect to five project performance parameters
- Assessing the influence of cost, time, quality and safety practices on the project overall performance status

1.4. Scope of the study

The study was specifically being confined to the performance of construction projects in terms of time, cost, quality, safety and client satisfaction. That is, the evaluation is being conducted after the project execution period. In contemporary researches different performance measurement is adopted in construction projects. But in these research only five project performance measurement parameters was used for evaluation purpose. The study was limited in scope and methodology employed for the study purpose. The study was only focused on evaluating the performance of Pillars Engineering company's two projects with respect to cost, time quality, health and safety and client satisfaction. The scope of the study was also delimited to one of the project management knowledge areas, which was post project performance evaluation. Due to time and budget constraints, this study was limited only to two projects implemented in the organization and thus it may be impossible to fully generalize the finding with confidence to projects in other organization.

Taking this as a reference point this research reviews and indicates feasible objectives of the client. The selected projects are all under the construction organization of Pillars Engineering P.L.C. That was only deployment projects with a go-live under between the year 2017 and 2018 were selected for this research. The selected time frame led to a representative selection which includes all projects completed as the projects offered for functioning.

1.5. Significance of the Study

In Ethiopia in the last ten years, different projects were implemented in different sectors in order to reduce poverty and enhance sustainable growth in the country. In this regard, even though some of the projects were successful, most of the projects were failed. This study takes one knowledge area of project management which is project performance evaluation and analyzes with respect to specified projects objective that was implemented in Pillars Engineering P.L.C. Thus, assessment of different projects may provide the already started project or the project that will be started in the future with important information that needs to be considered to implement on the projects successfully.

The findings and recommendations of this study will also be of a great importance to different project contractor, clients, consultants, project managers and project teams undertaking different projects. It would also give a general insight to the academic & professional society about the different aspects of project performance and how it is being evaluated in construction projects. Last but not least, this study will serve as a starting point and as a reference for further studies.

1.6. Limitation of the Study

In preparing this research paper the student researcher faced different limitations, among the restrictions; company's data organization and document custody was the major difficulties in conducting this research. It is very difficult to get Valuable documents easily within short period of time in such condition. In addition company structure and working environment was difficult to get all concerned individuals with effectual time and these was caused to finish the research within specified time. The study was also limited in scope and methodology employed for the study purpose. Due to time and budget constraints, this study was limited only to two projects implemented in the organization and thus it may be impossible to fully generalize the finding with confidence to projects in other organization.

1.7. Organization of the Study

The paper was organized in to five major chapters. The first chapter is an introductory part which includes; back ground of the study, statement of the problem, objective of the study, research questions, significance of the study, limitations, scope of the study, definition of terms used and organization of the study. The second chapter deals with review of literature concerning definition and theoretical concepts of project performance and project performance evaluation. Chapter Three was covers the research methodology of the study. The chapter was describes the research design, research approach, target population, tools and techniques of data collection and data analysis. Chapter Four covers data presentation, data analysis, data interpretation and discussion. Finally Chapter Five covers the study findings, conclusions, recommendations depending on finding of the study and areas for further studies. Lastly bibliography and appendixes was attached with their valuable components.

1.8. Definition of Terms and Operational Definition of Variables

- Building: A permanent or temporary construction used for the purpose of Ware house, office and Guard house under Pillars Engineering P.L.C;
- Construction: means the construction of new building projects under Pillars Engineering P.L.C.
- Client: Any private or public organization or individual for whom the construction project is being undertakes.
- Contractor: A natural or juridical person under contract with an owner to construct the building construction projects.
- Consultant: The person or entity appointed by the owner to establish and agree all budgets, and implement and manage the necessary cost control on the project.
- Performance: The accomplishment of a given building construction projects against the contractual cost, time, quality, client satisfaction and safety.
- Project: Building construction projects constructed in the last three years from 2007-2010 E.C. under Pillars Engineering P.L.C.

Chapter Two: Literature Review

2.1. Project performance

The Project Management Institute (1996) defines a project as "a temporary endeavor undertaken to create a unique product or services". Projects are unique, novel, specifically aimed at a certain goal, and have a clear finishing date. Success of construction projects depends mainly on success of performance. Many previous researches had been studied performance of construction projects. Dissanayaka and Kumaraswamy (1999) remarked that one of the principle reasons for the construction industry's poor performance has been attributed to the inappropriateness of the chosen procurement system. Reichelt and Lyneis (1999) remarked three important structures underlying the dynamic of a project performance which are: the work accomplishment structure, feedback effects on productivity and work quality and effects from upstream phases to downstream phases. Thomas (2002) identified the main performance criteria of construction projects as financial stability, progress of work, standard of quality, health and safety, resources, relationship with clients, relationship with consultants, management capabilities, claim and contractual disputes, relationship with subcontractors, reputation and amount of subcontracting.

Chan and Kumaraswamy (2002) stated that construction time is increasingly important because it often serves as a crucial benchmarking for assessing the performance of a project and the efficiency of the project organization. Cheung (2004) identified project performance categories such as people, cost, time, quality, safety and health, environment, client satisfaction, and communication.

It is obtained by Navon (2005) that a control system is an important element to identify factors affecting construction project effort. For each of the project goals, one or more Project Performance Indicators (PPI) is needed. Pheng and Chuan (2006) obtained that human factors played an important role in determining the performance of a project. Ugwu and Haupt (2007) remarked that both early contractor involvement (ECI) and early supplier involvement (ESI) would minimize constructability-related performance problems including costs associated with delays, claims, wastages and rework, etc.

2.2. Performance Evaluation

2.2.1. Definition of evaluation

As Patton (1986) defines Evaluation is the systematic collection of information about the activities, characteristics and outcomes of program [projects] for use by specific people to reduce uncertainties, improve effectiveness and make decisions with regard to what these programs are doing. Evaluation can also be defined as a process which determines as systematically and as objectively as possible the relevance, effectiveness, efficiency, sustainability and impact of activities in the light of a project / program performance, focusing on the analysis of the progress made towards the achievement of the stated objectives. Austrian Development Agency (2009) defines evaluation as a systematic and objective assessment of an ongoing or completed project or program, its design, implementation and results. The aim is to determine the relevance and fulfillment of objectives, development efficiency, effectiveness, impact and sustainability. Evaluation also defines as synthesizing the definitions from the major dictionaries; we take evaluation to be the process of determining merit, worth, or significance. Evaluations are the products of this process.(Michael Scriven as quoted from: Hughes & Nieuwenhuis, 2005).

As Gitlin and Smyth (1989) comment, from its Latin origin meaning 'to strengthen' or to empower, the term evaluation has taken a numerical turn - it is now largely about the measurement of things – and in the process it can easily slip into becoming an end rather than a means. In another breadth evaluation is a systematic assessment of a planned, ongoing or completed intervention to determine its relevance, efficiency, effectiveness, impact and sustainability. The intent is to incorporate lessons learnt into the decision making process (OECD Glossary, 2002)

As Scriven (1991); Evaluation is the process of determining the merit, worth and value of things and evaluations are the products of that process. Evaluation is not the mere accumulation and summarizing of data that are clearly relevant for decision making…gathering and analyzing the data that are needed for decision making comprise only one of the two key components in evaluation, a second element is required to get to conclusions about merit or net benefits: evaluative premises or standards. Evaluation has two arms: one in engaged in data gathering, the other collects, clarifies and verifies relevant values and standards.

As Stufflebeam (2000); Evaluation is (1) assesses the effectiveness of an ongoing program in achieving its objectives, (2) relies on the standards of project design to distinguish a program's effects from those of other forces, and (3) aims at program improvement through a modification of current operations.

2.2.2. Types of evaluation

2.2.2.1. Ongoing & Post-Project Evaluations

Ongoing and post-project evaluations, which can also be termed formative and summative evaluations, construct a dichotomy that is perhaps the most sensible way to categorize evaluation techniques (Scriven, 1996). Michael Scriven, a prolific forerunner in the field of evaluation, paved the way for defining and disseminating this dichotomy, and argues that the differences between the two are definitive, and understanding these differences is necessary for getting the intended outputs out of an evaluation (Scriven, 1967). Depending on the circumstance, both evaluation methods are valuable in their own right.

2.2.2.2. Formative Evaluation

Formative evaluation is also useful in analyzing learning materials, student learning and achievements, and teacher effectiveness. Formative evaluation is primarily a building process which accumulates a series of components of new materials, skills, and problems into an ultimate meaningful whole (Wally, 1978)

In the most basic sense, formative evaluations exist as a means to provide the evaluator (or whoever is to make use of the evaluation) with rapid feedback regarding what is working and what may not be working in the project as it currently stands in terms of implementation and progress. Furthermore, conducting formative evaluations in a project can result in the formulation of valuable documentation that can then be used in whatever way necessary to maximize project learning. For example, an evaluator can look back on an ongoing project to when a certain risk was first realized, and understand what activities, decisions, and roles lead to some particular outcome. Formative evaluations can also assist in planning a project. It can show when there is either congruity or a contradiction from what is actually happening to what the plan had stated in the beginning (Nan, 2003). Formative evaluation is used before program design or implementation. It generates data on the need for the program and develops the

baseline for subsequent monitoring. It also identifies areas of improvement and can give insights on what the program's priorities should be. This helps project managers determine their areas of concern and focus, and increases awareness of your program among the target population prior to launch. Formative evaluation's aims seem to be focused on project improvement; a developmental process that facilitates in revealing problem areas or recognizing successful ones (Hughes & Nieuwenhuis, 2005).

2.2.2.3. Summative Evaluation

Summative evaluations tend to be used as a tool to determine the accountability of the project. Once the project has concluded, measuring the effectiveness of the project's goals and outputs can give a project team evidence for whether the project was justified or not. A judgmental-type of evaluation technique, summative evaluations may be used by external sponsors or upper-management in order to validate the relevance or effectiveness of the project itself. By measuring a completed project, widespread issues that have existed in many projects may be realized which could then be learned and applied to many future projects. Furthermore, it could improve the perception of the project team's capabilities and worth (Cummings, 2001). Summative evaluation is conducted after the program's completion or at the end of a program cycle. It generates data about how well the project delivered benefits to the target population. It is useful for program administrators to justify the project, show what they have achieved, and lobby for project continuation or expansion (Patton, 1986).

2.2.2.4. The Goals & Roles of Evaluation

Evaluation can be understood in two ways – the general goals that the evaluation is supposed to achieve, and the specific roles it can play within a particular industry or function. Scriven (1967) once again leads the discussion, by describing that evaluation [goals] attempts to answer certain types of question about certain entities. The goals are rather simple and straightforward, and really just involve collecting and merging data from the project along with a weighted set of "goal scales" to yield some sort of qualitative or quantitative rating.

The role of evaluation in a specific context can vary quite a lot in terms of what the focus is on. It may play the role of training new project team members, of an investigation to deciding about needed resources, or of determining the sanctioning (positively or negatively) of the participants. Evaluation may even play several roles at once (Scriven, 1967).

Scriven (1967) points out that failure to see the difference between the goals and roles of evaluation is one of the reasons why the process of evaluation has become diluted to the point where it is not effective anymore at answering the questions that were the goal in the first place. Through this, goals have somehow blended with the evaluative roles, and when this happens, evaluations are used in inappropriate situations (roles) and the goals have no way of being met. This has led project managers and other professionals to considering evaluations ineffective, when in fact they are just not being used correctly.

2.2.2.5. Goal-Free Evaluation

Being able to make the distinction between evaluation goals and roles does not necessarily mean that the goals themselves need to exist at the start. It is true that goals help to measure the extent to which a project has reached its proposed objectives, but it can also have unintended consequences. Patton (2002) argues that stated goals set predetermined barriers, which risk missing significant but unexpected outcomes. Goals also set perceptual biases of the participants because the ideal outcome is already known.

In a goal-free evaluation, the evaluator holds any judgment about what the project is setting out to accomplish, and rather focuses on what is happening in terms of dynamics, effects, and observable outcomes. Gathering data this way gives the evaluator the opportunity to see project effects and its effectiveness without the restriction of a narrow focus. Goal-free evaluations can be conducted alongside goal-based evaluations, so long as separate evaluators are used (Quinn, 2002).

2.3. Construction Projects and Performance

Achievement of construction projects depends mainly on success of performance. Many previous researches had been studied performance of construction projects. Dissanayaka and Kumaraswamy (1999) remarked that one of the principle reasons for the construction industry's poor performance has been attributed to the inappropriateness of the chosen procurement system. Reichelt and Lyneis (1999) remarked three important structures underlying the dynamic of a project performance which are: the work accomplishment structure, feedback effects on productivity and work quality and effects from upstream phases to downstream phases. Thomas (2002) identified the main performance criteria of construction projects as financial stability,

progress of work, standard of quality, health and safety, resources, relationship with clients, relationship with consultants, management capabilities, claim and contractual disputes, relationship with subcontractors, reputation and amount of subcontracting.

Chan and Kumaraswamy (2002) stated that construction time is increasingly important because it often serves as a crucial benchmarking for assessing the performance of a project and the efficiency of the project organization.

Cheung (2004) identified project performance categories such as people, cost, time, quality, safety and health and client satisfaction. It is obtained by Navon (2005) that a control system is an important element to identify factors affecting construction project effort. For each of the project goals, one or more Project Performance Indicators (PPI) is needed. Pheng and Chuan (2006) obtained that human factors played an important role in determining the performance of a project. Ugwu and Haupt (2007) remarked that both early contractor involvement (ECI) and early supplier involvement (ESI) would minimize constructability-related performance problems including costs associated with delays, claims, wastages and rework, etc.

Al-Momani (2000) stated that the accomplishment of any project is related to two important features, which are service quality in construction delivered by contractors and the project owner's expectations. Managing the construction so that all the participants perceive equity of benefits can be crucial to project success. It is obtained that the complete lack of attention devoted to owner's satisfaction contributes to poor performance. Declining market shares, low efficiency and productivity, and the rapid construction cost escalation also lead to poor performance.

Nitithamyong et al (2004) remarked that the success of construction projects depends up on technology, process, people, procurement, legal issues, and knowledge management which must be considered equally. Pheng and Chuan (2006) defined project success as the completion of a project within acceptable time, cost and quality and achieving client's satisfaction. Project success can be achieved through the good performance of indicators of the project.

So, success refers to project success and performance refers to performance of indicators such as project managers. Wang and Huang (2006) stated that Project success has been widely discussed in the project management literature. The focus of most studies of project success is on dimensions of project success (how to measure it) and factors influencing project success. Wang

and Huang (2006) studied that how the engineers evaluate project success and to what extent key project stakeholders' performance correlates with project success. It is obtained that project owners play the most important role in determining project success, and project management organizations' performance as the single point of project responsibility has significant correlations with project success criteria. Lam (2007) stated that the allocation of risk among the contracting parties in a construction contract is an important decision leading to the project success. To perform is to take a complex series of actions that integrate skills and knowledge to produce a valuable result (Elger, 2008). Project performance has been defined as the degree of achievement of certain effort or undertaking which relates to the prescribed goals or objectives that form the project parameters (Ahmad, Ismail, Nasid, Rosli, Wan &Zainab, 2009). The key requirements of suitable performance measures and measurement frameworks are identified as including, having a few but relevant measures, being linked with critical project objectives, providing accurate information, and comprising financial and non- financial measures (Ankrah& Proverbs, 2005). There are many potential measures of performance for evaluating the success of a construction project. All address performance in three key areas: scope, schedule and budget (Alvarado, Silverman & Wilson, 2005). Akintoye and Takim (2002) discovered seven project performance indicators, namely: construction cost, construction time, cost predictability, time predictability, defects, client satisfaction with the product and client satisfaction with the service and three company performance indicators. Namely: safety, profitability and productivity.

2.4. Performance Indicators

The UK working groups on Key Performance Indicators (KPIs) have identified 10 parameters for benchmarking projects in order to achieve a good performance in response to Egan's report (1998). However, most of these indicators, such as construction cost, construction time, defects, client satisfaction with the product and service, profitability and productivity, promote result-orientated thinking, whereas predictability of design cost and time, and predictability of construction cost and time, and safety can be regarded as process-orientated thinking. There are no suggestions for performance indicators in benchmarking projects at the project selection phase i.e., analysis stage, when the client and end-user's requirements need statements and the delivery strategy are determined. In addition, the perspective of the 'project' and 'supplier' is not clearly indicated. None of the measures mentioned in this section could identify the performance

of suppliers in a project environment. According to Dvir (2002), the output of the requirements at the analysis stage will most likely determine the output of the entire development process. They indicate that the origination and initiation phase, in which major decisions are made, such as decisions on the project's objectives and planning the project's execution, has the most influence on the project's success. The issue is much more serious when the kind of activities that should be undertaken depends on the outcome of earlier activities. It is therefore important to identify parameters (performance indicators) for benchmarking projects at the project selection phase in order to achieve good project performance. Posten (1985), who found that 55% of all defects in R&D projects occur during requirement analysis and specification, earlier documented this position, whereas 43% of all defects are not found until after the testing stage. It is not surprising that the same situation is applicable to construction projects.

2.5. Project Performance Indicators for this Research

Performance measurement is defined as the process of evaluating performance relative to a defined goal. It provides a sense of where we are and, more importantly, where we are going (Rose, 1995). Rose further stated that measurement can guide steady advancement toward established goals and identify shortfalls or stagnation. Willis and Willis (1996) maintained the importance of measuring performance because it will indicate status and direction of a project.

It is widely accepted view that, at a minimum, performance measures of a project are based on time, cost and quality (Barkley and Saylor, 1994). Atkinson (1999) noted that these three components of project performance as the 'iron triangle'. However, Kumaraswamy and Thorpe (1999) considered variety criteria in measuring a project. This includes meeting budget, schedule, and the quality of work, stakeholder's satisfaction, and health and safety. Similarly, Chan and Tam (2000) noted that various other key components also used in measuring project performance such as health and safety and owners expectation / satisfaction. Therefore, in this research, five variables have been identified for measuring project performance. They are cost, time, quality, clients' satisfaction and safety.

2.5.1. Cost performance

Cost is defined as the degree to which the general conditions promote the completion of a project within the estimated budget (Bubshait and Almohawis, 1994). Salter and Torbett (2003) indicated that cost variance was the most common technique used to measure design performance. It is not only confined to the tender sum, but the overall cost that a project incurs from inception to completion, which includes any costs arise from variations, modification during construction period and the cost arising from the legal claims, such as litigation and arbitration. It can be measured in terms of unit cost, percentage of net variation over final cost (Chan and Tam, 2000). Cost variance is a very important factor in measuring project performance because it indicates how much the project is over or under budget. Andi and Minato (2003) used cost variance to measure project performance caused by defective design in Japan's construction industry. Similarly, Georgy (2005) suggested the element of cost to measure the performance of engineering projects. Hence, in this research, cost variance is calculated by the variance between the actual cost and the budgeted cost of a project.

2.5.2. Time performance

It is very important for construction projects to be completed on time, as the clients, users, stakeholders and the general public usually looks at project success from the macro view where their first criterion for project success appeared to be the completion time (Lim and Mohamed, 2000). Salter and Torbett (2003) and Odeh and Battaineh (2002) mentioned that time variance is one of the techniques for assessing project performance in construction projects. The element of time could indicate to project managers that the project was not running as smoothly as scheduled.

Furthermore, Latham Report (1994) suggested that ensuring timely delivery of projects is one of the important needs of clients of the construction industry. Construction time can be regarded as the elapsed period from the commencement of site works to the completion and handover of a building to the client. The construction time of a building is usually specified before the commencement of construction. Construction time can also be deduced from the client's brief or derived by the construction planner from available project information.

2.5.3. Quality performance

In the construction industry, quality is defined as the totality of features required by a product or services to satisfy a given need, or fitness for purpose (Parfitt and Sanvido, 1993). In other words, the emphasis of quality in construction industry is on the ability to conform to established requirements. Requirements are the established characteristics of a product, process or service as specified in the contractual agreement and a characteristic is any specification or property that defines the nature of those products, processes or services, which are determined initially by the client. In order to achieve a completed project that meets the owner's quality expectations, all parties to a project must acquire an understanding of those expectations, incorporate them into the contract price and other contract documents to the extent possible, and commit in good faith to carry them out (Ganaway, 2006).

2.5.4. Clients' satisfaction

Satisfaction is regarded as a function of comparison between an individual's perception of an outcome and its expectation for that outcome (Locke, 1970). In the construction industry, client's satisfaction has remained an elusive and challenging issue for some considerable time. Dissatisfaction is widely experienced by clients of the construction sector and may be caused by many aspects but is largely attributable to overrunning project costs, delayed completion, inferior quality and incompetent service providers including contractors and consultants (Contract Journal, 2004). Research findings by BSRIA (2003) have suggested that it is five times more expensive to develop a new construction client than to maintain an existing one and companies could increase their profits by almost 100 per cent by retaining just 5 per cent more of their clients. Client's satisfaction is therefore a fundamental issue for construction participants who must constantly seek to improve their performance if they are to survive in the global marketplace. In the construction industry, the measurement of client's satisfaction is often associated with performance and quality assessment in the context of products or services received by the client (Parasuraman, 1988; Soetanto and Proverbs, 2004). Usually the client' s requirements are to get construction needs translated into a design that specifies characteristics, performance criteria and conformance to specifications, besides to get the facilities built within cost and time (Ahmed and Kangari, 1995).

2.5.5. Health and safety

Health and safety are defined as the degrees to which the general conditions promote the completion of a project without major accidents or injuries (Bubshait and Almohawis, 1994). The measurement of safety is mainly focused on the construction period as most accidents occur during this stage. Throughout the world, construction industry is known as one of the most hazardous activities. Thousands of people are killed and disabling injury annually in industrial accident. Construction workers worldwide have three times more chances of dying and two times of getting injured than any worker of other economic activity (Sousa and Teixeira, 2004). In Malaysia, Social Security Organization (SOCSO) reported out of the total of 73,858 industrial accidents recorded in 2003, 4654 were occurred in construction industries with 2 per cent or 95 cases resulting in deaths. There is no single reliable measure of health and safety performance. Traditionally, the safety performance is measured through injury statistic. The main purpose of measuring health and safety performance is to provide information on the progress and current status of the strategies, processes and activities employed to control health and safety risks. Effective measurement not only provides information on what the levels are but also why they are at this level, so that corrective action can be taken.

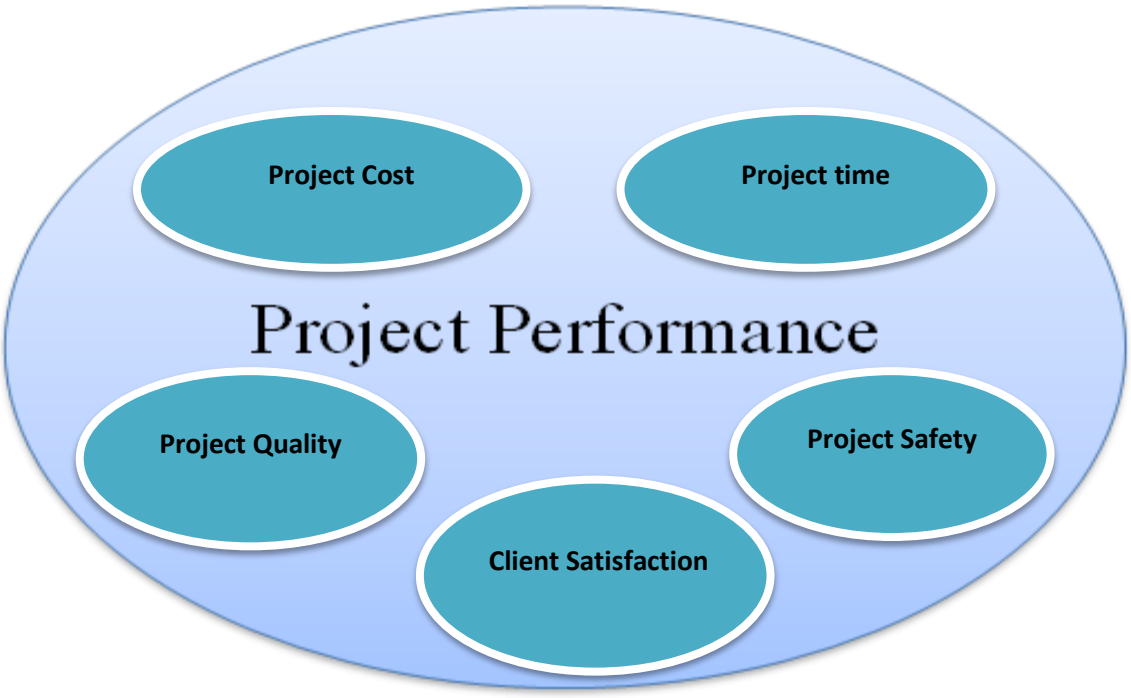

Figure 2.1 Performance indicators of construction projects

2.6. Performance Measurement

A literature review of the existing performance measurement models in construction would suggest that construction performance can be categorized in many ways, including the following four categories: construction project performance; construction productivity, project viability and project quality. Mbugua, (1999) and Love, (2000) have identified a distinction between performance indicators, performance measures and performance measurement.

According to Mbugua (1999), performance indicators specify the measurable evidence necessary to prove that a planned effort has achieved the desired result. In other words, when indicators can be measured with some degree of precision and without ambiguity they are called measures. However, when it is not possible to obtain a precise measurement, it is usual to refer to performance indicators.

Performance measures are the numerical or quantitative indicators (Sinclair and Zairi, (1995). On the other hand, performance measurement is a systematic way of evaluating the inputs and outputs in manufacturing operations or construction activity and acts as a tool for continuous improvements (Sinclair and Zairi, 1995; Mbuguaetal., 1999). In response to calls for continuous improvement in performance, many performance measurements have emerged in management literature. Some examples include: the financial measures (Brown and Lavenrick 1994; and Kaka, 1995), client satisfaction measures (Harvey and Ashworth, 1997; and Chinyio, 1998), project performance measures (Belassi and Tukel, 1996) and industry measures (Latham, 1994; Egan, 1998). Cordero (1990) classifies performance measurement based on the method of measurement and area of measurement. The methods of measurement of performance can be in terms of the technical performance, the commercial performance and the overall performance. The areas of measurement are at the planning & design level, the marketing level and manufacturing level etc., and for the overall performance are at the level of a firm or strategic business unit. Furthermore, he proposes a model of performance measurements in terms of outputs and resources to be measured at different levels. Outputs are measured to determine whether they help to accomplish objectives (effectiveness) and resources are measured to determine whether a minimum amount of resources is used in the production of outputs (efficiency).

In the construction industry's present scenario, the systematic ways of performance measurement have influenced many construction firms, government sectors, public and private clients and

other project stakeholders. They use the performance measurement to judge their project performances, both in terms of the financial and non-financial aspects and to compare and contrast the performance with others, in order to improve program efficiency and effectiveness in their organizations. Moreover, according to Steven (1996), measurements are needed to tract, forecast, and ultimately control those variables that are important to the success of a project, and this has been agreed by many researchers and practitioners (Chan, 2001). This is in line with Stevens (1996) views, who noted that the 'hard' and 'soft' sides of project measurement criteria are used in measuring project success, with time and cost being 'hard' and satisfaction being 'soft'.

The research by Freeman and Beale (1992) and Riggs (1992) contributes to the measurement of project success from the tangible and non-tangible aspects, where the tangible ones are in terms of cost and time, whereas the non- tangible may include customer satisfaction, the performance of the project manager, weather conditions and other attributes. So, in this research the measurement of project performance are included both tangible and non-tangible parameters of the performance.

2.7. Construction Project Performance Measurement model

Three different models developed for measuring construction project performance are integrated performance index (Pillai, 2002), project performance measurement model (Shahrzad Khosravi and Hamidreza Afshari, 2011), and key performance indicator (Construction Industry Task Force, 1998)

Integrated Performance Index was developed by Pillai, (2002) for performance measurement of R&D projects, based on their real-life experiences of working on the management system for the Integrated Guided Missile Development Program of India. 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 In order to measure the performance of a R&D project. Pillai, (2001) listed eight prominent factors that cut across the three project phases as follows: benefit, risk, project preference, project status, decision effectiveness, production preparedness, cost effectiveness and customer commitment. By integrating these key factors using mathematical

formulae, and based on their functional relationships, an integrated performance index (IPI) is computed. The usefulness of the integrated performance index is that it can be applied at all the phases of the project life cycle to rank the project for selection, to compare project performance under the execution phase and to act as an input for the management of future projects.
One problem of the model is lack of clarity in the way the mathematical formulae is used to integrate the identified key factors into an integrated performance index. Given this shortcoming, this model is not well received by practitioners.

Key Performance Indicators (KPIs) is the UK construction industry's response to Egan's report (Construction Industry Task Force, 1998) to measure project performances, based on 10 identified parameters. These consist of seven project performance indicators; construction cost, construction time, cost predictability (design and construction), time predictability (design and construction), defects, client satisfaction with the product and client satisfaction with the service; and three company performance indicators namely; safety, profitability and productivity. The model begins by establishing the fundamental 'key drivers for change', which comprise committed leadership, focus on customer needs, product team integration, a quality-driven agenda and commitment to people. The quality-driven agenda in the key drivers means that the total package needs to deliver zero defects, be right the first time, deliver on time and to budget and exceed customer expectations. As part of the KPIs, definitions are provided with the industry performance graphs and a radar chart.
The graphs allow analysis to be made by companies of their own results, by assessing these and comparing them with the radar chart that acts as a simple performance score-card. The strength of this model is that the overall concepts are easily understood and easily implemented by clients, designers, consultants, contractors, sub-contractors and suppliers. One problem with the model is that the KPIs are not compartmentalized along project phases
Lim and Mohamed (1999), as reviewed by Chan and Chan (2004), also modeled project success measurement into 'micro viewpoint: completion time, completion cost, completion quality, completion performance, completion safety; and macro-viewpoints: completion time, completion satisfaction, completion utility, completion operation. A key feature of this model is that it proposes only lagging indicators and gives no room for continuous assessment and monitoring.

The problem whether the project success can be measured or not has been addressed by many researchers.

Many researches created a solid foundation for this study when they described the whole picture of project success measurement indexes by Al-Tmeemy (2011). They collected the indexes from previous researches or industry and then asked the perception of respondents. Most of them were based on the important scale to evaluate the important level of each. These researches provided a valuable reference for this research. Project goals were the most appropriate criteria for project success assessment. They were based on the level of these objectives being met. In almost all previous researches, triangle project objectives, which included cost, time, and quality, were the main components in the evaluation system. Related to objective measures, four criteria in most of all research were Cost, Time, Health and Safety, and Quality. Other five measures were Technical performance/-Meeting specification, Functionality, Productivity, and Profitability, rarely appeared. In the subjective measures group, only one criterion, stakeholders' satisfaction, was predominant in almost all studies. Seven other criteria were only mentioned in one or two studies. They are Expectation/ Aspiration, Dispute/Conflict management, Claim management, Professional image, Aesthetics, Educational/social/ professional aspects, and Environmental sustainability. A group of researches concentrated on exploring the important weight and methodology to combine all indexes. They were Griffith (1999); Shawn (2004); Menches and Hanna (2006); and Shahrzad Khosravi (2011). Although some limitations made them difficult to apply in developing countries, these studies were very important in developing this research framework.

A success indexes equation was developed by Griffith (1999). Their equation considered four main criteria with their careful definition. The first criterion was Budget Achievement, which kept the highest proportion, weighted at 33% in evaluating project success. It was measured by percent of deviation between authorization budget and completion. The second criterion was Schedule achievement. It was weighted at 27% in project evaluation and was measured by the difference between the authorized schedule and schedule of actual completion. Two other criteria were Design Capacity and Plant Utilization. They were weighted at 12% and 28%, respectively, and were measured by authorization and actual attainment after six months of operation. Their relative weights were calculated by summing up all responses in important scale. This framework was developed specifically for facility projects. Therefore, it required more indicators

and modifications to apply in construction building. After two years, another group of researchers, Shawn (2004), developed a Construction Project Success Survey (CPSS) instrument. Their instrument included classic objective measures such as cost, schedule, quality, performance, safety, and operating environment. They used the seven point Likert systems to assess each criterion. In their instrument, respondents' perceptions about the importance of each issue were calculated. The instrument included thirty two issues related to six groups of criteria as mentioned above with the seven scale of answering. It made the instrument difficult and confusing for respondents. The result was still subjective because it depended on the perceptions of respondents. A quantitative measurement method of successful performance was developed by Menches and Hanna (2006). They provided a quantitative methodology to measure the success from the qualitative evaluation. This method was the nearest basis for conducting the project success/performance frame in this research. However, the model provided by Shahrzad Khosravi and Hamidreza Afshari is an effective method to convert a qualitative parameter to quantitative and weighting each performance parameter and calculate project performance status.

Chapter Three: Methodology of the Study

3.1. Research Approach and Design

In this study, the research tried to answer questions pertaining construction project performance. Subsequently this study employed a descriptive research design. This design is giving a comprehensive picture of company's projects in terms of cost, time, quality, safety and client satisfaction. Concerning the research strategy, both quantitative and qualitative research approaches was used to stipulate the research objective. The case-study method is also selected as the method used to conduct this research. This method is a powerful technique for executing in-depth investigations of a single person, group, organization or community in their natural settings. It is commonly used to obtain deep insight into a certain domain using several data sources and methods (Saunders, Lewis & Thornhill, 2015). This method was selected because it quickly provides details about cases that add depth to the quantitative breadth of related outcome data. So, the research aims was to measure and evaluate project performance, peculiar to the company specific case which accompanied in construction project performance, which is variables that are determined by clients. Accordingly due to research budget and other constraints, cross-sectional data collection method was used.

3.2. Population of the Study

Target population is said to be a specified group of people or object for which questions can be asked or observation made to develop required data structures and information (Hair 2010). Thus, for this study, the target population was mainly project that was constructed by Pillars Engineering P.L.C at different times. So the study takes projects from the total projects implemented by Pillars Engineering P.L.C. The first project is completed at July 2018;owned by Yes Brand Food and Beverage P.L.C namely ware house building project and the second selected project; owned by peace success industry P.L.C and completed at September 2018, namely Factory ware house and demolishing works project. Then from sample project selected, all concerned project team members was participated in answering the research questionnaire that was distributed to them.

Pillars Engineering P.L.C has currently seven projects under construction and there were two projects completed up to the year end of 2018. Accordingly, for the sake of measuring project performances, the study was only focus on completed projects. So, this study was focus on two projects that were constructed by the company. Even though there were a lot of projects in the company, it is not possible to get all the data related to consultants and clients which were constructed by the organization. So that is why the study was limited to only two projects.

Concerning respondents of the research, there are three groups of respondents that were composed to measure company case project performance; which was all concerned individuals that is clients, contractors and consultants were included on the respondents of this research. So, all concerned supervisors, project managers, site engineers, Foramens, structural engineers, consulting-engineers, and owner /clients were encompassed in the research.

Accordingly all resident engineers, supervisors, Forman's, site engineers, structural engineers and site supervisors, which are participated on the two selected projects, are the respondents of the study. In addition the project managers and client's project management office concerned officers and managers are also included. In this regard 48 respondents are the population of the study. That is 25 respondents were from ware-house building project and the rest 23 respondent are from factory where-house and demolishing works project.

3.3. Data Types and Data Sources

In this study, both primary and secondary data was employed. The primary data was collected from project contractor, owner and consultants from each specific project. Questionnaire was used to collect those data concerned with project performance. Secondary data was also obtained from written sources that include: reports and materials from company, journals and periodicals, internet, and others. The advantage of using secondary data is that it can be used as the baseline to compare the primary data collected from this research. A detail of these was analyze and interpreted in reference to the subject matter of the study.

3.4. Data collection techniques

A data collection method was both qualitative and quantitative. Qualitative because, document review those are completion reports of construction projects in the reviewed to disclose the extent of project performance and project objective. Quantitative because the researcher was prepared and distribute questionnaire for all respondent (Questionnaires was distributed to contractors, owner and consultants of the construction projects).

The respondents' response was collected by using questionnaires from contractors, consultants and owner. Archival documents were from completed projects, in which contract documents, project reports and payment disbursements were investigate thoroughly which are very important in identifying the cost and schedule related apprehensions and encompassed on the performance of construction projects. A questionnaires was prepared to deal the target i.e. owner, consultant and contractor. Feedback from owner, contractors and consultants was collected and sorted accordingly. And Likert Scale of five points (it ranges from 5=for excellent performances and 1=for worst performances) was used to measure the project performance parameters of each projects status that may influence the overall performances of a project.

3.5. Data analysis

The data collected was varying in nature in that some of its aspects were quantitative, that is it could be expressed in quantity form. In this respect various statistics was employ to suit particular characteristics in revealing the desired information. The collected data is being quantitative, raw data that have to be process to obtain information. The Quantitative data was analyzed by quantitative analysis, which is an approach to measuring and evaluating data through the examination of numerical values and variables. There are several tools and methods available to present quantitative analysis, such as tables, graphs, and statistics (Saunders, Lewis, &Thornhill, 2015). The statistic tool SPSS was also used for this analysis.

A closed ended item that was constructed in the rating scale form and in which respondents provided their responses by five point likert scale was analyzed quantitatively by using statistical tools. Then descriptive statistics techniques were run which consisted frequencies, percentages and mean to summarize the data. The percentage, mean, and standard deviation are offering to

present the variables such as actual cost, duration, quality, safety and actual deliverables of the two projects.

In order to analyze the projects coat and schedule performance status, in addition to performance index measurement model, document analysis technique was also used in association with expected performance standard that was transcribed in construction project related literatures. Harold Kerzner (1998) considers earned value analysis earned value analysis is a relevant maturity differential in project management. That can clearly show what was planned, what was performed, and the actual costs. Therefore, earned value analysis was used to analyze cost performance of the projects. Subsequently, all project performance indicators, which are cost, schedule, safety, quality and client satisfaction, were analyzed based on perception based analysis that is each of project performance parameter indexes was calculated through aggregate mean value of each of project performance parameter items. That was the final aggregate project performance result was expanded from the correspondent parameter means. Intended for measuring the cumulative performances status under each performance indicator comprised questions, central tendency value, which is the mean value statistics, was used for interpreting the aggregate result. Accordingly all the findings are conclusive and presented by descriptive analysis method.

Chapter Four: Data Presentation and Analysis

4.1. Introduction

In the previous chapter the student researcher has provided a clear research methodology framework on how the research is conducted. So this chapter proceeds analyzing the data after all the questionnaire and available documents are collected, which helps to evaluate the performance of Pillars Engineering P.L.C projects within five performance measurement parameters. The study employed a descriptive research design, which is helping to get a comprehensive picture about executed projects and an evaluation of its performance in terms of time, cost, quality, safety and client satisfaction. The research also used quantitative and qualitative research approach to stipulate the research objective in a well suited manner. Subsequently the questionnaire was distributed to clients, consultant companies and for Pillars Engineering company concerned employees. The student researcher was able to collect 41 questionnaires filled-up by respondents, which implies 85.4% response rate of data acquisition through this instrument. Document review was also compiled from company contractual agreement and different documents in order to getting real cost and schedule performance statuses. Thus in order to answer the major questions regarding construction project performance, the data is being organized and analyzed in to five major parts. That is questionnaire related with cost performance, schedule performance, quality performance, safety performance and clients satisfaction related parameters and were discussed in separate parts. Then all questions that are categorize under five major parts was presented based on the research question classifications detail and the data results are analyzed by changing the frequencies in to percentage, mean values and aggregated index was being organized in the form of table.

4.2. Respondents General Characteristics

Table 4.1 Profiles of the respondents

Respondents Profile		Quantity /No of respondent/	Percentage (%)
Questionnaire	Distributed	48	100%
	Valid	41	85.41%
Selected Pillar Engineering Construction Company Projects	(project A) Ware House Building	19	46.34%
	(project B) Factory Where House And Demolishing Works	22	53.66%
	Total	41	100%
Participants	Contractor	21	51%
	Client	9	22%
	Consultant	11	27%
	Total	41	100%
Respondents Designation	General Foreman	7	17.07%
	Supervisor	8	19.51%
	Engineer	4	9.76%
	Structural Engineer	5	12.20%
	Site Overseers	4	9.76%
	Resident Engineer	2	4.88%
	General Manager	2	4.88%
	Project Manager	2	4.88%
	PMO Employee	7	17.07%
	Total	41	100%

Table 4.1 shows the frequency and percent of each type of respondent's organization:

As described in the above table, a total of 48 questionnaires were distributed to the sample respondents of the study. From this, a total of 41 answered questionnaires were retrieved, which is 85.41% of the total distributed questionnaires. In this study, from the total number of respondents; 21 (51 %) of them were contractors, 9(22 %) clients and the remaining 11(27%) were consultants. It implies that the clients, consultants and contractors respondents were taken from each of pillar engineering construction company projects involved parties were valid for conducting this study. Accordingly it is sufficient to find out the overall project performance of a company by the response of 41 respondents from the two completed projects. Thus, ware house building project (project A) and Factory ware house and demolishing (project B) projects are selected intended for the case study in place of projects which is performed by Pillar Engineering PLC.

Table 4.1 shows that from the total respondents, 7 (17.07%) of them are General foreman's, 8 (19.51%) of them are Supervisors, 4(9.76%) of them are site Engineers, 5 (12.20%) of them are Structural engineers, 4(9.76%) of them are Site overseers , 2 (4.88%) of them are Resident Engineers, 2 (4.88%) of them are general managers 2(4.88%) of them are project managers and the rest 7 (17.07%) respondents are from project management office. Form this we can infer that the accumulated statistics are much valuable to the research findings and inferences, because all concerned department members, responsible individuals, primary performers and project members were involved in this research. So this is an opportunity for the researcher to get first-hand information within limited number of respondents and can also support the research by means of giving valid conclusion and recommendation from the consuming reliable data's.

4.3. Analysis of Major Findings

Table 4.2 Major Project Deliverables

Pillar Engineering P.L.C's Company Projects	**Planned Deliverable**	**Actual Deliverable**
Ware house building project (project A)	Ware house	**Delivered**
	Office and Guard house	**Delivered**
Factory Ware House and Demolishing Works Project(project B)	Ware house	**Delivered**
	Office	**Delivered**
	Transformer room	**Delivered**
	Guard house	**Delivered**
	Demolishing work	**Delivered**

Table 4.2 shows that actual and planned project deliverables status of the two projects.

As we can see from the above table; there are major project planned deliverables in project "A" and project B. The planned deliverables for project (A); which is ware house, office and guard house construction is being actually delivered as stated in the contractual agreement. Project "B" also planned to deliver Ware house, Office, Transformer room, Guard house and Demolishing works. Besides, project "B" also fully delivered as prearranged in the contractual agreement. From this we can understand that the projects are fully accomplished and finished according to contractual agreements. Explicitly, contractors are transferred major project deliverables as stated in the contractual agreement through accomplishing major project objectives.

Table 4.3 Project Phase and Project Cost Performance

Projects	Project Phase	Budgeted Cost of Work Performed	(approximate) Actual Cost of Work Performed	Cost Performance Index	
				Cost variance	**CPI (%)**
Project A	Foundation and Ground floor basement	1,660,000.00	2,668,589.00	(1,008,589.00)	62%
	First floor basement	1,037,500.00	1,589,638.26	(552,138.26)	65%
	Finishing	1,452,500.00	2,901,945.48	(1,449,445.48)	50%
	Total	**4,150,000.00**	**7,160,172.74**	**(3010172.74)**	**58%**
Project B	Demolishing	374,500.00	450,600.00	(76,100.00)	83%
	Structure (skeleton)	1,070,000.00	1,250,000.00	(180,000.00)	86%
	Block work and steel structure	2,140,000.00	2,350,000.00	(210,000.00)	91%
	Finishing	1,765,500.00	2,273,924.00	(508,424.00)	78%
	Total	**5,350,000.00**	**6,324,524.00**	**(974,524.00)**	**85%**

Tables 4.3 clearly show that, the cost performance index has significantly low in project A and relatively high in project "B" construction projects. From the projects' completion report it was found that the main reasons for cost overruns for project "A" is mainly project design change and caused the projects consumed more than the planned cost. Explicitly, project "A" earned only 58% of the cost was consumed on the project execution. As we can see clearly from the table, all phases under the project is being escalated above they earned which is cost was over above project must be earned. The cost overrun was high mainly for the finishing phase of the project which was escalated by 50% of the estimated initial cost of the project. From this we can infer that the project was not estimated based on actual economic price and was not consumed valuable costs that remained earned for real project value.

When we can see project "B" cost performance, relatively well at consumption level. On average the project cost was increased by 18%, which is relatively at good accomplishment record in all phases of project works. As we can understand from the above table, all projects phases were completed beyond their budgeted cost in project B as well. But in relative matter project "B" was completed at good project cost performance. Explicitly, project "B" was experienced 85% of the project was completed that was earned value result. From each phase of the project, the highest cost overrun was 22%, which was finishing phase of project B. But relative to an industry standard projects B was completed at respectable level in terms of project expected value level based on accomplishing the project within specified cost and earned value.

Table 4.4 Project Phase and Project Time Performance

Projects	Project Phase	Time Completion Period	Actual Completion Period	Time-Overrun /Initial Contract Period /	
				Number of days	%
Project A	Foundation and Ground floor basement	104 working day	230 working days	126 working days	55%
	First floor basement	35 working days	62 working days	27 working days	44%
	Finishing	208 working days	225 working days	17 working days	8%
	Total	**346 working days**	**517 working days**	**171 working days**	**49 %**
Project B	Demolishing	22 working days	60 working days	38 working days	63%
	Structure (skeleton)	90 working days	125 working days	35 working days	28%
	Block work and steel structure	46 working days	73 working days	27 working days	37%
	Finishing	101 working days	115 working days	14 working days	12%
	Total	**259 working days**	**373working days**	**114 working days**	**44 %**

Table 4.4 shows that actual and planned project cost of the two projects. As we can see from the table, project A has planned to be delivered within 346 working days and project B has planned to be delivered within 259 working days. But the actual completion time was far beyond the planned time. That is project "A" extended the completion time by 171 (49.4% time overrun) working days which in turn stays for two years period. Project B also has gotten time overrun by 114 (44% overrun) working days and stays one and half year on execution. As we can understand from the above table, all projects phases were completed beyond their planned completion period.

As it is clearly presented on the table, there is a significant difference between the plan and the actual performance status of projects in terms of time and cost requirements. The selected construction projects are completed beyond their plan in terms of time and cost; we can argue that all those projects are inefficient in terms of time and cost. From the projects' completion report it was found that the main reasons for time overruns are design change. Different research findings state that time and schedule has significant effect on project cost. But, in contrary even if the two projects have gotten comparable number of delays on schedule status, their cost overrun percentage is not falling on the same range. From this we can understand that projects with time overrun is not always mean that having a significant effect on project cost performance.

Table 4.5 Part One: Perceived Cost Performance of a Construction Projects

Cost Performance Indicators	Project A			Project **B**		
	Total	SD	Mean	Total	SD	Mean
1.Cost Estimation accuracy	22	.631	2.0	19	.631	3.8
2.Project design cost	22	.961	2.1	19	.961	4.4
3.Cost of rework level	22	.780	1.4	19	.780	2.9
4.Cost of variation orders Controlling Mechanism	22	1.302	1.7	19	1.30	3.8
5.Actual Waste rate of materials Management	22	.937	1.7	19	.937	3.9
6. Regular project budget update	22	1.316	2.6	19	1.316	2.2
7. Change Control and Scope Creep Management	22	.918	1.4	19	.918	1.8
8. Escalation and Fluctuation in prices of materials	22	1.425	1.6	19	1.425	2.7
9. Contractors Working Capability	22	.761	2.1	19	.761	4.4
Aggregate Project Cost Performance	1.8=Poor			3.3= Average		

Project Cost Management Practice	Total	SA (5)	A(4)	TA(3)	D(2)	SD(1)	Mean
1. Cost control system is being using (e.g. EVM method) in execution phase on a given time interval	41	0	0	4 (10%)	25 (61%)	12 (29%)	1.8
2. The organization structure for both tracking & controlling the budget is defined and assigned to a specific individual	41	2 (5%)	15(37 %)	18 (44%)	6 (15%)	0	3.3
3. Procedures for identifying budget variances been strictly followed in a periodic bases	41	0	2(5%)	8 (20%)	12 (29%)	19 (46%)	1.8
4.Vendor invoices are audited for accuracy before payment done	41	0	3(7%)	13 (32%)	21 (51%)	4 (10%)	2.4
5. There is a serious of problem on major decisions makings on procurement	41	19 (46%)	16 39%)	6 (15%)			4.3
6. Cash flow and financial difficulties face the contractors	41	21 (51%)	9 (22%)	9 (22%)	2 (5%)		4.1
7 Allocation of resources is more or less directly linked to units of performance	41	0	0	8 (20%)	19 (46%)	14 (34%)	1.9
Total number of respondent	41	Central Mean		2.8	Total Mean		19.6

As Table 4.5 shows, from the overall responses regarding project cost performance indicator responses of project "A", the majority of respondents (mean= 2.0)supposed that project cost estimation was not accurate and project cost design (mean= 2.1) had way-out in project planning phase. Similar to the planning phase of a project, the majority of respondents believed that, project performance on Cost of variation orders Controlling Mechanism(mean =1.7), actual Waste rate of materials Management (mean =1.7) and budget update process (mean =2.6) had been in poor performance. As the same performance level the majority of respondents alleged that Escalation and Fluctuation in prices of materials and Contractors Working Capability had been the cause for weak project cost performance. Nonetheless, Change Control, Scope Creep

Management and Cost of rework level had been facing the worst performance, which is totally confronted by the majority of respondent. From this we can infer that the aggregate cost of a project had encountered poor performance with respect to project cost planning and actual execution segments.

As Table 4.5also shows, from the overall responses regarding project cost performance indicator replies of project "B", as the same to project "A", the majority of respondents granted that cost estimation (mean= 3.8) and project cost design (mean= 4.4) was good at project planning phase. Corresponding to project planning performance, the majority of respondent agreeing that the projects are good Regarding Cost of variation orders and Controlling Mechanism(mean =3), actual materials management (mean =3) and Contractors Working Capability(mean =4.4). But on average the majority respondent (mean= 1.8) agreeing that divergent performance had facing in project budget update and Change Control and Scope Creep Management. But on average the majority of respondent believe that Escalation and Fluctuation in prices of materials and cost of rework level are not that much good or bad enough on triggering project cost performance. From this we can infer that the overall project cost performance of project B had on average level, which is on not good and not bad, status.

As table 4.5 shows, from the collected data regarding project cost management practice, out of 41 respondents asked about cost control system, 4(10%) responded to some extent agree , 25 (61%) responded disagree,12 (29 %) responded strongly disagree. That is on average the majority of respondents (Mean=1.8) assenting that the projects didn't apply well-organized Cost control system that can measure the project execution intensities in a given time interval.

As table 3.2.1 shows, from the collected data regarding project cost management practice, out of 41 respondents asked about project budget management , 2 (5%) responded agree 15 (37%) responded neutral18 (44%) responded disagree, and the rest 6 (15%) responded strongly disagree, when they asked about the organization structure in tracking & controlling of the project budget and assigned individual. That is on average the majority of respondents (Mean=3.3) to some extent agreed that the company is having a tracking & controlling mechanism of the budget on the project overall works and also with having assigned individual to some extent. In addition to budget controlling and management, the majority of respondents (mean=1.8) that company didn't been strictly followed periodic budget variance analysis and haven't yet Procedures for identifying budget variances.

Regarding payment process, the majority of respondents (Mean=2.4) responded and believed that company's payment accuracy is being in question that is vendor invoices are not audited rigorously before payment done.

On another breadth, the majority of respondents (Mean=4.3) agreeing that there is problems regarding projects execution and implementation process assisting progression decision makings on major procurement assisting parts. Beside project management decision making, on average the majority of respondents (Mean=4.1) agreeing regarding project cost performance, contractors having face Cash flow and financial difficulties on the process of project execution.

As table 3.2.1 shows, from the collected data regarding project cost management practice, out of 41 respondents asked about project resource allocation, 8 (20%) responded to some extent agree, 19 (46%) responded disagree, 14 (34%) responded strongly, when they asked about the linkage between unit of performance and Allocation of resources . That is on average the majority of respondents (Mean=1.9) agreeing that there is poor linkage between Allocation of resources and units of performance.

As Mansfield (1994) find that Cost overruns are attributed to payment arrangement, poor material shortage, inaccurate estimators and price fluctuation. In our cases all parameters are under worst performance status, as such the projects had been through in cost overrun. So such concerns are the critical factor in managing cost. It has also been recommended that project management could be improved in the planning stage of the project itself. So the managements must give a lot of time for project planning in order to avoid cost overrun.

The central mean result shown that, the overall cost performance of the company is not good at all. That is all cost related functions are not done well according to projects specific need and they are not efficient based on the cost management specification.

As stated by Kombe (2016) the most effective solutions for better cost performance is to employ better estimation methods and budget for costs. In our specific cases, the respondents and actual project document findings show that the estimations was not being undertaking in an efficient manner. In addition the budgeted costs are not being evaluated based on scientific measurement standard.

Table 4.6 Part Two: Perceived Time Performance of a Construction Projects

Time Performance Indicators	Project A			Project **B**		
	Total	SD	Mean	Total	SD	Mean
1.Site Preparation Period	22	.93	4.3	19	.93	4.3
2.Subcontractor Accomplishment Performance	22	1.1	2.0	19	1.10	2.1
3.Time usage of orders delivered	22	.65	2.4	19	.66	3.1
4.Time usage to implementing variation orders	22	.91	1.4	19	.92	1.8
5.Time usage to rectify defects	22	.47	1.3	19	.48	1.7
6.Claim Approval Response	22	.51	2.6	19	.51	4.5
7.Regular payments process	22	.37	3.4	19	.37	4.2
8. Contractor Financial Ability	22	.73	1.7	19	.74	4.1
9. Materials and Equipment Availability	22	.22	1.7	19	.23	4.1
Aggregate Project Schedule Performance	2.3= Poor			3.3=Average		

Project Schedule Management Practice	Total	SA (5)	A(4)	TA(3)	D(2)	SD(1)	Mean
1.Use different Techniques for project planning and time control	41		10 (24%)	19 (46%)	9 (22%)	3 (7%)	2.9
2.Having the procedures for identifying variances from estimates & adjusting the detailed work program been followed	41		2 (5%)	4 (10%)	16 (39%)	19 (46%)	1.7
3.The project work is being proceeding in accordance with the original project schedule	41		0	25 (61%)	8 (20%)	8 (20%)	2.4
4. All project delays been adequately accounted for, communicated to clients and adjustments made in overall project schedule	41		2	10 (24%)	10 (24%)	19 (46%)	1.9
5. Gantt Chart and/or Network Diagram updated periodically and used to assess the overall project timetable	41		15 (37%)	12 (29%)	8 (20%)	6 (15%)	2.9
6. Having an industry recognized mechanized support tool(s) being used for project scheduling & tracking	41		0	3 (7%)	6 (15%)	32 (78%)	1.3
Total number of respondent	41	Central Mean		2.1	Total Mean		13.1

As Table 4.6 shows from the overall responses regarding project cost performance indicator replies of on project "A", on average the majority of respondents (mean=4.3) agreeing that site preparation period was good enough in preparing the specific construction projects ground. Conversely, on average the majority of respondents (mean=3.4) understood that regular payment process and claim approval responses (mean=2.6) had stumble upon not god at all and not bad somewhat. From this we can inference that the payment process that is being done on the completion period of each of project phase had done on middling level. Contrary to site preparation and payment process, the majorities of respondents are perceived that time usage in rectifying defects (mean=1.3), time usage in implementing variation orders (mean=1.4)and time

usage in orders delivered (mean=2.4) had it done in worst performance status and the time treatment of such project execution practices has their own upshot on project schedule.

While we comprehend the contractors influence on project schedule performance, on average the majority of respondents (mean=1.7) rely on that contractor financial ability was bad on all the way of performing the construction work of the project.as extended to subcontractors, the majority of respondent (mean=2.0) also agreed that subcontractor accomplishment piece is very stumpy and had been encountering bad performance. In addition, on average the majority of respondent (mean=1.7) reply that material and equipment availability had been conducted as the major difficulties which encounter bad project schedule performances.

Consequently, from the above responses we can infer that, project "A" aggregate schedule performance had encountered bad performance in a way of time usage variables, payment process and contractors performance.

As Table 4.6 shows from the overall responses regarding project cost performance indicator replies on project "B", the majority of respondents (mean=1.8) replied that projects Time usage for variation orders and are very poor. As well the same response was given by the respondents is on defects rectify processing and time consumption.

As table 4.6 shows, from the collected data regarding project Schedule management practice, out of 41 respondents asked about project planning techniques and systems, 10 (24%) responded agree,19 (46%) responded to some extent agreed, 9 (22%) responded disagree and the rest 3(7%) responded strongly disagree. That is on average the majority of respondents (Mean=2.9) to some extent agreeing that the projects are consuming project planning and time control Techniques for proper project schedule management. In connection with project planning and controlling techniques, the majority of respondents (Mean=2.9) to some extent agreeing that Gantt chart and/or Network Diagram updating process and assessment had been undertaking on the overall project timetable.

Regarding scheduling tools and techniques, unexpectedly the majority of respondents (Mean=2.9) consider that the projects are not run-through an industry recognized mechanized support tool(s) for project scheduling & tracking process. In this regard the majority of respondents(Mean=1.9) reply expressed that all project delays is being not adequately accounted

for, communicated to clients and adjustments also are not made in proper manner on the overall project schedule management process. In addition to scheduling tools and techniques, the majority of respondents (Mean=1.9) responded that the projects haven't the procedures for identifying variances for estimates & adjusting the detailed work program.

Accordingly as table 3.2.1 shows, from the collected data regarding project Schedule management practice, out of 41 respondents asked about project planning and execution, 25 (61%) to some extent agreed, 8 (20%) disagree, 8 (20%) strongly disagree that the project work is being applied based on project scheduling plan. That is on average the majority of respondents (Mean=1.9) believe that the project work isn't being proceeding in accordance with the original project schedule.

The central mean result shown that, the overall schedule performance of the company is not good at all. That is the monitoring and controlling tools and mechanisms, and managing those problems had been bring about in low performing status from management side of the company. Form this we can infer that the projects had been managers of the organization is been giving less attention to the schedule management process and is being stumpy in evaluating their work based on the stated goal.

It is very clear from the documents available in the literature that the most important factors affecting scheduling process for any project are the financial situation of the owners and contractors, resources availability, change orders, communication between involved parties, prices escalation, and the delays in contractors' payment and engineer's experience (Nouban, 2017). In our projects case also change order, scope creep management and contractor financial capability had been week performance in project A but not in B. so we can see the effect clearly on the performance status of the projects. Contractor financial capabilities will as such affect the performance of project schedule.

Table 4.7 Part Three: Perceived Quality Performance of a Construction Projects

Project Quality performance Indicators		Project A			Project **B**		
		Total	SD	Mean	Total	SD	Mean
1.Conformance level of the completed buildings to design standard		22	1.06	2.9	19	1.07	3.6
2.Timeliness of implementation		22	.229	1.2	19	.23	1.9
3.Cost effectiveness		22	.769	1.3	19	.77	3.6
4. Procurement Process		22	.602	3.0	19	.60	3.8
5.Major Project Deliverables Accomplishment Level		22	.535	3.0	19	.54	3.2
6.Standards of contract and performance by contractor		22	.705	3.5	19	.71	3.1
7. Reduction in construction errors, defects and wastes		22	.806	3.6	19	.81	2.3
8.Quality of materials and equipment used in the project construction		22	.834	1.6	19	.83	4.2
9.Effectiveness of project monitoring and communications		22	.697	1.5	19	.70	1.5
Aggregate project quality performance		2.4= Poor			2.8=Average		
Project quality Controlling practice	Total	SA (5)	A(4)	TA(3)	D(2)	SD(1)	Mean
1. Activities is being done based on specific timetable	41	0	2 (5%)	11 (27%)	5 (12%)	23 (56%)	1.8
2.Clear and achievable implementation strategy and schedules	41	9 (22%)	19 (46%)	9 (22%)	4 (10%)	0	3.8
3. Main risks are identified and Risk management plan sufficiently detailed and realistic.	41	0	15 (37%)	9 (22%)	8 (20%)	9 (22%)	2.7
4. Contract scope of services and basis of payment are clear, concise and consistent with project design document.	41	0	2 (5%)	4 (10%)	19 (46%)	16 (39%)	1.8
5.Project closure is done efficiently	41	2 (5%)	19 (46%)	17 (41%)	3(7%)	0	3.5
6. schedule management is done in every phase of a project	41	5 (12%)	9 (22%)	18 (44%)	9 (22%)	0	3.2
7. Measure clients satisfaction periodically	41	0	0	0	9 (22%)	32 (78%)	1.2
8.the contractors employee ought to availability of competent skill	41	6 (15%)	11 (27%)	18 (44%)	6 (15%)	0	3.4
9.There is applied Quality assessment system in the projects	41	0	6 (15%)	9 (22%)	7 (17%)	19 (46%)	2.0
10. Quality assurance training and follow up is being done periodically	41	0	0	9 (22%)	4 (10%)	28 (68%)	1.5
11. Contractor's poor site management and supervision can cause errors, defects and wastes	41	28 (68%)	9 (22%)	4 (10%)			1.5
Total number of respondent	41	Central Mean		2.14	Total Mean		26.4

As Table 4.7 shows from the overall responses regarding project quality performance indicator replies of on project "A" the aggregate mean result shows that the project quality performance as perceived by the respondents had been accounted average status. That is the performance is not loudly supposed that good or bad, but it's in the middle of the two. Regarding the major quality performance parameters, the majority of respondents believed that projects encountered worst

performance in project related with cost and time, which is timeliness of implementation (Mean=1.2) and cost effectiveness strategy (Mean=1.3). Furthermore, the respondents are not totally dissatisfied by, Effectiveness of project monitoring and communications systems (Mean=1.6), project design Standard (Mean=1.7) and Quality of materials and equipment used in the project construction (Mean=1.5). But in other project quality dimension as perceived by the respondents the projects is being good. As an illustrated on the above table, the majority of respondents believed that projects are good in major project deliverables accomplishment level (Mean=4.4), contractor's performance (Mean=3.5), procurement process (Mean=4), Conformance level of the completed buildings (Mean=4.5), and errors, defects and wastes reduction (Mean=3.6). From this we can infer that as an aggregate level the respondents perceived that the projects are on doing on average performance status.

As Table 4.7 shows from the overall responses regarding project quality performance indicator replies of on project "B" the aggregate mean result shows that the project quality performance as perceived by the respondents had been accounted average status. As we can see from the respondents, the majority of respondents assumed that the project quality performance had been worst in terms of monitoring and communications. Furthermore the respondents agreed that quality with respect to time (Mean=1.9), design (Mean=1.7), and wastes reduction (Mean=2.3), is also had been bad status in project execution. On the contrary, on the other project management quality performance standard parameters, on average the majority of respondents affirm that the projects had good performance in procurement process, cost management, Conformance level of the completed buildings and Quality of materials and equipment used in the project construction. From this we can infer that the majority of respondents are satisfied by some of the quality measurement parameters, but not in all.

As table 4.7 shows, from the collected data regarding project quality, out of 41 respondents asked about project activity exertion within time table, 2 (5%) responded agree 11 (27%) responded to some extent agree 5 (12%) responded disagree and the rest 23 (56%) responded strongly disagree. That is on average the majority of respondents (Mean=1.8) asserting that project activities isn't being done based on specific timetable plan. In tallying, on average the majority of respondents (Mean=3.2) to some extent agreeing that the projects run-through schedule management practice is done in every phase of a project.

As table 4.7 shows, from the collected data regarding project quality, out of 41 respondents asked about Contractor's project practice , 6 (15%) responded strongly agree,11(27%) responded agree, 18 (44%) responded to some extent agree and the rest 6 (15%) responded disagree. That is on average the majority of respondents (Mean=3.4) to some extent affirming that project contractors employee having competent project carrying out skill. In tallying, on average the majority of respondents (Mean=3.2) upholding that Contractor's poor site management and supervision can cause errors, defects and wastes.

As table 4.7 shows, from the collected data regarding project quality, out of 41 respondents asked about project closure efficiency, 2 (5%) responded strongly agree, 19 (46%) responded agree and 17 (41%) responded to some extent agree that the project closure is being done in an efficient ways; whereas the rest 3 (7%) responded disagreed with the assertion that closure is being done in an efficient ways. That is on average the majority of respondents (Mean=3.5) asserting that project closure is been triggered in an efficient manner. In tallying, on average the majority of respondents (Mean=3.8) to some extent agreeing that the project schedule and strategy was Clear and achievable.

As table 4.7 shows, from the collected data regarding project quality, out of 41 respondents asked about Quality assessment system, 6 (15%) responded agree, 9 (22%)responded to some extent agreed, 7 (17%) responded disagree and the rest 19 (46%) responded strongly disagree. Explicitly on average the majority of respondents (Mean=2.0) asserting that project quality assessment system isn't being applied for project specific case. In tallying, all respondents assure that (Mean=1.2) and totally approving that the projects are not formulating any system to measure client's satisfaction at all in any phase. From this we can understand that there are definitely not any antiscientific tools to measure client's satisfaction about project overall performance.

Concerning project risk management practice, on average the majority of respondent (mean=2.7) to some extent agreed that risks are identified and Risk management plan sufficiently assessed on the project execution period.

Table 4.8 Part Four: Perceived Safety Performance of a Construction Projects

Safety Performance Indicators	Project A			Project **B**		
	Total	SD	Mean	Total	SD	Mean
1. Assurance Rate of A Project	22	.697	1.3	19	.70	1.5
2. Management Commitment to Safety Programs	22	.535	1.9	19	.54	1.2
3. Monitoring The Compliance of Safety Measures	22	.780	1.4	19	.78	2.1
4. Convention 0f Input Resources For Safety	22	.769	1.8	19	.77	2.4
5.Personal Protective Equipment	22	.820	1.3	19	.82	1.7
6.Safe Construction Site Environment	22	.855	2.1	19	.85	2.8
7.Onsite Safety Supervision	22	.761	1.5	19	.76	1.5
Aggregate project safety performance	1.6= Poor			1.9= Poor		

Project Safety customary Practice	Total	SA (5)	A(4)	TA(3)	D(2)	SD(1)	Mean
1.Balanced Schedule and Activities are being applied for workers	41	2(5%)	15 (37%)	16 (39%)	8 (20%)		3.3
2.Safety Budget Usage is consumed for managing risks	41			9 (22%)	7 (17%)	25 (61%)	1.6
3.Reportable Accidents frequency in the Projects are less	41	9(22%)	19 (46%)	9 (22%)	4 (10%)		3.8
4.Safety Awareness of Top Management is good	41			7 (17%)	16 (39%)	18 (44%)	1.7
5.There is an Emergency Plan and Procedures Practice for greater safety	41		6 (15%)	16 (39%)	6 (15%)	13 (32%)	2.4
6.Onsite Inspection is done periodically	41			3(7%)	19 (46%)	19 (46%)	1.6
7. Good in treating Workers' Physical Fatigue	41		1(2%)	3(7%)	8 (20%)	29 (71%)	1.4
8. There is well organized accident Record Keeping and Reporting System	41			8 (20%)	2 (5%)	31 (76%)	1.4
9.Peredically assessed tasks that may include any hazardous Manual Handling activity	41			1(2%)	21 (51%)	19 (46%)	1.6
Total number of respondent	41	Central Mean		2.0	Total Mean		18.8

As Table 4.8 shows from the overall responses regarding project safety performance indicator replies of on project "A" the majority of respondents believed that the project safety performance is the worst in safety assurance rate (mean=1.3), safety Monitoring the Compliance (mean=1.4), in using personal protective equipment (mean=1.3) and Onsite safety supervision (mean=1.5). From this we can infer that the projects are not as such giving attention to safety related issues. As well the respondents describing the project safety performance of the project as disgruntled by construction site safety (mean=2.1). Surprisingly the respondents assert that managements are not committed to safety programs. Form this we can understand that the management's degree of concern in such extent known by the majority of project members.

As Table 4.8 shows from the overall responses regarding project safety performance indicator replies of on project "B" the majority of respondents believed that safety managements is not the major concern in the projects environment. This can be shown in the response that, on average the majority of respondents describe the project safety level as worst in safety assurance rate (mean=1.5) and project onsite safety inspection system (mean=1.5). Moreover the respondents assure that the projects are week in using personal protective equipment (mean=1.7). And creating safe construction site environment (mean=2.8). Like the above project status, project managers are not giving as such attention for construction safety management.

As an illustrated in the above table, Responses on project safety performance reveal that5% of the respondents strongly agreed and 37% of them agreed and 39% of the to some extent agreed questions regarding projects partaking the existence of a Balanced Schedule and Activities in project construction workers; whereas only 20%of respondents are disagree. This indicates that the majority of respondents (mean=3.3) to some extent agreed that the application of Balanced Schedule and Activities program are operational for workers. In connection with employee related safety management, 20% of the respondent disagree and 77% of them responded strongly disagree supposing the claim that there is good projects labor treatment situation in a physical fatigue intervals and the rest 9% of the respondent believed that the projects are in a position to give treatment when there is physical fatigue in the project. As a result, on average the majority of respondents (mean=1.4) believed that the projects are not Good enough in treating Workers' Physical Fatigue.

Concerning safety management and managements attitude about project safety , as an illustrated in the above table, 17% of the respondents to some extent believed that top managements are good in safety management awareness; whereas 39% of them are responded disagree and the rest 44% of them responded strongly disagree the account that top managements safety awareness is good. This indicate that the majority of respondent (mean=1.7) believed that top managements haven't good awareness in project safety. Agreeing with the above implication in top management attitude, the response also indicated that 17% of the respondent disagree and 66% of them are responded strongly disagree that there is Safety Budget usage consumption in managing project risks. That is the majority of respondents (mean=1.6) supposed that safety budget consumption is low in manage project risks.

As an illustrated in the above table, Responses on project safety management practice reveal that 15% of the respondents agreed and 39% of the respondents are to some extent agreed that there is an emergency plan and procedure practice of safety in projects; whereas 15% of the respondents disagreed and the rest 32% of them responded disagreed about the existence of emergency plan and procedure of safety practices in projects. Explicitly on average the majority of respondents (mean=2.4) to some agreed that there is an emergency plan and procedures practice project safety performance. On the subject of safety practice, the majority of respondents (mean=1.6) also believed that there is definitely not carrying out onsite inspection practice on the projects which is done periodically. Despite site inspection system, there is also problem in safety system organization. Responses reveal that 5% of the respondent disagreed and 76% of the respondent strongly disagree the claim that projects are having well organized accident Record Keeping and Reporting System. Afterward, this indicate that the majority of respondent (mean=1.4) believed that there were certainly not prearranged accident Record Keeping and Reporting System on the projects. But on the contrary, from all respondents 22% of them strongly agree, 46% of them agree and 22% of the respondents agreeing that reportable accidents and frequency of accidents in the projects are less; whereas the rest 10% of the respondent oppose the claim that there is less frequent accident report. On the same issue, from all respondents, 51% of them responded disagree and the rest 46% of them responded strongly disagree the claim that the project had periodically assessed tasks that may include hazardous and Handling activity such activity. Explicitly, the majority of respondents (mean=1.6) believe that assessment on finding and monitoring the hazardous incidents in the construction project is less. From this we can infer that, there is disagreement between factual and real onsite accidents. This may be because there is certainly not well-organized accident record keeping and reporting system and also there is week On-site Inspection monitoring and controlling system.

The central mean result shown that (Mean=2.0), the overall safety performance of the company was poor in terms of specific safety performance parameters. Form this we can infer that the company had carrying out poor practices on managing safety related issues.

Table 4.9 Part Five: Measuring Client Satisfaction on Specific Construction Project

Client satisfaction Index	Project A			Project **B**		
	Total	SD	Mean	Total	SD	Mean
1.Performance with respect to cost	4	.957	1.8	5	.837	3.8
2.Performance with respect to time	4	.500	1.3	5	.837	2.2
3.Performance with respect to product quality	4	.816	3.0	5	.707	3.0
4.Performance with respect to project outcome	4	.500	2.8	5	1.34	3.8
5. Change Control and Scope Creep Management	4	.957	1.8	5	.707	2.0
6. Overall capability and communication of contractor's team	4	.500	2.8	5	.707	3.0
7. Overall capability and communication of consultant's team	4	.500	3.3	5	.548	3.4
8. post project service	4	.500	3.3	5	.707	3.0
Aggregate Client satisfaction	2.5= AVRAGE			3.0=GOOD		

As an illustrated in the above Table 4.9, on average the aggregate client satisfaction level of project "A" is on average rate. That is the clients are to some extent satisfied by the overall project performance. On average the clients are dissatisfied by the Performance with respect to time (mean=1.3), cost (mean=1.8), and Change Management (mean=1.8). From this we can infer clients are not satisfied by all project performance parameters as perceived by them.

As an illustrated in the above Table 4.9, on average the aggregate client satisfaction level on project "B" is good. To be precise the majority of respondents are satisfied by cost performance status of a project (mean=3.8) and by the overall project outcome (mean=3.8). As well the clients are to some extent satisfied by post project building service (mean=3), overall capability and communication of consultant (mean=3.4) and contractor (mean=3) team. From this we can infer that on average the clients are satisfied by the projects in all performance dimensions. Project "B" is good at cost performance but not in schedule. But on average clients are satisfied by the projects overall performance. As stated by Yasamis (2002) for owners to receive more value for their investment definitions of quality in construction need to be expanded to include the performance of the company as a whole and the client satisfaction derived from that performance. As stated, in both projects the performance levels of quality as perceived by the clients are to some extent good. This is what we seen in client's satisfaction level, which realized from aggregate level of client satisfaction.

Table 4.10 Part six: Client Satisfaction Level about Construction Project A

Client satisfaction level	Total	SA (5)	A(4)	TA(3)	D(2)	SD(1)	Mean
1. The project was completed on time, based on the most current approved schedule	11	0	1 (9%)	1 (9%)	5 (45%)	4 (36%)	1.9
2. Schedule changes were communicated promptly and were managed well	11	0	1 (9%)	7 (64%)	3 (27%)	0	2.8
3.Targets and outcomes were achieved as planned and in according with expectations	11	2 (18%)	3 (27%)	6 (55%)	0	0	3.6
4. The technical specifications of the project were completely to our satisfaction	11	0	0	3 (27%)	5 (45%)	3 (27%)	2.0
5. The change control process supported your needs and concerns	11	2 (18%)	6 (55%)	3 (27%)	0	0	3.9
6. The technology applied to the project was the best available to fit the specifications	11	0	0	2 (18%)	3 (27%)	6 (55%)	1.6
7. The project plan and works program meet all specifications as planned	11	0	0	0	3 (27%)	8 (73%)	1.3
8. The project was completed with an efficient cost	11	0	0	2 (18%)	3 (27%)	6 (55%)	1.6
Total number of respondent	11	Central Mean		2.3	Total Mean		18.7

As an illustrated in the above Table 4.10, Responses on client satisfaction level on project "A" revealed that 9% of the respondent agree, 9% of the respondents to some extent agree that project was completed on time and based on the most current approved schedule; whereas 45% of the respondent disagreed and the rest 36% of them responded strongly disagreed by project completion time and schedule performance. Explicitly on average the majority of respondents (mean=1.9) was not satisfied by project completion time and schedule performance of the project. In connection with schedule performance, the clients also revealed 27% of them are disagree and the rest 73% of the respondent are strongly disagree that the project plan and works program meet all specifications as planned. In line with schedule performance, the majority of respondents (mean=2.8) to some extent agreed that the project schedule changes were communicated promptly and were managed well in this project. From this we can allege that clients are not at all satisfied by the project work being doing related with schedule performances but to some extent satisfied by schedule change communication system.

In another breadth, from all respondents 27% of them are disagreeing, 55% of them are strongly disagreeing about when the claim is supposed that the project had been performing cost effective system. From this we can infer that the majority of respondents (mean=1.6) are not satisfied by the overall project cost performance and in an ineffectual activity.

The majority of respondents (Mean=3.6) whispered that targets and outcomes were achieved as planned and in according with expectations. In addition from the total respondent 18% of them strongly agreed 55%of them agreed and the rest 27% are to some extent agreed by project change control process and being support clients' needs and concerns. Specifically on average the majority of respondents (Mean=3.9) are satisfied by the projects change control system.

Contrary to the above assertions, from all respondent 27% of them to some extent agree, 45%of them disagree and the rest 27% of them strongly degree the claim that technical specifications of the project was entirely to clients satisfaction. From this we can infer that even if the clients whispered that targets and outcomes were achieved as planned and in according with expectations, but they also are dissatisfaction by technical specification execution ways and performances at all.

Table 3.11Part seven: Client Satisfaction Level about Construction Project B

Client satisfaction level	Total	SA(5)	A(4)	TA(3)	D(2)	SD(1)	Mean
1. The project was completed on time, based on the most current approved schedule.	9		1 (11%)	5 (56%)	1 (11%)	2 (22%)	2.6
2. Schedule changes were communicated promptly and were managed well.	9		2 (22%)	4 (44%)	2 (22%)	1 (11%)	2.8
3. Targets and outcomes were achieved as planned and in according with expectations	9	2 (22%)	4 (44%)	2 (22%)	1 (11%)		3.8
4. The technical specifications of the project were completely to our satisfaction	9			1 (11%)	4 (44%)	4 (44%)	1.7
5. the change control process supported your needs and concerns	9	2 (22%)	3 (33%)	4 (44%)			3.8
6. The technology applied to the project was the best available to fit the specifications	9			2 (22%)	2 (22%)	5 (56%)	1.7
7. The project plan and works program meet all specifications as planned	9			1 (11%)	3 (33%)	5 (56%)	1.6
8. The project was completed with an efficient cost	9		2 (22%)	5 (56%)	2 (22%)		3
Total number of respondent	9	Central Mean		2.62	Total Mean		21

As an illustrated in the above Table 4.11, Responses on client satisfaction level on project "B" revealed that 11%of them agree 56% of them to some extent agree by project was completed on time, based on the most current approved schedule; whereas the rest 11% of them are disagree and 22% of respondents response strongly disagree the claim that project was completed on time and based on the most current approved schedule. Explicitly on average the majority of respondents

(mean=2.6) was to some extent satisfied by project completion time and schedule performance of the project. In connection with schedule performance, the clients also revealed 11% of them are to some extent agree, 33% of them disagree, and the rest 56% of them are strongly disagreed the claim that project plan and works program meet all specifications as planned. In line with schedule performance, the majority of respondents (mean=2.8) to some extent agreed that the project schedule changes were communicated promptly and were managed well in this project. From this we can allege that clients are not at all satisfied by the project work being doing related with schedule performances but to some extent satisfied by schedule change communication system.

In another breadth, from all respondents 22% of them are agreed, 56% of them are to some extent agreed by the project was completed with an efficient cost; whereas the rest 22% of the respondents are disagreeing the claim that the project was completed with an efficient cost.

From this we can infer that the majority of respondents (mean=3) to some extent agreed by project cost effectiveness and project cost performance.

Regarding projects out come and technical specification, the majority of respondents (Mean=3.8) whispered that targets and outcomes were achieved as planned and in according with expectations. In addition from the total respondent 11% of the respondent to some extent agreed by the claim that the projects were completed within technical specifications; whereas the rest 44% of them are disagreed and 44% of the respondents strongly disagreed and dissatisfied by project completion status and technical specifications application routine.

As an illustrated in the above Table 4.11, regarding technology application in the project, from total respondent 22% of the respondent to some extent agreed by there had been technology application obtainability on the projects for the better specifications accomplishment; whereas 22%of the respondent disagree and the rest 56% of them strongly disagreed by the claim that technology was applied to the project to fit the project specifications. From this we can infer that the majority of respondent (mean=1.7) are not whispered that the project consumes construction technologies to greatly succeeded project specification.

Chapter Five: Summary of Major Finding, Conclusion and Recommendation

Evaluating the construction project performance of pillar engineering Company was the interest of this research. This paper wants to light what is the overall performance status of projects beyond cost and time dimension of project performance indicator. All the performance parameter in this study covers are, major performance parameters which can clearly show the performance of executed projects beyond the traditional way of evaluating project performance. Therefore the most relevant factors of effective project performance where collected from literature and analyzed accordingly. Furthermore project practices and the overall performance status of the projects are summarized in this paper. Hence, this chapter has three parts; summary, conclusion and recommendation. The summary indicates with the basic questions raised in the first chapter and the major finding obtained from the analysis and interpretation of the data. At last some recommendation was suggested which gives as possible solution to the problem.

5.1. Summary of Major Findings

5.1.1. Findings from Project "A" construction performance

Cost performance

The comprehensive results expressed that cost performance status of the projects had unsatisfactory at all. The findings as well show that there had been the worst project performances encountered in Change Control and Scope Creep Management (Mean=1.4) and Cost of reworks (Mean=1.4). Moreover in supplementary performance indicator parameters, the findings correspondingly show that there was stumpy performance in Cost of variation orders supervision (Mean=1.7), actual Waste rate materials Management (Mean=1.7) and Contractors Working Capability (Mean=2.1). Consistent with the average performance, the findings also show that the project had been poor in Cost Estimation (Mean=2) and Project design cost of the project (Mean=2.1).

Time performance

The aggregate results articulated that, like cost performance, schedule performance status of the projects had been passing through in bad situation. The findings also show that there had been the worst project performances encountered in implementing variation orders (Mean=1.4) and defect rectify processes (Mean=1.3). Furthermore the findings revealed that there was stumpy performance status in Subcontractor Accomplishment (Mean=2.0), orders delivery (Mean=2.4), contractor financial ability (Mean=1.7) and Equipment Availability (Mean=1.7). Divergent to projects blameful schedule performance, Claim approval response (Mean=2.6) and Regular payments process (Mean=3.4) encountered to some extent good performance. Moreover Site preparation period (Mean=4.3) was good from schedule perspective.

Quality performance

The thorough results expressed that quality performance status of the projects had carrying out not good and not bad which is somewhat on an average status. The findings also show that there had been the worst project performances encountered in Timeliness of implementation (Mean=1.2), Effectiveness of project monitoring and communications (Mean=1.5) and Cost effectiveness (Mean=1.3). Besides, there was very puny performance in design standard (Mean=) and quality of materials and equipment used (Mean=1.6) in the project construction. But the majority of performance indicators variables have encounter good performance in Conformance level of the completed buildings with respect to design standard and specifications(Mean=1.7) , procurement process(Mean=4.0) , Major project Deliverables accomplishment level(Mean=4.4) and Reduction in construction errors, defects and wastes(Mean=3.6).

Safety performance

The middling results expressed that safety performance status of the projects had been stumble upon the worst performance of any kind. The findings also show that there had been the most awful project performances encountered in Assurance Rate of a Project (Mean=1.3), Monitoring and Compliance of Safety (Mean=1.4), Personal Protective Equipment (Mean=1.3) and Onsite Safety Supervision (Mean=1.5). Moreover the same in the safety practices, safety performance also had been stumpy performance in Management Commitment to Safety Programs

(Mean=1.9), Convention of Input Resources for Safety (Mean=1.8) and Safe Construction Site Environment (Mean=2.1).

Client satisfaction

The wide-ranging results expressed that client's satisfaction level had average regarding different satisfaction level extents. The findings also show that there had been the worst project performances encountered in performance with respect to time (Mean=1.3). The clients are not satisfied at all by project cost performance (mean=1.8). As well the clients are very dissatisfied by Change Control and Scope Creep Management system (Mean=1.8) and cost performance. Corresponding to average clients satisfaction level, the findings revealed that the clients had been to some extent satisfied by project product quality (Mean=3.0), performance with respect to project outcome (Mean=2.8), overall capability and communication of contractor's project team (Mean=2.8) and overall capability and communication of consultant's team (Mean=3.3).

5.1.2. Findings from Project "B" construction performance

Cost performance

The comprehensive results expressed that cost performance status of the projects had unsatisfactory at all. The findings also show that there had been the worst project performances encountered in Change Control and Scope Creep Management (Mean=1.8) and project budget updating (Mean=2.2). Corresponding to average cost performance status, there had been awful somewhat in Cost of rework level (Mean=2.9). Dissimilar to the above findings, the respondent reveal that there is good performances in Cost Estimation (Mean=3.8), Project design (Mean=4.4), variation orders Controlling Mechanism (Mean=3.8), Waste rate of materials Management (Mean=3.9) and Contractors Working Capability (Mean=4.4).

Time performance

The aggregate results articulated that, schedule performance status of the projects had been passing through average status. The findings also show that there had been bad project performances encountered in subcontractor accomplishment performance (Mean=2.1), implementing variation orders (Mean=1.8) and defect rectifying process (Mean=1.7).Furthermore

the findings revealed that there was to some extent good performance status in orders delivered related time intake (Mean=3.1). In another indicator that can prearrange schedule performances responses, the majority response agreeing that there was good performances in claim approval response (Mean=4.5) and Regular payments process (Mean=4.2). Likewise the findings show that Materials and Equipment are Available (Mean=4.1) at blameless level and also the contractors financial capability (Mean=4.1) was good.

Quality performance

The comprehensive results expressed that quality performance status of the projects had carrying out not good and not bad at all status which is somewhat on an average status. The findings also show that there had been weak project performances encountered in Standard of design (Mean=1.7), in construction errors (Mean=2.3), defects and wastes reduction (Mean=2.3), Timeliness of implementation (Mean=1.9) and project monitoring and communications (Mean=1.5).Above and beyond, project faced relatively average performances in major project deliverables accomplishment level (Mean=3.2), standards of contract (Mean=3.1) and performance of contractor (Mean=3.1). But the majority of performance indicators variables had encounter good performance in conformance level of the completed buildings (Mean=3.6), cost effectiveness (Mean=3.6), quality of materials and equipment used (Mean=4.2) in the project construction and procurement process (Mean=3.8).

Safety performance

The collective results expressed that safety performance status of the projects had been stumble upon the worst performance of any kind in project performance parameters. The findings also show that there had been the most awful perception encountered by the respondents was in assurance rate of a project (Mean=1.5) and management commitment to safety programs (Mean=1.2). Moreover the same in the safety practices, safety performance also had been stumpy performance in monitoring the compliance of safety measures (Mean=2.1), convention of input resources for safety (Mean=2.4), usage of personal protective equipment (Mean=1.7) and onsite safety supervision (Mean=1.6).Besides, the finding also shows that Construction Site Environment is relatively good (Mean=2.8).

Client satisfaction

The wide-ranging results expressed that clients are to some extent satisfied by this specific project. The findings also show that there had been some amount of dissatisfaction on time performances (Mean=2.2) and change control and scope creep management (Mean=2) in the projects execution period but the rest indicators are to some extent satisfied the clients. The findings also show that the clients are to some extent satisfied by post project service (Mean=3), product quality (Mean=3.), overall capability and communication of contractor's (Mean=3) and consultant project team (Mean=3.4). Correspondingly clients are more satisfied by project cost performances (Mean=3.8) and by project outcome (Mean=3.8).

5.1.3. General findings about project performance management practice

Concerning projects cost management practice; all the findings show that low consideration was given to Cost control system (Mean=1.8), Allocation of resources (Mean=1.9) and Vendor invoices auditing (Mean=1.8).

Relating to projects time management practice; all the finding show that the projects are weak in using an industry recognized mechanized support tools (Mean=1.3) for project scheduling & tracking, delays in communication and adjustments approaches (Mean=1.9), managing procedural issues (Mean=1.7) and adjusting the detailed work program and on controlling project work (Mean=2.9) in accordance with the original project schedule.

Regarding project quality management practice; the finding show that project are weak in Measuring clients satisfaction level (Mean=1.2), giving Quality assurance training and follow up (Mean=1.5), applying Quality assessment measurement system (Mean=2.0) and risks identification and management practice (Mean=2.7) and in Contractor's site management and supervision (Mean=1.5).

With reference to safety management practice; all the findings show that projects are not committed in undertaking Onsite Inspection (Mean=1.6), treating Workers' Physical Fatigue (Mean=1.4), accident Record Keeping (Mean=1.4) and assessing different risks associated tasks (Mean=1.6).

Regarding Clint's satisfaction on project "A"; not quietly in all indicators, the clients are not satisfied by the project of any kind. The findings also show that clients are not satisfied at all by technology application on to the project (Mean=1.6), project planning and works program execution (Mean=1.9), cost efficiency alternatives (Mean=1.6) and schedule application (Mean=1.3).

Regarding Clint's satisfaction on project "B"; the clients are not satisfied by technical specifications (Mean=1.7), technology application (Mean=1.7) and project planning and works program (Mean=1.6).

5.2. Conclusion

From the cumulative performance status findings, project "A" construction performance is being acquired poorly in terms of safety, cost and schedule performances. The rest which is client's satisfaction and quality is being on an average status (the performance is not as perceived by the respondents as satisfactory). Based on the aggregate project performance measurement, the overall performance status of the project was facing poor performance status according to five performance parameters. Which is the project are not at a uniform level achieving the average industry level construction performance standards.

As well from cumulative performance status findings, project "B" performance is encountered on average performance in terms of cost, schedule, client satisfaction, and quality. Only safety performance had done in weak performance status. So as getting from the aggregate result (Mean=2.9), the cumulative performance status of the project is average.

From cost management perspective the company's projects are not considerably efficient using cost effective mechanisms which can be literally seen in their cost performance status of the projects. There is loose management and controlling mechanisms in cost of reworks, scoop creep and waste management practices. So we can infer that, all the cumulative effects of improper material and scope management practices having an impact on project cost performance. As Such the management shortcomings will be seen clearly on what the projects faced in cost and time overrun status of the projects.

In another breadth, the overall company's management structure and working manuals are not organized and arranged in a way of measuring and evaluating each of project phases based on work performance standard and industry model in a scientific criterions.

Furthermore the finding revealed that there is much more significant problem in safety management of the projects. That is because the most responsible individuals, which are managements, are not giving that much attention to safety performance and on an extra side the risk related issues are not properly monitored by the concerned government bodies. So loses in controlling systems, by the concerned controlling organs and management insights, are possibly derived for bad safety performances.

All data's concerning cost, schedule, quality and safety are not properly recorded, retrieved and analyzed based on an industry standard technique. Furthermore they are not easily retrieved for management decision making. In reverse truck the performance of each and every valuable data's of the projects is being considerably a difficult task. Therefore, we can conclude that the major difficulties concerning evaluation are to some extent failure in executing each and every detail of project performances. Since the projects had not even certainly used standardized systems and tools to monitor and truck the project states periodically, the projects may face different problems undertaking the project in total delicate. That was the problem in a way projects performance status was not recognized in detail in every moments as such earned value with respect to actual value performance status was not computed in execution period and in every project phases at all. So management and organization related problems are the major hindrance for the project accomplishments and have their own influence on each and every performance status of the projects. To conclude that, absence of well-structured systems and consideration about managing projects of project organization are the foundations of performance failure even to perform an industry average standard. So that performing regular activities are not as such easy tasks in a situation loosing major performance indicators.

Likewise from the overall findings it can be concluded that, in all proportions safety related managements and contemplation are not being consider as a generally acceptable performances standard by the managements. From such circumstance we can determine that all the management bodies and concerned site supervisors are potentially week performer even if they can manage safety and risks appropriately. Absence of clear recording, controlling and follow up system confirming the source for poor project performance status in addition to organization management perceptions.

On the other hand absence of well suited communication system had been the reason for client dissatisfaction. Every detail performance status was not communicated well in each of project phases. The communication also is being prepared only for payment related purpose. So communication problem is the major hindrance element on the client's perspective and to the better project performance status.

5.3. Recommendation

Based on the findings of the research, the following points can be recommended to all parties in order to minimize and control low project performance.

- The following recommendation should be put into practice for a contractor who aims at performing better in construction projects. The organization (contractor) is recommended to use advance payment properly to avoid the financial problems. It is advised to conduct breakeven analysis from time to time. They are recommended to have a proper planning and good site management system in the different activities of the project so as to avoid any mistakes that may lead to rework of activities, resulting in time and cost performance problem. Besides they should use proper planning and scheduling, continuing processes during construction and match with the resources and time to develop the work to avoid cost overrun/performance problem and disputes.
- To perform site management and supervision accordingly administrative and technical personnel should be assigned as soon as project is awarded to make arrangements to achieve completion within specified time with the required quality, and estimated cost.
- The organization should be in control on the work to reduce cases of rework and should buy materials in bulky at the start of the project to avoid effect of escalation of prices. They should agree with the owner that incase of delay due to late sight delivery and late payments from the owner, the owner should be responsible. In another dimension the organization should use qualified and experienced staffs, use good quality of materials and equipment and ensure that the project conforms to the specification.
- Contractor is recommended to monitor the quality of activities continuously and to set the required quality system in the different activities of project so as to avoid any mistakes that may lead to rework of activities. Moreover, having qualified and quantified technical staff with appropriate experience of the project is valuable in order to be able to follow the different technical and managerial aspects of the project. In another breadth Contractors must have enough cash before beginning any project to avoid the financial problems. Also it is advised to monitor financial spending of the project and payments because any problem in financial aspect will lead to cost overruns.

- As it has been seen, there are several parameters for project cost performance. Perhaps, the status related with fluctuation of market prices and poor site management is one of the problems in actual circumstances. Understanding these factors is essential to limiting their effect of the success of a project. They not only affect cost performance but the overall success of a project and thus they need to be resolved as soon as they are identified. Delaying their resolution might make them have a bigger impact on the project progress or they might even cause the termination of the project. Likewise, solutions to cost problems in projects have been given adequate attention. The most effective solutions are to employ better estimation methods and budget for costs. When these procedures are implemented, projects will have a better chance of performing highly in terms of cost and other parameters. Because cost performance is a major issue in the success of a project, adopting these solutions will ensure that projects have a better chance at success.
- In addition projects must set up a computerized system to perform documentation process for all activities in the site, so they would be able to detect performance in the actual execution period of works. Concerning project system application, the project must create a system that can easily measure Planning and scheduling of the continuing processes during construction and match with the resources and time to develop the work in avoidance of low project performance.
- Clients are also recommended to facilitate payment to contractors in order to overcome delay, disputes and claims. In addition owners must ensure that the scopes are includes all the work required in order to pass the repetitive scope creep contingencies.
- The client should give attention on the right of way problem. Before the construction starts the client has to fulfill all the necessary requirements for delivering the site. Failure to deliver the site will affect time and cost performance. The client should determine the required duration of project and impose realistic duration to avoid time and cost overruns. Client recommended having technical personnel who is able to manage the different stages of any project and to follow the performance percentages, and also able to compare the actual performance with the planned one. The owner recommended minimizing design change as much as possible in order to avoid any factors affecting time and cost performance.

- Owners must ultimately responsible for the safety aspect of the construction project and should actively participate in contractors' safety enhancement programs. Designers also must pay more attention to safety factors and ensure that the project can be constructed and maintained safely.

- The management of construction must also establish and enforce safety policies for employees. A safety recording and evaluation systems must a pre-requisite to an improved safety program, and the company should require identifying potential accident costs, and likely safety benefits. Auditing of safety programs should also be conducted annually. In addition workers must be educated about safety regulations and procedures, and should be trained for safe working methods. Management also should give attention for safety and require the work force to act safely and in accordance with hazard-prevention methods.
- Safety could be better managed by a centralized safety center that acts as a liaison between the deferent safeties departments. The main purposes of such a proposed center are to develop and establish united safety standards; create a construction accident data bank; provide training, technical safety consultation, and inspections; and to require the implementation of the lasted methods of accident prevention at construction sites. Current safety regulations should be improved to permit strict implementation of safety procedures at construction sites and to incorporate a safety cost margin for the contractors in the tenders.
- In order to manage schedule overruns, the project management bodies must consider different controlling mechanisms. It is of paramount importance to have a proper updated work program at any given time to evaluate the concurrency of a project. It is also necessary the construction management bodies to keep updating the program periodically. Claim documentation is also very important in analyzing concurrent delays. So it is recommended to ensure the completeness and timeliness of those documents.

5.4. Limitations and Suggestion for Future Research

The outcome of the study is solely dependent on the individual responses of the respondents that participated in the study. This study employed the cross sectional data and it is difficult to determine the time series link across variables and specific project cases. Hence, the research result may differ if it is conducted in another time and in another project. The limitation of sample projects implied that the finding cannot be generalized across all construction projects. Therefore, the researchers propose to conduct a research on different construction project's performance with emphasizing project performance indicator variables.

This research was also not considered projects based on their type and size of its performance. But the size and the type of projects can have a greater impact on the overall project performance of a construction projects. In addition other performance parameters other than cost, time, quality, safety and clients satisfaction, were not getting covered in this research. So In addition to the above, the researcher recommends that further research is conducted on other dimension of project performance indicator and specific case measurement weighting factor in accordance with project size and type.

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Appendix 1: Questionnaire for client

Addis Ababa University School of Commerce

Department of Project Management

Post Graduate Program

My name is **Israel kibru.** I am a student at Addis Ababa University School of Commerce Department of Project Management**.** I am conducting a survey on the construction project performance of pillars engineering PLC's projects as part of my academic requirement. I request you to fill this questionnaire for my study purpose. The answers you give will strictly be used for purposes of this study and your identity shall be kept anonymous. However, the outcome of the research can be made available to you if you desire.

General instruction and information: Part I contains questions about general demographic characteristics of the respondents and part II contains questions that are directly related to the research objectives. Please attempt to answer all the questions and indicate your opinion by marking the appropriate number corresponding to your choice for the five point scale questions and by circling the letter of your choice for the multiple choice questions that best describes of project performance of the project.

Part I: General questions

Company name: _____

Project name: _____

SECTION 2: Measuring the performance of a project constructed by pillar engineering PLC.

Please indicate the significance of each indicator and their variables by ticking (/) the appropriate boxes.

E	= Excellent Performance (5)		SA	= Strongly Agree (5)
G	= Good Performance (4)		A	= Agree (4)
A	= Average Performance (Not Bad Not Good) (3)		TA	= To Some Extent Agree(3)
P	= Poor Performance (2)		D	= Disagree (2)
W	= Worst Performance (1)		SD	= Strongly Disagree (1)

Part One: Measuring Client Satisfaction on Specific Construction Project

Client satisfaction Index measurement	E(5)	G(4)	A(3)	P(2)	W(1)
1.Performance with respect to cost					
2.Performance with respect to time					
3.Performance with respect to product quality					
4.Performance with respect to project outcome					
5. Change Control and Scope Creep Management					
6. Overall capability and communication of contractor's project team					
7. Overall capability and communication of consultant's team					
8. post project service					

Part Two: Client Satisfaction Level about specific Construction Project

Client satisfaction level	SA (5)	A(4)	TA(3)	D(2)	SD(1)
1. The project was completed on time, based on the most current approved schedule.					
2. Schedule changes were communicated promptly and were managed well.					
3. Targets and outcomes were achieved as planned and in according with expectations					
4. The technical specifications of the project were completely to our satisfaction					
5. the change control process supported your needs and concerns					
6. The technology applied to the project was the best available to fit the specifications					
7. The project plan and works program meet all specifications as planned					
8. The project was completed with an efficient cost					

Thank You Very Much for Your Cooperation and Time!!!!

Appendix 2: Questionnaire for Consultant and Contractors

Addis Ababa University School of Commerce

Department of Project Management

Post Graduate Program

My name is **Israel kibru.** I am a student at Addis Ababa University School of Commerce Department of Project Management**.** I am conducting a survey on the construction project performance of pillars engineering PLC's projects as part of my academic requirement. I request you to fill this questionnaire for my study purpose. The answers you give will strictly be used for purposes of this study and your identity shall be kept anonymous. However, the outcome of the research can be made available to you if you desire.

General instruction and information: Part I contains questions about general question regarding the respondents and part II contains questions that are directly related to the research objectives. Please attempt to answer all the questions and indicate your opinion by marking the appropriate number corresponding to your choice for the five point scale questions and by circling the letter of your choice for the multiple choice questions that best describes of project performance of the project.

Part I: General questions

1. In which project you were participated

- Factory Where House And Demolishing Works (peace success industry P.L.C) ☐
- Ware House Building (Yes Brands Foods And Beverage P.L.C) ☐
- Both ☐

2. Respondent organization/company type:

Contractor ☐ Consultant ☐

3. Respondent's designation:

Project Manager ☐ Site Engineer ☐ Resident Engineer ☐ Site Supervisor ☐ General Foreman Site Overseers ☐ Other_____

SECTION 2: Measuring the performance of a project constructed by pillar engineering PLC.

Please indicate the significance of each indicator and their variables by ticking (/) the appropriate boxes.

E	= Excellent Performance (5)		SA	= Strongly Agree (5)
G	= Good Performance (4)		A	= Agree (4)
A	= Average Performance (Not Bad Not Good) (3)		TA	= To some extent agree (3)
P	= Poor Performance (2)		D	= Disagree (2)
W	= Worst Performance (1)		SD	= Strongly Disagree (1)

Part One: Cost Performance of a Construction Projects

Cost Performance Indicators	E(5)	G(4)	A(3)	P(2)	W(1)
1.Cost Estimation accuracy					
2.Project design cost					
3.Cost of rework level					
4.Cost of variation orders Controlling Mechanism					
5.Actual Waste rate of materials Management					
6. Regular project budget update					
7. Change Control and Scope Creep Management					
8. Escalation and Fluctuation in prices of materials					
9. Contractors Working Capability					
Project Cost Management Practice	SA(5)	A(4)	TA(3)	D(2)	SD(1)
1. Cost control system is being using (eg. EVM method)					
2. The organization structure for both tracking & controlling the budget is defined and assigned to a specific individual					
3. Procedures for identifying budget variances been strictly followed					
4. Vendor invoices are audited for accuracy before payment done					
5. Low speed of decisions making					
6. Contractor's poor site management and supervision					
7. Cash flow and financial difficulties face the contractors					
8 Allocation of resources is more or less directly linked to units of performance					

Part Two: Schedule Performance of a Construction Projects

Schedule Performance Indicators	E(5)	G(4)	A(3)	P(2)	W(1)
1.Site preparation period					
2.Subcontractor Accomplishment Performance					
3.Time usage of orders delivered					
4.Time usage to implementing variation orders					
5.Time usage to rectify defects					
6.claim approval response					
7.Regular payments process					
8. contractor financial ability					
9. Materials and Equipment Availability					
Project Schedule Management Practice	SA (5)	A(4)	TA (3)	D(2)	SD(1)
1.Use different Techniques for project planning and time control					
2.Having the procedures for identifying variances from estimates & adjusting the detailed work program been followed					
3.The project work is being proceeding in accordance with the original project schedule					
4. All project delays been adequately accounted for, communicated to clients and adjustments made in overall project schedule?					
5. Gantt Chart and/or Network Diagram updated periodically and used to assess the overall project timetable					
6. Is an industry recognized mechanized support tool(s) being used for project scheduling & tracking					

Part Three: Quality Performance of a Construction Projects

Project Quality performance Indicators	E(5)	G(4)	A(3)	P(2)	W(1)
1.Conformance level of the completed buildings to design standard					
2.Timeliness of implementation					
3.Cost effectiveness					
4. procurement process					
5.Major project Deliverables accomplishment level					
6.Standards of contract and performance by contractor					
7. Reduction in construction errors, defects and wastes					
8.Quality of materials and equipment used in the project construction					
9.Effectiveness of project monitoring and communications					
Project quality performance practice	SA (5)	A(4)	TA (3)	D(2)	SD(1)
1. Objectives are measurable, clear and realistic					
2.Clear and achievable implementation strategy and schedules					
3. Main risks are identified and Risk management plan					

sufficiently detailed and realistic.					
4. Contract scope of services and basis of payment are clear, concise and consistent with project design document.					
5.Project closure is done efficiently					
6. schedule management is done in every phase of a project					
6.Activities done based on specific timetable					
7.the contractors employee ought to availability of competent skill					
8.There is applied Quality assessment system in the projects					
9. Quality assurance training and follow up is being done periodically					

Part Four: Safety Performance of a Construction Projects

Safety Performance Indicators	E(5)	G(4)	A(3)	P(2)	W(1)
1. Assurance Rate of a Project					
2. Management Commitment To Safety Programs					
3. Monitoring the Compliance of Safety Measures					
4. Convention of Input Resources for Safety					
5.Personal Protective Equipment					
6.Safe Construction Site Environment					
7.Onsite Safety Supervision					
Project Safety Performance Practice	SA (5)	A(4)	TA (3)	D(2)	SD(1)
1.Balanced Schedule and Activities are being applied for workers					
2.Safety Budget Usage is consumed for managing risks					
3.Reportable Accidents frequency in the Projects are less					
4.Safety Awareness of Top Management is good					
5.There is an Emergency Plan and Procedures Practice for greater safety					
6.Onsite Inspection is done periodically					
7. Good in treating Workers' Physical Fatigue					
8. There is well organized accident Record Keeping and Reporting System					
9.Peredically assessed tasks that may include any hazardous Manual Handling activity					

Thank You Very Much for Your Cooperation and Time!!!!