
**ST. MARY'S UNIVERSITY**

**SCHOOL OF GRADUATE STUDIES**

# DETERMINANTS OF PROJECT PERFORMANCE: THE CASE OF 40/60 HOUSING PROJECTS IN AYAT SITE, ADDIS ABABA

**By**

**ABEBE SAHLE**

**DECEMBER, 2018**

**ADDIS ABABA, ETHIOPIA**

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**A THESIS SUBMITTED TO ST.MARY`S UNIVERSITY, SCHOOL OF GRADUATE STUDIES IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF BUSINESS ADMINSTRATION (PROJECT MANAGEMENT CONCENTRATION)**

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**APPROVED BY BOARD OF EXAMINERS:**

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# ACKNOWLEDGEMENT

I would like to thank the **Almighty God** for the good health and wellbeing that were necessary to complete this thesis. Secondly, I wish to express my sincere thanks to Dr. Maru Shete, my advisor, for his patience, motivation and continuous support. I am also grateful to our parents for their nonstop encouragement, support and attention. Finally, I would like to thank all individuals who were willing to have interview and provided me the data that was important ingredients for successful completion of this thesis.

# ACRONYMS

| | |
|---|---|
| ACWP | Actual Cost of Work Performed |
| ASHDE | Ababa Saving Houses Development Enterprise |
| BCWP | Budgeted Cost of Work Performed |
| BCWS | Budgeted Cost of Work Scheduled |
| CBE | Commercial Bank of Ethiopia |
| CBPP | Construction Best Practice Program |
| CPI | Cost Performance Index |
| EIA | Environmental Impact Assessment |
| PMI | Project Management Institute |
| QMS | Quality Management Systems |
| QPI | Quality Performance Index |
| SPI | Schedule Performance Index |
| UK | United Kingdom |

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# ABSTRACT

The study has met its objectives through providing answers for the basic questions What are the performance problems of projects to achieve the target and What are the tools and techniques applied on the project in order to control project performance. The study is conducted on Addis Ababa 40/60 saving housing project the case of Ayat site. Both primary and secondary data were collected for the accomplishment of the study. Data collection was done through structured questioners, interview and office document review which was designed based on factors found from literature. A total of 54 questioners were distributed to clients, consultants and contractors and 35 questioners were collected and which 28 responses were found valid. Descriptive statics methods were employed through frequency Index/ mean score and average Index to understand the variables of cost, time and quality performance. The frequency of occurrence and significant impacts each causative factors on the studied area. The findings from the study identified that the performance indicators represent both cost performance and schedule performance are below target and poor performance of the project respectively. The performance of the work is poor because of lack of competent and experienced professionals in the field, Scarcity of resources including capital, material and equipment, and inappropriate and malpractice in the program like corruption. Client and consultants stressed poor implementation of project follow up and controlling methods as a contributing factor towards the inefficient and ineffective performance of project. The study identified the factors which affect the project performance into three criteria such as cost, time and quality factor. First criteria, Cost factors are high wastage of material, delay in issuing information to the contractor during construction stage and cost of rework and Material and equipment cost. Second criteria, time factors aremistake during construction, labor productivity, and time needed to rectify defects and poor construction methodology. Third criteria, quality factors availability of personals with high experience & qualification, quality of equipment & material, belonging to work and employee attitudes.The project is inefficient with that lack of meets time of project plan and low quality of workmanship and low decision making process. The project is also ineffective with that lack of integration with national plans and fit with purpose and not free from defects. Finally, this study gives own recommendation to improve the performance of the project.

**Key words: project Performance Evaluation cost**, time and quality factor

# CHAPTER ONE

## 1. INTRODUCTION

### 1.1 Background

The topic of this study is "determinants of project performance: the case of 40/60 housing projects In Ayat site, Addis Ababa". As the topic indicates, the study is focused on evaluate the performance of the project. Construction industry has complexity in its nature because it contains large number of parties as clients, contractors, consultants, stakeholders, shareholders and regulators. It makes significant contributions to the socio-economic development process of a country. It also contributes to employment and creates income for the population and has multiplier effects on the economy.

Housing is one of the major challenges of the city of Addis Ababa due to the increase population and high rate of urbanization. It is a serious problem especially for low-income households of the city's population. The city economy remains weak making it difficult for the city to accommodate the large number of housing demands and provide urban services as well as create employment opportunities for the rapidly growing population. The current market cannot provide low cost housing at the needed quantity with affordable price for large number of unmet housing need. Knowing of these challenges, the Addis Ababa city government took the initiative to reverse the situation and committed itself to new and innovative approaches through the integrated housing development program in 2004 for the low- and middle income families (Ermed, 2010).

The Addis Ababa city administration is responsible and major stakeholder in the implementation and management of the projects. In response to significant pressure from high level authorities to deliver such projects to citizens, many of these projects commence in 2013. However, the projects are not completed and transferred to the users successfully. It is important to evaluate the performance of the project that is initiated by the Addis Ababa City Administration. The projects areeither succeeded or failed due to different factors of the project performance. Several reasons were being responsible for the poor performance of construction projects during lifecycles from planning to operation stage. Therefore, it is obvious from the above that there is an urgent need to develop a system through which to determine current performance, resolve problems and benchmark them against best practice in order to meet the expectations of stakeholders, contractors, consultant and users. " if you can't measure it, you can't manage it" (Kaplan & Norton, 1992).

The definition of Evaluation as "an assessment, as systematic and objective as possible, of an ongoing or completed project, program or policy, its design, implementation and results. The aim is to determine the relevance and fulfillment of objectives, developmental efficiency, effectiveness, impact and sustainability. An evaluation should provide information that is credible and useful, enabling the incorporation of lessons learned into the decision-making process of both recipients and donors"(IFRC, 2011).The subject of performance measurement or assessment has become a matter of concern to several countries at different levels of socio-economic development which have realized the need to improve the performance of their construction industry.

Therefore, there were not enough studies to evaluate the performance of housing project in Addis Ababa with the previous studies. In the gap of the studies, the present research has been studied and evaluated the performance of project in the implementation of cost and time management that are participated on 40/60 saving house project in Addis Ababa.

## 1.2 Statement of the problem

Addis Ababa City Administration had planned to construct condominium houses for the house seekers in different schemes such as 10/90, 20/80 and 40/60 hosing projects since 2012.

The Addis Ababa Saving House Development Enterprise had begun the construction of 40/60 housing projects across 13 sites. Eight of those that commenced construction in 2013 and 2014 are running far behind their scheduled completion dates. "Addis Ababa's housing projects under the 40/60 scheme are lagging behind their contracted schedules. This is evidenced by the Addis Ababa Saving House Development Enterprise's delay in delivery of the initial phase, which was scheduled for June 2015" (Endeshaw, 2015).

The costs of the 972 houses that were recently transferred to the lucky winners of the 40/60 condo system is set to increase by up to 124,000 birr. This price is added by Commercial Bank of Ethiopia (CBE) claiming the additional cost is just an interest rate payment. The interest rate increment expects two-bedroom buyers to add 91, 470 birr and three and four bedroom buyers to add 110, 650 and 124,000 birr respectively on the total prices that they've paid for the houses. Previously Addis Ababa Saving Houses Development Enterprise (ASHDE) had raised the prices for the condos from 3,200, birr to 4,918 birr per square meter(Getnet, 2017).

As a response to the above problem that all construction stake holders, such as client, contractor, consultant, government regulator bodies and users, are responsible. However, the focus of this study, therefore, is to investigate existing performance of the selected project, to identify factors that affect

the performance of the projectand to show better direction for the improvement of project performance.

## 1.3 Research questions

In order to achieve the research objectives, the following three main questions will be addressed:

- What are existing practice applied on the project in order to control time and cost?
- What are the performance problems of projects to achieve the target?
- What are the main factors that affect the project performance?

## 1.4 Objective of the study

**General objective**

The main objective of this paper is to evaluate the performance of 40/60 housing project in Addis Ababa in the case of Ayat Site.

**Specific objective**

- To review the cost and time follow up system adopted by the housing project.
- To evaluate the performance of the project in terms of cost and time efficiency.
- To evaluate the performance of the project in terms of quality specifications.
- To assess the determinant factors on the performance of the project.

## 1.5 Significance of the study

This study can have the following contributions. It can help project managers in the building construction industry to include effective project follow up systems in the preparation of project plans. It provides relevant stakeholder with factors that determine the performance of housing projects, which paves that way to adopt systems that improve their performances

## 1.6 Scope of the study

The study is delimited conceptually, geographically and in terms of participants. Conceptually, it is focused on effectiveness and efficiency of the project performance with particularly based on the project time and cost management. Geographically, it covers 40/60 saving house project in Addis

Ababa Ayat site. Collect data from the participants of the project such as Client, Contractors and Consultants.

## 1.7 Limitation of the study

The project data and documents were not arranged in organized and sequenced in systematic way such as project report, schedule, and payment and quality specifications due to this the study was limited.

## 1.8 Organization of the study

The thesis is organized into five chapters. The first chapter is an introductory chapter covering background on the study, statement of the problem, study question, objectives of the study, significance of the study, scope of the study, limitation of the study, and organization of the study. The second chapter presents overview of different literature on the application of tools and techniques to control the project to complete within plan and cost. The third chapter is about study design and methodology that encompass study design, population, and sample size, sampling techniques, source of data, data collection instruments, and methods of data analysis. The fourth chapter deals with data analysis and interpretation. The fifth chapter is the final chapter that involves summary of major findings, conclusions, and recommendations.

# CHAPTER TWO

## 2. REVIEW OF LITERATURE

### 2.1 Introduction

An incomplete vision of project performance is directly related to fulfilling the original goals of time, cost and quality. Therefore, the broader performance criteria are used by professionals plays an important role in various projects. They proposed the concept of perceived success when they observed in their study that projects that did not meet their original goals of cost, schedule and quality were not necessarily perceived as failed projects by the people involved in the development of the projects. Thus, a project's success is linked to the perception of those involved (stakeholders) regarding the performance of the project.

### 2.2 Construction project

A project is an endeavor that is undertaken to produce the results that are expected from the requesting party. A project consists of three components: scope, budget, and schedule. The term Scope represents the work to be accomplished, i.e., the quantity and quality of work. Budget refers to costs, measured in dollars/Birr and/or labor-hours of work. Schedule refers to the logical sequencing and timing of the work to be performed. The quality of a project must meet the owner's satisfaction and is an integral part of project management (Garold, 2000).

A project is a temporary endeavor undertaken to create a unique product, service, or result. The temporary nature of projects indicates that a project has a definite beginning and end. The end is reached when the project's objectives have been achieved or when the project is terminated because its objectives will not or cannot be met, or when the need for the project no longer exists. A project may also be terminated if the client (customer, sponsor, or champion) wishes to terminate the project. Temporary does not necessarily mean the duration of the project is short. It refers to the project's engagement and its longevity. Temporary does not typically apply to the product, service, or result created by the project; most projects are undertaken to create a lasting outcome (Project Management Institute, 2013). A construction is a process of constructing something by human for one purpose or another. It may be a road, a dam, a private residence, an airport, a commercial building, office and etc. Construction project is the recruitment and utilization of capital, specialized personnel, materials and equipment on a specific site in accordance with drawings, specifications, and contract documents prepared to serve the purposes of a client.

## 2.3 Project management tools and techniques

Although delay and cost overrun may seem very inherent in most projects, the good news is that it can reduce or totally eliminated using a proper project management system that will integrate all the key activities of each phase of the project. According to project management Institute (PMI) (2013) defines project management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements. The project owner and the project manager should be able clear define the management success and product success so that the project team has clear knowledge of its objectives. This application of knowledge requires the effective management of the project management processes. For any given project, the project manager, in collaboration with the project team, is always responsible for determining which processes are appropriate, and the appropriate degree of rigor for each process. Project managers and their teams should carefully address process and its inputs and outputs and determine which applications to the project they are. The project manager is responsible personnel to a project owner for the overall control and coordinating of a project and for ensuring that a project is completed within time, budget and that is satisfies the project owner`s specifications. This ensures that problems can be quickly and measures taken to mitigate them.

## 2.4 Performance assessment and evaluation

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. 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) described performance as relating to such factors as increasing profitability, improved service delivery or obtaining the best results in important areas of organizational activities. Performance in the construction context may be approached from two perspectives; the first relating to the business performance of organizations and the second relating to project performance. Other more comprehensive self-assessment tools such as the balanced scorecard (Kaplan & Norton, 1992), pyramid of measures (Lynch & Cross, 1995) and the business performance measurement framework (Mbugua, 2002). References to performance in this review therefore generally relate to project performance, and to the extent to which performance measures are met.

According to IFRC (2011) Project performance is evaluated based on five evaluation criteria such as: relevance, efficiency, effectiveness, impact and sustainability.

**Relevance**

The extent to which the objectives of a development intervention are consistent with beneficiaries 'requirements, country needs, global priorities and partners' and donors' policies.

**Efficiency**

A measure of how economically resources/inputs (funds, expertise, time etc.) are converted to results (outputs and outcomes). Efficiency is the relationship between resources and results: the input-output ratio. As such, it is a relative not an absolute concept, and requires a reference point to be meaningful.

**Effectiveness**

The extent to which the development intervention's objectives were achieved, or are expected to be achieved, taking into account their relative importance.

**Impact**

Positive and negative, primary and secondary long-term effects produced by a development intervention, directly or indirectly, intended or unintended.

**Sustainability**

The continuation of benefits from a development intervention after major development assistance hasbeen completed; the probability of continued long-term benefits; the resilience to risk of the net benefit flows over time.

According to IFRC (2011) log frame's objectives and key evaluation questions are summarized on the following figure-1 in order to show how things have been performed and what difference has been made.

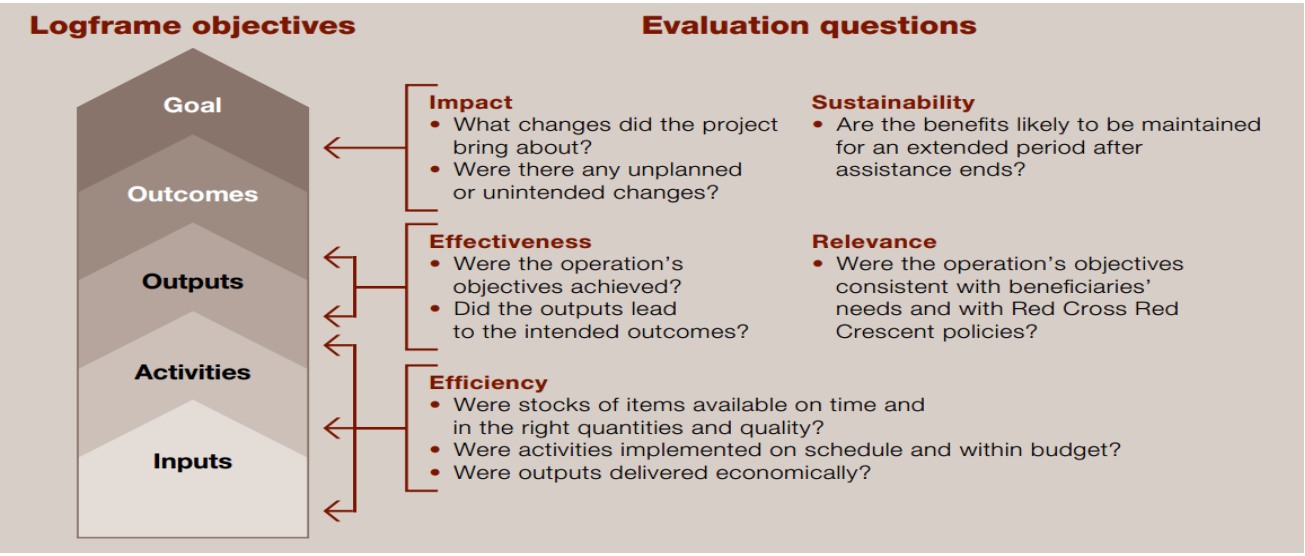


Figure 2-1: Evaluation questions and the log frame

## 2.5 Performance measurement in construction industry

Before starting to review and investigate the previous research regarding to performance measurement, it is necessary to define the word performance measurement.

Ahmad, et al. (1998) define Performance Measurement as "a process that involves the assignment of numerals to objects or events according to rules or to represent properties"

According to Sinclair & Zairi (1995) "Performance measurement is the process of determining how successful organizations or individuals have been in attaining their objectives".

Performance measurement is defined as "a process of assessing progress toward achieving predetermined goals, including information on the efficiency with which resources are transformed into goods and services (outputs), the quality of those outputs (how well they are delivered to clients and the extent to which clients are satisfied) and outcomes (the results of a program of activity compared to its intended purpose)" (Sapri & Pitt, 2005).

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, 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. 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. Measurement is important because it is a means of generating data that could find useful application in a wide variety of problems and situations. Its purpose is to provide timely and accurate feedback on the efficiency and effectiveness of operations and to focus attention on continuous improvement (Amaratunga & Baldry, 2002). Through this function, it acts as a key factor in supporting and ensuring the successful implementation of an organization's strategy. According to Kaplan and Norton (1996) "if you can't measure it, you can't manage it." It provides necessary information for process control, and also enables an organization to establish challenging but feasible goals. With regards to the business of construction, the only way that prices could be seriously reduced, profit margins seriously raised and the out-turn costs kept within budget, is by the elimination of unnecessary costs caused by the ineffective and inefficient utilization of labor and materials. These unnecessary costs can however only be eliminated if their causes can be located, and performance measurement provides the means by which these unnecessary causes of waste can be identified so that the organization knows where to focus its efforts (Cain, 2004). Quite clearly, it is a critical means

to the end of achieving continuous performance improvement in construction project delivery. It may be a "complex, frustrating, difficult, challenging, abused and misused" process, but as appropriately pointed out by Cain (2004), "if you don't know how well you are doing, how you know you are doing well?"

The construction industry is mainly project based. Therefore, this perspective requires construction organizations to drive focus on evaluating the successfully achievement of project performance. Project performance is the realization of predefined project objectives and hence project success. Performance measurement is an integral part of management and defined as a process of quantifying both the efficiency and effectiveness of an action. Some of the major concerns of performance measurement include "What to measure?", "Which measures are used?", "How to measure?" and "How to interpret results?"

The success of the project should be measured in terms of completing the project within the constraints of scope, time, cost, quality, resources and risk as approved between the project managers and senior management (Project Management Institute, 2013).

It is obvious that the construction industry has special features that are not usually encountered in other industries. Usually in construction, when conditions in the field turn out to be more complex than what was anticipated in the planning and design phase, additional costs and time are needed. Any extremes can affect productivity level, damage materials and work in place. Moreover, the industry, most of the time, is custom oriented, meaning that it is difficult to use mass production techniques. Because of all these factors and others, it is difficult to predict creating a large facility takes a long time and usually involves a large capital investment. Cost overruns, delays and other problems tend to be proportionally monumental Cost and time is the primary measures of a project's success.

A project successful if it was completed on budget, on schedule, conformed to user Expectations, met specifications, attained quality of workmanship and minimized Construction aggravation. Generally, a project is considered successful if the project is completed within a stated cost or budget, getting the project into use by a target date, meets the technical specification, and if there is a high level of satisfaction concerning the project outcome among the project participants.

Completion alone does not constitute success for the project owner. For the owner, much of the success of a project depends on many factors, the most important of which is project completion within specified cost. The second most important factor affecting success is on time completion as

delays in completion of facilities often directly equate to financial losses due to lack of revenue from facility operation.

The project follows up objectives are generally stated in terms of the specified completion time with in predetermined costs and profitability. The project plan shows the path of achieving these objectives. But even with the best efforts, the probability of execution of a project exactly as per planning is low. There will be unpredictable resource limitations and unforeseen activity delays. Project needs an effective follow-up system to continuously monitor the devotions from the planned paths, and to apply corrective measures.

According to Costa & Formoso (2004), managers in Brazilian construction firms still make decisions mostly based on intuition, common sense, experience, and a few broad financial measures that are inadequate in today's competitive environment. Although Brazil may not be representative of the general situation, anecdotal evidence suggests that to some extent, strategy is formulated in a similar fashion even in countries such as the UK where there has been strong advocacy for performance measurement (Cain, 2004). A growing awareness among construction firms of the importance of measurement systems for monitoring and controlling their performance. Unfortunately, this realization has not been well established and as a result, performance measurement is still not widely implemented in the construction industry (Costa & Formoso, 2004). This situation has been attributed to the inadequacy of measures with construction companies claiming to have difficulties in identifying and selecting adequate performance measures related to their strategies and critical processes. It has also been due to the fact that industry practitioners consider comprehensive measurement too complex and time consuming, and that the benefits accruing from these measurements would not necessarily offset the cost of undertaking them. To some extent, another drawback to effective performance measurement has been the project-oriented nature of the industry. It is argued that the generally utilized approaches based on the business performance and measures of profitability do not meet the specific needs and strategies of a project-based industry like construction. Other views expressed in industry have been to the effect that "efficiency levels were universally high across the industry," Cain (2004) implying that measurement is unnecessary. 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, and traditionally within the construction industry, performance has been measured in terms of cost,

time and quality (Xiao & Proverbs, 2003) as shown in figure 2. This has mainly been due to the fact that these indicators of performance provide 'hard' and relatively easy-to-collect data. Another important reason is that construction products tend to be investment goods with great potential to appreciate in value, hence the strong emphasis by construction clients on cost, time and quality.

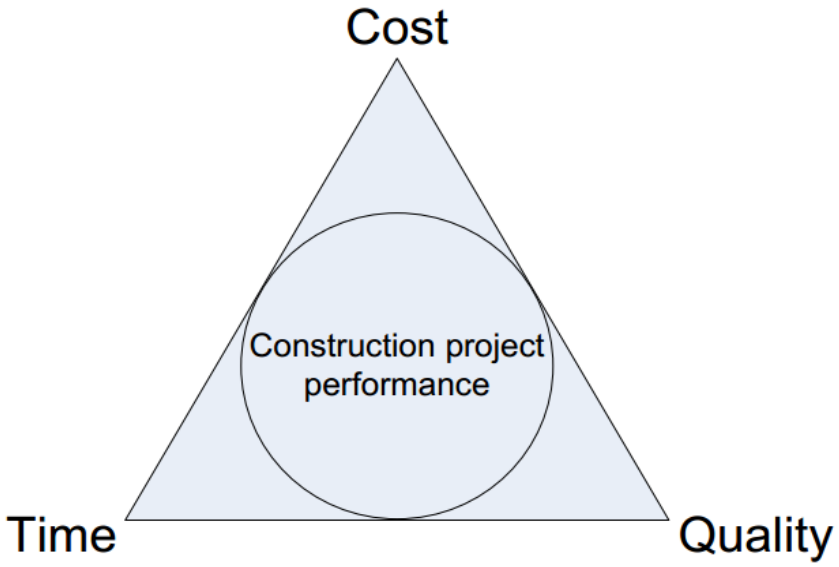


Figure 2-2**:** The 'iron triangle' of construction project (Xiao & Proverbs, 2003)

Other 'hard' indicators that are also employed in measuring performance include labour turnover, accident rates, and productivity (Costa & Formoso, 2004). In the construction industry, labor productivity dominates such measures of productivity. More recently, the inception of such initiatives as the Construction Best Practice Program (CBPP), the need to comply with Quality Management Systems (QMS) based for instance on ISO 9001, the inadequate support for decision-making using such measures as productivity rates, and the need for benchmarking (Costa & Formoso, 2004) have led to the development of improved frameworks for performance measurement. Besides the traditional reliance on the measures of cost, time and quality, these other frameworks have extended measures to include client satisfaction measures encompassing 'softer' aspects of satisfaction, which have increasingly been found to be rather significant. An examination of some client satisfaction literature provides evidence of this shifting paradigm. Some measurement frameworks have even synthesized some of these 'softer' indicators into measures such as "trust/confidence in contractors' ability" and a "willingness to use the same contractors again". Apart from the client satisfaction criteria, greater attention is also being paid to such issues as environmental impacts, health and safety, investment in research and development and personnel training (commitment to continuous improvement), as well as the sustained profitability of the organizations in the supply chain and the

nature of relationships with the other members of the supply chain (Xiao & Proverbs, 2003). This reflects the changing objectives and philosophy of the construction industry at large and shows the growing awareness of the importance of the other stakeholders to the value chain.

In regards to time and quality aspects of project delivery in addition to 'minimizing disputes between the parties to construction contracts'. The study summarizes a number of performance measures that can be grouped into six categories that provide for fair project delivery (Construction Queensland, 2001): Customer focus, Optimum use of information, People involvement, Process improvement, leadership and Strong supplier relations

Kagioglou, et al. (2001) explains that 'the construction industry in the U.K. and many other developed countries has a long track record of less than optimal performance'. Investigations dating back to as far as 1944 indicate the need for change and improvement. Latham (1994) identified that improvements to project performance could be made by increasing the focus on design process, quality management, productivity, training, and education while Egan (1998) highlighted areas of productivity, profits, quality, and safety while emphasizing the importance of performance measurement as key in delivering improvement in performance of the construction industry.

A study undertaken by Crow & Barda (2001) looked at 28 projects that had been delivered and deemed as 'excellent projects'. It was revealed that there were several attributes that were responsible for excellence achievement. They stated that approximately 10% of projects achieve this excellence rating, and that the utilization of the identified attributes could raise this statistic. They specifically state that the following drivers were responsible for achieving excellent project outcomes: Client leadership, Trusting relationships, Project initiation, Team establishment, Team pride, Value management, Stakeholder involvement and communication;

## 2.6 Key requirements & criteria for performance measurement

Besides the need to align measures with the purpose of the measurement, performance measurement undertaken must meet four basic criteria in terms of what it enables the assessor to achieve. Essentially, performance measurement must enable the assessor to check the position of an organization, communicate this position, confirm priorities and compel progress (Amaratunga & Baldry, 2002). To fulfill these functions, performance measurement frameworks and their associated measures must have certain characteristics. However, in the context of this research, the relevant characteristics of performance measurement as noted from the various sources are that they must: Be composed of both financial and non-financial performance measures, be intelligible to a majority of

stakeholders, provide timely and accurate feedback, be based on a few but essential indicators, provide visibility e.g. a 'score-board', concentrate on the core of activities/processes critical to the firm's strategy, facilitate understanding of cause and effect relationships regarding performance, be founded on easy to collect data, be dynamic; and allow performance to be compared against competitive benchmarks.

In particular, the measurement and evaluation of performance are central to control posing four basic questions (Shaw, 1999): What has happened? Why has it happened? Is it going to continue? And What are we going to do about it?

The first question can be answered by performance measurement. The remaining ones will depend on the information from assessing the performance of the project for management to take decisions and actions. The information about what is really happening is vital for the project management team and other stakeholders to determine with considerable certainty what to do. Thus, assessing the performance of project throughout its lifecycle is one of the major ways of achieving the objectives of the project and to ensure better performance. In addition, it is a means of ensuring improvements in executions. Improvements in project execution within a construction industry will them be one of the key indicators of a construction industry of a country. Within the construction sector, mostly in the developed countries, various frameworks exist for the measurement of project success or failure. This also includes which factors are influencing the performance of the projects.

The criteria in which project success/failure has often been assessed have also been called key performance indicators and even dimensions. Several authors, within the multidimensional construct of project performance have proposed different criteria or indicators based on empirical research. While some focused on using these measures as strategic weapons, others emphasized the proper delineation of the measures and groupings into classes that will make tracking and management reasonable.

Shenhar & Wideman (1996) model is based on the principle that projects are undertaken to achieve business results and that they must be "perceived as powerful strategic weapons, initiated to create economic value and competitive advantage, and project managers must become the new strategic leaders, who must take responsibility for project business results.". In their opinion, "projects in future will no longer be just operational tools for executing strategy –they will become the engines that drive strategy into new directions." The second premise is about the existence of project typologies, on the slogan "one size does not fit all". They propose that project success should be considered in four dimensions: project efficiency, Impact on the customer, Business success, and

Preparing for the future. These are to be assessed on the basis of four project types: Low-tech, Medium-tech, High-tech, and Super-high tech projects. Vandevelde, et al. (2002) summarized various works on project performance measurement which are based on the multidimensional, multi-criteria concept. In all, they identified seven dimensions: respect for time, respect for budget and technical specification, knowledge creation and transfer, contribution to business success, financial and commercial success. They merged these seven dimensioned model into a three-polar model namely, process, economic and indirect poles. Atkinson (1999) separates success criteria into delivery and post-delivery stages and provides a "square route" to understanding success criteria: iron triangle, information system, benefits (organizational) and benefit (stakeholder community). The 'iron 25 triangle', has cost, time and quality as its criteria (for the delivery stage). The post-delivery stages comprise: (i) The Information system, with such criteria as maintainability, reliability, validity, information quality use; (ii) Benefit (organizational): improved efficiency, improved effectiveness, increased profits, strategic goals, organizational learning and reduced waste; (iii) Benefit (Stakeholder community): satisfied users, Social and Environmental impact, personal development, professional learning, contractors profits, capital suppliers, content project team and economic impact to surrounding community. This model takes into consideration the entire project life cycle and even beyond. It thus lends itself for continuous assessment. Chan & Chan (2004), 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. Below each view point are list of "factors" for measurement. Chan and Chan (2004) concentrated on construction projects, and, based on previous works, proposed a 15 key project indicators, key performance indicators (KPIs), comprising both objective measures: construction time, speed of construction, time variation, unit cost, percentage net variation over final cost, net present value, accident rate, environmental Impact assessment (EIA) scores; and subjective measures: quality, functionality, end-user's satisfaction, client's satisfaction, design team's satisfaction, construction team's satisfaction. Patanakul & Milosevic (2009) grouped their measurement criteria into three: Criteria from organizational perspective: Resource productivity, Organizational learning; Criteria from project perspective: time-to-market, Customer satisfaction and Criteria from personal perspective: personal growth, personal satisfaction. Sadeh, et al. (2000) proposed a division of project success into four dimensions. These are: Meeting design goals, benefit to end user, benefit to the development

organization, benefit to the defense and national infrastructure, in that order. Finally, Freeman & Beale (1992) provided technical success, efficiency of project execution, managerial and organizational success, personal growth, completeness, and technical innovation as the main success criteria. In effect, these authors are emphasizing the need to strategically assess project in dimensions that will facilitate its management for good performance. Taking from the often quoted adage of performance management: "if you cannot measure, you cannot manage", it is also true that: if you cannot measure appropriately, you cannot manage appropriately.

## 2.7 Factors that Influence Performance of Projects

The factors that influence the success/failure of the project have received similar attention from a number of authors. The classical proposition is that organizations must develop a set of strategic strength areas that are important to the environment and industry in which they operate. With reference to Pinto& Kharbanda (1995), Torp, et al. (2004) agrees that identifying critical success factors and potential pitfalls in project at the front-end (knowing beforehand as much as possible and how to respond) will help project teams to minimize firefighting, intuitive and ad hoc approach in managing uncertainties. Several others have developed various frameworks for success factors, mostly highlighting project management in general. These works, together with Mengesha's (2004) influenced Torp et al.'s (2004) observation that there is gradual shift in focus over time from purely technical issues towards organizational and management issues. Significantly, they identify progressive emphasis on such issues as top management support, organizational issues, stakeholder management, coordination and human relations. They established from the case study evidence that there is a relationship between critical success factors and potential pitfalls in the projects; that lack of critical success factors are considered potential pitfalls and vice versa. This is in line that "the presence of critical success factors does not guarantee success but their absence is likely to lead to failure". In their contribution Shenhar, et al. (2002) propose that "different factors influence the success different kinds of projects and that future scholarship of project management must adapt a more project specific approach to identify the exact causes of project success and failure". Based on information collected on 127 projects executed in Israel, they identified three different types of success factors: factors which are independent of the project characteristics, factors which are solely influenced by uncertainty and factors which are solely influenced by scope.

Belassi & Tukel (1996) provided a framework for grouping project performance factors (they called them success factors) into factor groups under each of which are several other factors which are

viewed as the indicators for measuring a particular factor group. These are: factors related to the project, the project manager, the project team, the clients' organization and the external environment. In addition, the provided an intermediate set of factors called system response. The strength of the framework lies in the fact that it opens itself up to several other factors that could be relevant based on the context of the project. In addition, it shows that 29 with the five factor groups appropriately distinguished, one can even expect an entirely different set of factors under the groups. This provides a means by which Shenhar et al's (2002) position of looking at success factors as contingency factors could be appropriately considered. Belassi and Tukel (1996) also spoke of their framework helping project managers to understand the intra- relationships between factors in different groups.

Shenhar et al (2002) in their study of 646 projects, used path analysis to show that success factor influence each other. In relating to this position, the scope of this research covers the linkage between the identified factors and the indicators of assessment. It, however, supports the argument that to be successful in achieving the goals of enterprise project management, performance measurement, and thus management, should of necessity identify the linkages and interactions between factors-factors, factors-measures that exist in the system surrounding the project. In this regard, it could be possible to deploy effective project management through the project as a temporary organization and also to ensure good monitoring and controlling of those critical factors that could impact on the project performance in identifiable criteria.

## 2.8 Project performance indices

According to Nadim (2009) research studies cost, schedule and quality are the objectives considered as the traditional most critical to the success of construction projects. The performance indicators represent efficiency in terms of cost, time and quality. Each of these indices is quantitatively determined and transformed into a standard scale as will be shown as follows:

### Cost performance index (CPI)

The Cost Performance Index (CPI) is a measure of the cost efficiency of the project.

$$CPI=BCWP/ACWP$$

Where,

**BCWP** = Budgeted Cost of Work Performed. It is the budgeted amount of cost of work-completed to-date or the cost allowed (based on budget) to be spent for the actual work done.

**ACWP** = Actual Cost of Work Performed. It is the cost incurred to complete the accomplished work to-date.

The cost performance rating table as shown in table 2.1 is proposed for illustration purposes only.

Table 2-1: Cost performance rating table

| Condition | Rating | Index range |
|---|---|---|
| A | Outstanding performance | I> 1.15 |
| B | Exceeds target | 1.05 < I <= 1.15 |
| C | Within target | 0.95 < I <= 1.05 |
| D | Below target | 0.85 < I <= 0.95 |
| E | Poor performance | I <= 0.85 |

## Schedule performance index (SPI)

The Schedule Performance Index (SPI) is a measure of the Schedule efficiency of the project.

SPI=BCWP/BCWS

Where,

**BCWP** = Budgeted Cost of Work Performed. It is the budgeted amount of cost of work-completed to-date or the cost allowed (based on budget) to be spent for the actual work done.

**BCWS** = Budgeted Cost of Work Scheduled. It is the budgeted amount of cost for work scheduled to date.

The Schedule performance rating table as shown in table 2.2 is proposed for illustration purposes only.

Table 2-2: Schedule performance rating table

| Condition | Rating | Index range |
|---|---|---|
| A | Outstanding performance | I> 1.15 |
| B | Exceeds target | 1.05 < I <= 1.15 |
| C | Within target | 0.95 < I <= 1.05 |
| D | Below target | 0.85 < I <= 0.95 |
| E | Poor performance | I <= 0.85 |

## Quality performance index (QPI)

The Quality Performance Index (QPI) is a measure of the cost efficiency of the project. Quality is a major project performance attribute that requires measurement and continuous improvement. A strong quality performance can have the following benefits:

- Enhances an organization's ability to market its services.
- Increases the client satisfaction and consequently the chances for repeat business.
- Reduces the amount of rework, and improves the effectiveness and efficiency of construction operations

The Quality Performance Index (QPI) is a measure of consistency in the application of the project standards and procedures as well as the compliance of the delivered product with the project specification. Non-consistency in the application of project processes will lead to rework, poor quality audits and high number of nonconformance reports.

QPI = (Total Direct and Indirect Cost of Rework performed in the field)/(Total Field construction phase cost)

The Quality performance rating table as shown in table 2.3 is proposed for illustration purposes only.

Table 2-3: Quality performance rating table

| Condition | Rating | Index range |
|---|---|---|
| A | Outstanding performance | I > 1.15 |
| B | Exceeds target | 1.05 < I <= 1.15 |
| C | Within target | 0.95 < I <= 1.05 |
| D | Below target | 0.85 < I <= 0.95 |
| E | Poor performance | I <= 0.85 |

## 2.9 Empirical research review

There are a number of studies are done in different countries worldwide that related with factors affecting the project performance and evaluation of the project performance. Some of them are summarised as follows.

According to Abera & Fekadu (2016)studied about Factors affecting the performance of construction project the key factors that affect the performance of construction projects are cost, time, quality, andleadership style. Cost of designchange, fluctuations of material cost that increase the cost of

project, inadequate review for drawings and contractdocuments, delivering orders late to thesite, financial problem of contractor due to late approvel of variation order, use low quality of materials and equipment, not conforms to specification.

Saleh (2008) on his research study found out that the most imprtant factors agreeed by the owners, consultants and contractors were: average delay because of closyre and material shoratage, availablitiliyt of resources as planned through project duration, leadership skills for project manageer, escalation of material prices, availability of personals with high experience and qualification and quality of equipment and raw material in project.

Bui & Ling (2010) in the study that was carried out in Vietnam on factors affecting construction project outcomes discovered that major enablers that lead to project success are foreign experts' involvement in the project, government officials inspecting the project and very close supervision when new construction techniques are employed. A factor which leads to poor performance is the lack of accurate data on soil, weather, and traffic conditions.

Amusan (2011) studied factors affecting construction cost performance in Nigerian construction sites. It was discovered from the analysis that factors such as contractor's inexperience, inadequate planning, inflation, incessant variation order, and change in project design were critical to causing cost overrun, while project complexity, shortening of project period and fraudulent practices are also responsible.

Iyer & Jha (2005) did a research on factors affecting cost performance evidence from Indian construction projects and found out that the project manager's competence and top management support are found to contribute significantly in enhancing the quality performance of a construction project.

Nyangilo (2012) did an assessment of the organization structure and leadership effects on construction projects' performance in Kenya, he found out that lack of appropriate project organization structures, poor management systems and leadership are the major causes of poor project performance.

# CHAPTER THREE

## 3. RESEARCH DESIGN AND METHODOLOGY

### 3.1 Introduction

In this chapter the details of all information regarding the methods that is used to carry out the research, the type of research design that should use, the target population, the sample size, sampling techniques, the procedure that is used to obtain samples and the research instrument and method of data collections are discussed. It also indicated how data are analyzed and presented.

### 3.2 Research Design and Approach

Adopting a certain research method depends on a range of factors. Some of these are the nature of the problem under study, the situation in which the research is conducted, availability of sources, and the background and inclination of the researcher. In this regard, the relationship between methodology and research objectives is the fundamental factor to determine the quality of the data (Denzin & Lincoln, 1994).

As mentioned earlier, the major concern of the study is examining the design and outcomes of the project. The goal of this study is comprehensive for understanding the ways in which the performance of Housing project in Addis Ababa Ayat site. Therefore, descriptive design is appropriated to emphasize on analyzing and explaining the actual situation.

The method chosen for the study is mixed to seek and use both qualitative and quantitative information for the analysis. Among the specific techniques of qualitative investigation, the study involves interviews. On the other side, quantitative data were gathered using distributed questionnaire by taking the representative sample from project stakeholders such as Clients, Contractors and Consultants.

### 3.3 Population and sampling Techniques

The target population of the study was organized in cluster ways that includes tripartite such as client, contractor and consultant. A simple random sampling method was applied to select the sample from the population of each cluster. The questionnaire will be applied to 63 informants in the investigation.

There are 63professionals; (consultant, contractor and client) the study area from which the sample population size is selected. According to Kothari (2004) if the sample populations are less than 10,000 the required representative sample size will be computed by the proportion of sample size formula.

According to Kothari (2004), n=Z2 PQ/d2 will be used, where n=the desired sample size Z=Standard nominal deviate at required confidence level P=the proportion in the target population estimated to have a particular characteristic q=1-p, and d=statistical significance Here let the population with particular characteristics from the sample population is 50% thus P=50% =0.5and q=1-p=1-0.5=0.5 the researcher considered to be 93% level of Confidence. The Corresponding standard nominal deviate is Z=1.81 and desired level of significance was 0.07 then sample size is

n= (1.81)2(0.5) (0.5)/(0.07*0.07) = 167

So that, according to Kothari (1990) if N <10,000 the formula is,

fn= n /(1+n/N)

Where= the desired sample size when the population is less than 10,000 n=the sample size of the population N= the estimated population size.

Accordingly,

- For contractor n=167, N=42

  fn= 167/(1+167/42)=167/(1+3.98)=167/4.98=34

- For Consultant n=167, N=16

  fn= 167/(1+167/16)=167/(1+10.44)=167/11.44=15

- For Client n=167, N=5

  fn= 167/(1+167/5)=167/(1+33.4)=167/34.4=5

I selected the professional who were working on fourteen contractors 34 samples, on two consultants 15 samples and on the client 5 samples from the total population of 42 contractor workers, 16

consultant workers and 5 client workers in Ayat site 40/60 Condominium housing project in Addis Ababa respectively.

In applying qualitative method, document review and unstructured interviews were applied as instruments. Fifteen informants (five from each) were interviewed from the three clusters by applying purposive random sampling method.

## 3.4 Instrumentation of data collection

In statistical investigations, collection of data occupies the important place and the data collected is the foundation of the whole structure. The whole statistical analysis is based on the way the Data have been collected or obtained, because the data provide a raw material to statistical analysis interpretation. The details of the methods and techniques, the details of the sources and instruments of data collection, the selection techniques of facilitation and the methods and instruments of data analysis were elaborated after employing the techniques. Three types of data gathering tools were used in the study. One was structured questionnaire the second one was document analysis that from monthly report, schedule, payments and different letters and the other one of data gathering tool was interviews.

## 3.5 Procedures of data collection

Three types of data gathering tools were used in the study. One was structured questionnaire to be applied for gathering data from participants, the second one was document analysis that from monthly report, schedule, payments and different letters and the other one of data gathering tool was interviews that officials at the management level in the project teams and Engineers in the project.
The details of the methods and techniques, the details of the sources and instruments of data collection, the selection techniques of facilitation and the methods and instruments of data analysis were elaborated after employing the techniques.

## 3.6 Methods of data analysis and interpretation

For the data analysis, the numerical data were analyzed using statistic Package for Social Science (SPSS) by use of Relative Importance Index (RII) as appropriate. The qualitative information was coded as per the framework of the inquiry and included into the overall analysis and result for further interpretation with the quantitative information. Furthermore, in deriving meanings from the data, the objectives identified earlier and the concepts discussed in the literature review were consulted.

RII method to determine the relative importance of the various factors affecting the performance of the project and inefficiency and effectiveness measure of the project.

RII for each factor is calculated as shown below:

$$RII = \sum W/A*N$$

Where:

RII = Relative Important Index

W=Weighting given to each factor by respondents (Ranging from 1 to 5)

A= Highest weight that is 5

N=Total number of respondents

The RII values have a range of 1-5; the higher the RII is the more important factors indicators affecting the performance of the project. The RIIs is ranked, and the results are shown by using tables.

## 3.7 Research Ethical Consideration

The necessary permissions were requested prior to distributing the questionnaires and interviews for the selected candidates and participants have the awareness that no information were made public and the study was utilized for academic purposes only.

# CHAPTER FOUR

## 4. DATA PRESENTATION, ANALYSIS AND DISCUSSION

### 4.1 Introduction

The main target of this chapter is to report and discusses the survey findings to conduct the questionnaire survey was carried out. Statistical analyses were undertaken on the responses using various methods described in the research methodology.

### 4.2 Analysis of findings

The results from the document review, interview and questionnaire survey are presented, interpreted and analyzed in detail in this part.

#### 4.2.1 Personal and organizational profile

**Type of respondent companies**

The characteristics of the sample size for the respondent companies that shows on table 4-1. The sample consists of Contactors (63 %), consultants (28 %), and client (9 %).

Table 4-1: Respondent type of company

| Type of respondent companies | No. of sample | Percentage of sample |
|---|---|---|
| Client | 5 | 9% |
| Consultant | 15 | 28% |
| Contractor | 34 | 63% |

**Questionnaire response rate**

Out of the fifty-four questionnaires distributed on the selected samples, 28 responses were received with 52% return rate in this study. The other 19(35%) questionnaires have not been received, among the responded questioners 4 (7%) have been uncompleted and 3 (6%) have been incorrect responded.

Table 4-2: Response rate among the groups of respondent

| Companies classification | No. of sample | Completed responses | Not been received | Uncompleted responses | Incorrect responses |
|---|---|---|---|---|---|
| **Contractor** | 34 | 18 | 11 | 2 | 3 |
| **Client** | 5 | 2 | 2 | 1 | 0 |
| **Consultant** | 15 | 8 | 6 | 1 | 0 |
| **Total** | **54** | **28** | **19** | **4** | **3** |
| **Total percentage** | **100%** | **52%** | **35%** | **7%** | **6%** |

## Respondents experience

Figure 4.3 shows the years of experience for the respondent in the construction industry. About 8(28.57%) of respondent have 1-3 years of experience, 5(17.85 %) of them have 3-5 years of experience, 9(32.14 %) of them have 5-10 years of experience, 6 (21.43 %) of them have 10-15 years of experience and while no above 15 years of experience respondent.

Table 4-3: Experience of respondent

| Experience | No. of Respondent | Percentage of respondent |
|---|---|---|
| < 3 years | 8 | 28.57% |
| Between 3 and 5 years | 5 | 17.85% |
| Between 5 and 10 years | 9 | 32.14% |
| Between 10 and 15 years | 6 | 21.43% |
| | | |

## Performance measurement practice

The following figure 4-4 shows that 78% of respondents indicated that not practice any performance measurement system in the construction projects to know project performance and only 22% of respondents indicated that practice about performance measurement system in the construction project.

Table 4-4: Respondent practice of performance measurement in the construction project

| Performance measurement | Number of respondent | Percentage of respondent |
|---|---|---|
| Practice performance measurement | 6 | 22% |
| Not practice performance measurement | 22 | 78% |

## Performance of the 40/60 housing program

The contractors (42%) together with 38% and 20% of clients and consultants respectively, believe performance of the Addis Ababa 40/60 housing program is good. The contractors' perception may arise from their direct engagement on the works in which they believe that they fulfilling in executing the works as prescribed in the contract. However, the majority of the respondent believes the performance of the Addis Ababa 40/60 housing program is poor. According to the respondents' reasons for the poor performance of the program that are lack of competent and experienced professionals in the field as major contributing factors. Scarcity of resources including capital, material and equipment are considered a second factor by respondents. Inappropriate and malpractice in the program like corruption is also revealed by considerable respondents behind the reason for the bad performance. Most of the respondents specify the reason for poor performance of the project such as: very poor selection method of contractor, unfair unit rate of the work, lack project follow up system and bureaucracy of the government office.

Most of the professionals have been interviewed agree on the associated problems that hinder the performance of the project such as: continues increase of material price, labor rate and equipment. All interviewee from contractor and consultant raised the problems of prevailing adversarial relation and mistrust among the parties also contributes a great deal to the bad performance. Some of the interviewee from client and consultants stressed poor implementation of project follow up and controlling methods as a contributing factor towards the inefficient and ineffective performance of project.

### 4.2.2 Factors affecting the performance of the project

Respondents were surveyed on three factors that were affecting the performance of project. Such factors as identified were: cost, time and quality factors. Responses obtained in these criteria have been analyzed as follows:

## Identified cost factors

Table 4-5: Cost factors affecting on the project performance respond result

| Cost factors | Extremely significant | Very significant | Moderately significant | Slightly significant | Not significant | RII | Rank |
|---|---|---|---|---|---|---|---|
| Cost planning/monitoring during pre and post contract stage | 8 | 12 | 6 | | 2 | 77% | 9 |
| Cash flow of project | 11 | 7 | 9 | 1 | | 80% | 8 |
| Design changes | 5 | 3 | | 9 | 11 | 47% | 11 |
| Inadequate review for drawings and contract document | 18 | 7 | | | 3 | 86% | 5 |
| Material and equipment cost | 14 | 10 | 4 | | | 87% | 3 |
| Project labor cost | 6 | 4 | 10 | 2 | 6 | 61% | 10 |
| Delay in issuing information to the contractor during construction stage | 20 | 4 | 1 | 3 | | 89% | 2 |
| Cost of rework | 14 | 12 | | 2 | | 87% | 3 |
| Cost of variation orders | 14 | 10 | 2 | 2 | | 86% | 6 |
| High wastage of materials cost | 20 | 6 | 2 | | | 93% | 1 |
| Consultant experience | 16 | 6 | 2 | 4 | | 84% | 7 |
| Unpredictable bad weather condition | | | | 10 | 18 | 27% | 12 |

The responses obtained from the three parties are compiled on table 4-5 above, and the result shows that the mean values of rating of nine cost factors affecting on the performance of the project outlines in the questionnaire are to be found above 60%. As it is illustrated in the table, high wastage of material, delay in issuing information to the contractor during construction stage and cost of rework

and Material and equipment cost are the top three cost factors. On the other side, unpredictable bad weather condition, design change and labor cost are less effect on the project.

## Identified time factor

Table 4-6: Time factors affecting on the project performance respond result

| Time factors | Extremely significant | Very significant | Moderately significant | Slightly significant | Not significant | RII | Rank |
|---|---|---|---|---|---|---|---|
| Discrepancies on the contract document | | 8 | 5 | 9 | 6 | 51% | 14 |
| Time needed to implement variation orders | 7 | 12 | 3 | 2 | 4 | 71% | 12 |
| Time needed to rectify defects | 19 | 6 | 2 | 1 | | 91% | 2 |
| Delay of claim approval | 11 | 5 | 9 | | 3 | 75% | 11 |
| Delay of payment from owner to contractor | 19 | | | 3 | 6 | 76% | 10 |
| Contactor financial problem | 20 | 4 | | 2 | 2 | 87% | 5 |
| Poor construction methodology | 18 | 8 | | 2 | | 90% | 4 |
| Mistake during construction | 20 | 4 | 4 | | | 91% | 1 |
| Inadequate experience | 16 | 9 | | 2 | 1 | 86% | 6 |
| Shortage of material supply | 14 | 6 | 2 | 4 | 2 | 79% | 9 |
| Labor productivity | 20 | 5 | 1 | 2 | | 91% | 2 |
| Waiting time for approval of tests and inspections | 19 | | 4 | 2 | 3 | 81% | 7 |
| Communication among parties | | 21 | | | | 80% | 8 |
| Rules and regulation changes | | 2 | 2 | 16 | 8 | 39% | 15 |
| Unforeseen ground condition | | 6 | 12 | 5 | 5 | 54% | 13 |

From the above table 4.6 times factor that affecting the performance of the project, the majority of respondents indicated that mistake during construction, labor productivity, time needed to rectify defects and poor construction methodology are ranked from 1 up to 4 respectively. On the other side, rules and regulation changes, discrepancies between the contract document and unforeseen ground condition are less effect on the project performance.

## Identified quality factor

Table 4-7: Time factors affecting on the project performance respond result

| Quality factors | Extremely significant | Very significant | Moderately significant | Slightly significant | Not significant | RII | Rank |
|---|---|---|---|---|---|---|---|
| Conformance to specification | 15 | 9 | 4 | | | 87.86% | 6 |
| Availability of personals with high experience & qualification | 20 | 4 | 4 | | | 91.43% | 1 |
| Quality of equipment and raw material in project | 22 | 2 | 2 | 2 | | 91.43% | 1 |
| Participation of managerial levels with decision making | 8 | 7 | 12 | | 1 | 75.00% | 10 |
| Quality assessment system in organization | 16 | 5 | 3 | 2 | 2 | 82.14% | 9 |
| Quality training/meeting | 20 | 4 | | 2 | 2 | 87.14% | 8 |
| Employee attitudes in project | 18 | 8 | | 2 | | 90.00% | 4 |
| Recruitment and competence development B/n employees | 16 | 8 | 4 | | | 88.57% | 5 |
| Employees motivation | 18 | 7 | | 2 | 1 | 87.86% | 6 |
| Belonging to work | 19 | 6 | 2 | 1 | | 90.71% | 3 |

The responses obtained from the three parties are compiled on table 4-7 above, and the result shows that the mean values of rating of all cost factors affecting on the performance of the project outlines in the questionnaire are to be found above 70%. As it is illustrated in the table, availability of personals with high experience & qualification, quality of equipment & material, belonging to work and employee attitudes are the top four quality factors. On the other side, participation of managerial levels with decision making, quality assessment system in organization and quality training are less effect on the project performance.

### 4.2.3 Inefficiency and ineffectiveness of the project performance

Respondents were surveyed on inefficiency and ineffectiveness of the project performance of the Addis Ababa housing project on 40/60 program on the case of Ayat project site. Such measures as identified and analyzed as follows:

## Inefficiency of the project

Table 4-8: Inefficiency of the project performance responds result

| Inefficiency measures | Extremely significant | Very significant | Moderately significant | Slightly significant | Not significant | RII | Rank |
|---|---|---|---|---|---|---|---|
| No meets time of project plan | 22 | 5 | 1 | | | 95% | 1 |
| Low decision making process | 18 | 6 | 2 | 1 | 1 | 88% | 3 |
| Low project productivity | 8 | 15 | 2 | 3 | | 80% | 6 |
| No meets budget of the project | | | 21 | 5 | 2 | 54% | 8 |
| Not fulfill technical specifications | 15 | 4 | 6 | 2 | 1 | 81% | 5 |
| Scope change | | 2 | 8 | 2 | 16 | 37% | 11 |
| Amount of material wastages | | 16 | 3 | 6 | 3 | 63% | 7 |
| Inefficiency utilization of manpower | 10 | 12 | 6 | | | 83% | 4 |
| High dispute between stakeholders | | | 8 | 17 | 3 | 44% | 10 |
| Low quality of workmanship | 16 | 10 | | 2 | | 89% | 2 |
| Minimum effect on the environment | | | 19 | 4 | 5 | 50% | 9 |

Most of respondents indicated that lack of meets time of project plan, low quality of workmanship and low decision making process are the highest three factors for the inefficiency of project performance. Next to these, inefficiency utilization of manpower, unfulfilled technical specification and low project productivity are the next highest factors that inefficiency of construction project performance. On the other side, scope change and high dispute between stakeholders are the lower effect on the project inefficiency of the project performance.

Based on the payment certificate and schedule data of the projects from contractors, consultants and client. I summarise the project amount, project budget up to date, actual executed amout and schedule upto date in order to evaluate the project performance.

Table 4-9: Project contract and executed amount Data

| I.No. | Contract amount for two G+12 Building (Birr) | BCWP (Birr) | ACWP (Birr) | BCWS (Birr) | Work progress percentage |
|---|---|---|---|---|---|
| 1 | 82,495,050.00 | 63,108,713.25 | 70,120,792.50 | 74,626,832.13 | 85% |
| 2 | 82,495,050.00 | 56,698,847.87 | 65,171,089.50 | 68,429,643.98 | 79% |
| 3 | 82,495,050.00 | 70,566,265.77 | 77,545,347.00 | 81,422,614.35 | 94% |
| 4 | 82,495,050.00 | 72,100,673.70 | 78,370,297.50 | 82,288,812.38 | 95% |
| 5 | 82,495,050.00 | 75,953,192.54 | 81,670,099.50 | 85,753,604.48 | 99% |
| 6 | 82,495,050.00 | 75,953,192.54 | 81,670,099.50 | 87,753,604.48 | 99% |
| 7 | 82,495,050.00 | 75,953,192.54 | 81,670,099.50 | 87,753,604.48 | 99% |
| 8 | 82,495,050.00 | 75,953,192.54 | 81,670,099.50 | 85,753,604.48 | 99% |
| 9 | 82,495,050.00 | 49,299,041.88 | 59,396,436.00 | 62,366,257.80 | 72% |
| 10 | 82,495,050.00 | 51,889,386.45 | 61,046,337.00 | 64,098,653.85 | 74% |
| 11 | 82,495,050.00 | 59,528,428.08 | 67,645,941.00 | 72,028,238.05 | 82% |
| 12 | 82,495,050.00 | 53,209,307.25 | 61,871,287.50 | 64,964,851.88 | 75% |
| 13 | 82,495,050.00 | 42,097,224.02 | 51,971,881.50 | 54,570,475.58 | 63% |
| 14 | 82,495,050.00 | 45,322,780.47 | 55,271,683.50 | 58,035,267.68 | 67% |
| | **Total** | **867,633,438.87** | **975,091,491.00** | **1,029,846,065.55** | |

## Cost performance index (CPI)

The Cost Performance Index (CPI) is a measure of the cost efficiency of the project.

$$CPI=BCWP/ACWP$$

Where,

**BCWP** = Budgeted Cost of Work Performed. It is the budgeted amount of cost of work-completed to-date or the cost allowed (based on budget) to be spent for the actual work done.

**ACWP**=Actual Cost of Work Performed. It is the cost incurred to complete the accomplished work to-date.

**CPI= 867,633,438.87/975,091,491.00=0.89**

According to the cost performance rating table as shown in table 2.1 is proposed for illustration purposes only. The Addis Ababa 40/60 housing program in the case of Ayat site is below target.

## Ineffectiveness of the project

Table 4-10: Ineffectiveness of the project performance respond result

| Ineffective measures | Extremely significant | Very significant | Moderately significant | Slightly significant | Not significant | RII | Rank |
|---|---|---|---|---|---|---|---|
| No pleasant environment | 16 | 4 | 6 | 2 | | 84% | 3 |
| Not free from defects | 17 | 7 | 1 | 2 | 1 | 86% | 2 |
| No meets client satisfaction on product | 6 | 13 | 4 | 5 | | 74% | 6 |
| No Flexible for future expansion | | 5 | 12 | 9 | 2 | 54% | 8 |
| No integrated with national plans and fit with purpose | 24 | 4 | | | | 97% | 1 |
| Not project functionality | 2 | 9 | 4 | 3 | 10 | 53% | 9 |
| High rectification of defects | 4 | 19 | 1 | 4 | | 76% | 5 |
| Difficult to maintain | | 1 | 4 | 8 | 15 | 34% | 11 |
| No meets pre-stated objectives | 4 | 7 | 8 | 6 | 3 | 62% | 7 |
| No meets stakeholders' needs and expectation | 20 | | 2 | 6 | | 84% | 3 |
| No meets client satisfaction on service | | | | 24 | 4 | 37% | 10 |

From the result of respondents in the above table 4.10 that indicated lack of integration with national plans and fit with purpose and not free from defects are the top two factors for the ineffectiveness of project performance. Next to these, not pleasant environments, lack of meets stakeholders' needs and expectation, high rectification of defects and are the next high factors that ineffectiveness of construction project performance. On the other side, Difficult to maintain and not meets client satisfaction on service are the lower effect on the project inefficiency of the project performance.

## Schedule performance index (SPI)

The Schedule Performance Index (SPI) is a measure of the Schedule efficiency of the project.

$$SPI=BCWP/BCWS$$

Where,

**BCWP**=Budgeted Cost of Work Performed. It is the budgeted amount of cost of work-completed to-date or the cost allowed (based on budget) to be spent for the actual work done.

**BCWS**=Budgeted Cost of Work Scheduled. It is the budgeted amount of cost for work scheduled to date.

**CPI= 867,633,438.87/1,029,846,065.55=0.84**

According to the Schedule performance rating table as shown in table 2.2 is proposed for illustration purposes only. The Addis Ababa 40/60 housing program in the case of Ayat site has poor performance.

# CHAPTER FIVE

## 5. SUMMARY OF FINDING AND RECOMMENDATION

### 5.1 Summary of finding

This study is focused on the performance evaluation of the project in Addis Ababa 40/60 housing project the case of Ayat site. The study resulted in some key findings, some of which addressed the main aim and objectives set. Therefore, based on the results obtained, the following major conclusions have been made in accordance with the objectives of this thesis research.

A structured questionnaire and unstructured interview assist to study the attitude of owners, consultants and contractors towards the performance of the project and factors affect the project.

- The performance indicators represent efficiency in terms of cost, time and quality. As per document review and analysis evaluate the cost and schedule performance using Cost Performance Index (CPI) and Schedule Performance Index (SPI). The results show the Addis Ababa 40/60 Housing project in the case of Ayat site both cost performance and schedule performance are below target and poor performance respectively.
- The majority of the respondent agree that the performance of the work is low because of lack of competent and experienced professionals in the field, Scarcity of resources including capital, material and equipment, and inappropriate and malpractice in the program like corruption. Most of the respondent specifies the reason for poor performance of the project such as: very poor selection method of contractor, unfair unit rate of the work, lack project follow up system and bureaucracy of the government office.
- Most of the professionals have been interviewed agree on the associated problems that hinder the performance of the project such as: continues increase of material price, labor rate and equipment. All interviewee from contractor and consultant raised the problems of prevailing adversarial relation and mistrust among the parties also contributes a great deal to the bad

performance. Some of the interviewee from client and consultants stressed poor implementation of project follow up and controlling methods as a contributing factor towards the inefficient and ineffective performance of project.

- The factors that affect the performance of the Addis Ababa 40/60 Housing program in Ayat site identified in three criteria. First criteria, identified cost factors are high wastage of material, delay in issuing information to the contractor during construction stage and cost of rework and Material and equipment cost. Second criteria, identified time factors are mistake during construction, labor productivity, time needed to rectify defects and poor construction methodology. Final criteria, identified quality factors availability of personals with high experience & qualification, quality of equipment & material, belonging to work and employee attitudes.
- The result from evaluation of efficiency and effectiveness of the Addis Ababa 40/60 housing program on the case of Ayat project site. The project is inefficient with that lack of meets time of project plan, low quality of workmanship and low decision making process. The project is also ineffective with that lack of integration with national plans and fit with purpose and not free from defects.

## 5.2 Recommendation

Based on the findings of this study, the following recommendations are forwarded.

- Performance problem is costly and often result in disputes, claim and affect the target of the project. The responsible parties like client, consultant and client must have a clear mission and vision to formulate, implement and evaluate performance.
- Proper and continuous training programs must give concerned about project performance. The training programs can update their knowledge and can assist to be more familiar with project management techniques and processes.
- Realistic plan for project implement should be more suitable for practice.
- Project participants should employ regular meeting to enhance good performance.
- Continuous coordination and relationship among project participants are required through project life cycle in order to solve problems and develop project performance.
- Consultants should facilitate and quicken orders delivered for contractors to obtain better time performance and to minimize disputes and claims.
- Contractors should adequate contingency allowance in order to cover increase in material cost and a proper motivation and safety systems should be established for improvement labor productivity performance.
- Contractors should minimize wastage rate through project implementation in order to improve cost performance.
- Contractors should practice with conformance to project specification to overcome disputes, time and cost performance problems. Besides that, quality materials should be implemented to improve cost, time and quality performance.

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# APPENDIX

## Questionnaire

Dear Participant,

I am undertaking a research study entitled "**Performance Evaluation and its Determinants of40:60 Housing Project in Addis Ababa: The Case of Ayat Site**" as part of our MBA. Study in Project Management at St. Mary's University School of Graduate Studies Department of Project Management.

Please answer all questions where possible. All the information gathered will be kept strictly confidential and will be used only for academic research and analysis without mentioning the names of individuals companies involved; hence, I sincerely request you to complete and return the questionnaire in short period of time.

Thank you for your invaluable time and cooperation.

**Requested by:** Abebe Sahle

**Advisor:** Maru Shete (PhD)

December, 2018

Please indicate your response by ticking (√) mark at the appropriate box (s) or by filling the blank spaces provided, as appropriate. You may kindly use the back side of the paper if the blank space (s) is/are not sufficient.

**PART ONE: Personal and Organization Profile**

1.1. Type of Company:

☐ Client/Employer ☐ Consultant ☐ Contractor

1.2. Your work experience in construction projects and construction project related works:

☐ < 3 years ☐ 3-5 years ☐ 5-10 years ☐ 10-15 years ☐ > 15 years

1.3. Do you practice any performance measurement systems in the construction projects?

☐ Yes ☐ No

1.4. In general, how do you describe the performance of the Construction project in Addis Ababa 40/60 housing project?

☐ Very good ☐ Good ☐ Bad ☐ Very bad

If your answer is bad, what challenges may have contributed in your opinion for the poor competence? (Please check all that apply in your point of view)

☐ Lack of competent and experienced professionals in the field

☐ In appropriate and malpractice in the industry (like corruption)

☐ Scarcity of resources (material, equipment etc.)

Other (Please specify) _____

**PART TWO: Factors affecting the Performance of Construction Projects**

Below are numbers of factors affecting the performance of construction projects. From your experience on the project, please express your opinion on the importance of the following factors as key performance indicators of Addis Ababa 40/60 housing construction project at Ayat Site.

1 - Not significant (N.S.) 4 - Very significant (V.S.)

2 - Slightly significant (S.S.) 5 - Extremely significant (E.S.)

3 - Moderately significant (M.S.)

| I.N | Groups/Factors | 5 (E.S.) | 4 (V.S.) | 3 (M.S.) | 2 (S.S.) | 1 (N.S.) |
|---|---|---|---|---|---|---|
| | **1. Cost factors** | | | | | |
| 1.1 | Cost planning/monitoring during pre and post contract stage | | | | | |
| 1.2 | Cash flow of project | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1.3 | Design changes | | | | | |
| 1.4 | Inadequate review for drawings and contract document | | | | | |
| 1.5 | Material and equipment cost | | | | | |
| 1.6 | Project labor cost | | | | | |
| 1.7 | Delay in issuing information to the contractor during construction stage | | | | | |
| 1.8 | Cost of rework | | | | | |
| 1.9 | Cost of variation orders | | | | | |
| 1.10 | High wastage of materials cost | | | | | |
| 1.11 | Consultant experience | | | | | |
| 1.12 | Unpredictable bad weather condition | | | | | |
| | **2. Time factors** | | | | | |
| 2.1 | Discrepancies on the contract document | | | | | |
| 2.2 | Time needed to implement variation orders | | | | | |
| 2.3 | Time needed to rectify defects | | | | | |
| 2.4 | Delay of claim approval | | | | | |
| 2.5 | Delay of payment from owner to contractor | | | | | |
| 2.6 | Contactor financial problem | | | | | |
| 2.7 | Poor construction methodology | | | | | |
| 2.8 | Mistake during construction | | | | | |
| 2.9 | Inadequate experience | | | | | |
| 2.10 | Shortage of material supply | | | | | |
| 2.11 | Labor productivity | | | | | |
| 2.12 | Waiting time for approval of tests and inspections | | | | | |
| 2.13 | Communication among parties | | | | | |
| 2.14 | Rules and regulation changes | | | | | |
| 2.15 | Unforeseen ground condition | | | | | |
| | **3. Quality factors** | | | | | |
| 3.1 | Conformance to specification | | | | | |
| 3.2 | Availability of personals with high experience | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | &qualification | | | | | |
| 3.3 | Quality of equipment and raw material in project | | | | | |
| 3.4 | Participation of managerial levels with decision making | | | | | |
| 3.5 | Quality assessment system in organization | | | | | |
| 3.6 | Quality training/meeting | | | | | |
| 3.7 | Employee attitudes in project | | | | | |
| 3.8 | Recruitment and competence development B/n employees | | | | | |
| 3.9 | Employees motivation | | | | | |
| 3.10 | Belonging to work | | | | | |

**PART THREE: Inefficiency and Ineffectiveness performance of the project**

Project success is measured in terms of efficiency and effectiveness performance.

1 - Not significant (N.S.)
2 - Slightly significant (S.S.)
3 - Moderately significant (M.S.)
4 - Very significant (V.S.)
5 - Extremely significant (E.S.)

| I.N | Measures | 5 (E.S.) | 4 (V.S.) | 3 (M.S.) | 2 (S.S.) | 1 (N.S.) |
|---|---|---|---|---|---|---|
| | **1. Inefficiency of the project** | | | | | |
| 1.1 | No meets time of project plan | | | | | |
| 1.2 | Low decision making process | | | | | |
| 1.3 | Low project productivity | | | | | |
| 1.4 | No meets budget of the project | | | | | |
| 1.5 | Not fulfill technical specifications | | | | | |
| 1.6 | Scope change | | | | | |
| 1.7 | Amount of material wastages | | | | | |
| 1.8 | Inefficiency utilization of manpower | | | | | |
| 1.9 | High dispute between stakeholders | | | | | |
| 1.10 | Low quality of workmanship | | | | | |
| 1.11 | Minimum effect on the environment | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **2. Ineffectiveness of the project** | | | | | |
| 2.1 | No pleasant environment | | | | | |
| 2.2 | Not free from defects | | | | | |
| 2.3 | No meets client satisfaction on product | | | | | |
| 2.4 | No Flexible for future expansion | | | | | |
| 2.5 | No integrated with national plans and fit with purpose | | | | | |
| 2.6 | Not project functionality | | | | | |
| 2.7 | High rectification of defects | | | | | |
| 2.8 | Difficult to maintain | | | | | |
| 2.9 | No meets pre-stated objectives | | | | | |
| 2.10 | No meets stakeholders' needs and expectation | | | | | |
| 2.11 | No meets client satisfaction on service | | | | | |

**THANK YOU!**

# DECLARATION

I the undersigned declare that this Thesis is my original work, prepared under the guidance of Dr. Maru Shete. All sources of materials used for this Thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher learning institution for the purpose of earning any degree.

_____ _____

Name Signature Signature
St. Mary's University College, Addis Ababa December, 2018

# ENDORSEMENT

This Thesis has been submitted to ST Mary's University, School of Graduate Studies for examination with my approval as a University Advisor.

| | |
|---|---|
| _____ | _____ |
| Advisor | Signature |
| St. Mary's University, Addis Ababa | December, 2018 |