ST. MARY'S UNIVERSITY
SCHOOL OF GRADUATE STUDIES

FACTORS AFFECTING CONSTRUCTION PROJECTS PERFORMANCE: THE CASE OF SAVE THE CHILDREN

BY

MESFIN HABTEMARIAM

JANUARY 2019
ADDIS ABABA, ETHIOPIA

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LIST OF ACRONYMS/ABBREVIATIONS

ANOVA ……Analysis of Variance

SPSS……..Statistical Package for Social Science

USD…….United States Dollar

SCI …… Save the Children International

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Abstract

Construction industry has complexity in its nature because it involves large number of parties as clients, contractors, consultants and others. Construction projects suffer from many problems and complex issues in performance such as cost, time, scope and quality. The same is true for save the children construction projects. This thesis tries to identify and evaluate the main factors affecting the performance of construction projects in the organization. A questionnaire survey was conducted using 35 identified factors which are categorized into 7 groups. 117 Questionnaires were distributed, and 104 questionnaires were returned: 18 (100%) from owners and 86 (88.9%) from contractors. The results were analyzed using Relative Importance Index (RII) to determine owners and contractors' perceptions toward the identified performance influencing factors in construction projects. Accordingly, the top most important factors agreed by both parties were: Completion period given for the contract, unavailability of Skillful workers, insufficient supply of materials, escalation of material prices, political environment, physical environment, delay of progress payment to contractors, planning effort, technical skill of the project staffs and project leaders early and continuous involvement in the project. Multiple linear regression analysis was also conducted to see independent variables (the project characteristics related factors, labor and material related factors, contractual relationship, project procedures, external environment, clients' related factors and contractors' related factors) relation on dependent variable (performance of construction project). The study found that independent variables showed significant relation with the dependent variable and the independent variables explain 83.8% of variance of the dependent variable performance of construction projects in save the children. The results of the regression analysis also showed, except for labor and material related factors and contractual relationship, the factors influence the construction performance positively.

Keywords: *Contractors, Owners, Performance Multiple Regression Analysis, Save the children, Construction projects*

CHAPTER ONE

INTRODUCTION

1.1. Background of the study

The construction sector worldwide in general is a multibillion-dollar industry that almost always grows in size and complexity of technology. It is a vital sector of the economy that has a significant effect on the efficiency and productivity of other industry sectors. In some of the developing countries, the growth rate of construction activity outstrips that of population and of GDP (Chitkara, 2004). Construction industry in the projects has complexity in its nature because it contains large number of parties as clients, contractors, consultants, stakeholders, shareholders and regulators, this parties can affect the performance of the project through many related topics and factors. These involvements of numerous parties, with various processes, different phases and stages of work and a great deal of input from both the public and private sectors, with the major aim being to bring the project to a successful completion.

The level of success in carrying out construction project development activities will depend heavily on the quality of the managerial, financial, technical and organizational performance of the respective parties, while taking into consideration the associated risk management, the business environment, and economic and political stability (Takin, R and Akintoye, 2004). The long-term success of construction project depends on its performance, which is measured base on timely completion, within the budget, required quality standards and customers satisfaction (Omran, 2012). It is realized that maximization of the success factors and minimization of failure factors will ensure the construction industry realizes its goals. Okuwoga (1998) stated that the performance of the construction industry is considered as a source of concern to both public and private sector clients. Karim and Marosszeky (1999) studied performance measurement using Key performance indicators.

Studies were conducted to examine factors impacting on project performance in developing countries. Shortage of skills of manpower, poor supervision, poor site management, unsuitable leadership, shortage and breakdown of equipment among others contribute to construction delays in the United Arab Emirates. (Faridi and El-Sayegh, 2006). According to Ajayi et al. (2010) the choice of contractor(s) is a critical factor for the project manager and usually has a significant impact on the success or failure of a project. The performance of a contractor will definitely correlate with the performance of the contract. He further observed that the evaluation

of performance has been a challenge for the construction industry for decades. Several models and methods have been proposed by researchers for the evaluation of project performance. However most of these procedures according to Ajayi et al. (2010) limit their analysis to selected measures such as cost, schedule or labor productivity. Construction performance embraces client's satisfaction, time performance, cost performance, construction quality and sustainable development.

A research done by Tatiana (2005) specified that project participants, project procedures, human aspects and environment may affect project performance. These factors may be associated with the different parties who involved in construction project, and each of them will play their individual roles contributing to the success of a project. It is widely believed that the performance of projects consist of the performance of all stages with each other to result in the final performance according to time, cost and quality and others factors.

Save the children International (hereafter called SCI) is one of the prominent International Non-Governmental Organization which has been actively and continuously involved in Ethiopia in varieties of developmental and humanitarian activities since 1960's. Currently, it is operating in over 120 countries. Though the type and degree of involvement is different in different regions, SCI is currently working in all regions with its three hub offices plus 50+ field Offices in different zones and towns of Ethiopia. The major sectors of its operation are Child Friendly System and Structure, Child Protection, Education, Livelihood & Resilience, Health and Nutrition, Water, Sanitation and Hygiene, and Humanitarian relief. The average total annual budget during the studied time for Save the Children International Ethiopia programs is more than a 100 million USD. In most of programs, there are small to large construction projects undertakings as part of their plan. As per construction management unit of the organization, the total annual budget of these construction ranges between 60-100 million birrs during this study period. This study will focus on identifying the main construction performance factors for save the children and test how they will affect with overall performance to help improve performance of the future construction projects.

1.2. Statement of the Problem

In Ethiopia, the present state of the construction industry falls short of meeting domestic and international quality standards and the performance demand expected from the sector (MoWUD, 2006). Construction projects have problems with construction techniques and management as well as limitation of funds and time. The critical problems are inability to complete the projects

on schedule, low quality work and cost overrun. In general, most (if not all), construction projects experience time overrun and cost overruns during their execution phase. An examination of the records of more than four thousand construction projects by Morris et al, (1998), showed that projects were rarely finished on time or within the allocated budget. In Save the Children the same is true that construction projects suffer mainly time overrun but also cost & quality performance issues (SCI Construction tracker reports, 2017 & 2018) and because of this the construction activities are always treated as highly risky activity during program development.

As it is shown from previous studies (Karim and Marosszeky, 1999; DETR, 2000; Lehtonen, 2001; Samson and Lema, 2002; Kuprenas, 2003; Cheung, 2004; Iyer and Jha, 2005; Navon, 2005; Ugwa and Haupt, 2007) that the failure of any project is mainly related to the problems and failure in performance. Moreover, there are many reasons and factors which attribute to this problem. Most of these studies mainly focus on one aspect of performance issues mainly Cost and Time instead of their overall performance. In addition, there very few studies were conducted on Ethiopia context (Merid, (2016); Shambel, (2018); Fetene, (2008); Tadesse, (2009)) and none on specific non-governmental implemented construction projects. Therefore, this study will focus on identifying the main construction performance factors for save the children and test how they will correlate with overall performance to help improve performance of the future construction projects.

1.3. Research Questions

This section encompasses questions that the researcher wants to ask to shape the study. These are:

1. What are the factors affecting the performance of construction projects?
2. How are the perceptions of owners and contractors towards the relative importance of this factors in construction projects of Save the Children?
3. What is the relationship between factors (project characteristics related factors, labor and material related factors, contractual relationship, project procedures, external environment, clients' related factors and contractors' related factors) on the one hand and performance of construction projects in Save the children on the other?
4. How is the performance of construction projects affected by the identified factors?

1.4. Research objective

1.4.1 General Objective

The aim of this research is to analyze the local factors affecting the performance of construction projects in the Save the Children Ethiopia programs.

1.4.2 Specific Objectives

The specific objectives are:

- To identify the factors affecting the performance of construction projects and identify the most ranked significant factors
- To examine the relationship between the identified factors ((project characteristics related factors, labor and material related factors, contractual relationship, project procedures, external environment, clients' related factors and contractors' related factors) and performance in construction projects

1.5. Research Hypothesis

The following hypotheses are developed and to be tested using Analysis of Variance (ANOVA) statistical tool.

H_a1: There is statistically significant effect on the performance of construction projects by the project characteristics related factors.

H_O1: There is no statistically significant effect on the performance of construction projects by the project characteristics related factors.

H_a2: There is statistically significant effect on the performance of construction projects by the labor and material related factors.

H_O2: There is no statistically significant effect on the performance of construction projects by the labor and material related factors.

H_a3: There is statistically significant effect on the performance of construction projects by the contractual relationship related factors.

H_O3: There is no statistically significant effect on the performance of construction projects by the contractual relationship related factors.

H_a4: There is statistically significant effect on the performance of construction projects by the project procedures factors.

H_O4: There is no statistically significant effect on the performance of construction projects by the project procedures factors.

H_a5: There is statistically significant effect on the performance of construction projects by the external environment related factors.

H_O5: There is no statistically significant effect on the performance of construction projects by the external environment related factors.

H_a6: There is statistically significant effect on the performance of construction projects by the clients' related factors.

H_O6: There is no statistically significant effect on the performance of construction projects by the clients' related factors.

H_a7: There is statistically significant effect on the performance of construction projects by the contractors' related factors.

H_O7: There is no statistically significant effect on the performance of construction projects by the contractors' related factors.

1.6. Scope and Limitations of the research

Methodological scope: The researcher used descriptive research design and quantitative research method and multiple linear regression analysis. Questionnaire and document review were used for the study.

Geographic Scope: Save the Children International, Ethiopia country office was considered for the study.

Timeline Scope: The study focused on projects completed between 2016 – 2018 GC (2009 & 2010 EC) for the sake of getting relevant information.

1.7. Organization of the Research

This study is organized into five chapters. The first chapter is the introductory part of the study which consists of background of the research, statement of the problem, research question, objectives, significance, scope and limitation of the study. The second chapter deals with related review of literature relevant to this study. The third chapter discusses the research method. The collected data from the subject of the study are carefully analyzed and interpreted under the fourth chapter. The fifth chapter presents summary, conclusions and recommendations on the findings of the study. Reference and appendix which include questionnaire are also be part of this study paper.

CHAPTER 2

LITERATURE REVIEW

This chapter presents a literature review of the research work that was done by various scholars in the field of performance of construction project. This includes theoretical review, conceptual frame work and empirical review of literature relevant to the study and summary.

2.1. Theoretical review

2.1.1 The Theory of Performance

The Theory of Performance develops and relates six foundational concepts to form a framework that can be used to explain performance as well as performance improvements (Don, 2010). To perform is to produce valued results. A performer can be an individual or a group of people engaging in a collaborative effort. Developing performance is a journey, and level of performance describes location in the journey. Current level of performance depends holistically on 6 components: context, level of knowledge, levels of skills, level of identity, personal factors, and fixed factors. Three axioms are proposed for effective performance improvements. These involve a performer's mindset, immersion in an enriching environment, and engagement in reflective practice. Performance advancing through levels where the labels "Level 1," "Level 2," etc. are used to characterize effectiveness of performance. That is, a person or organization at Level 3 is performing better than a person or organization at Level 2. Performing at a higher level produces results that can be classified into categories: (i) quality increases; results or products are more effective in meeting or exceeding the expectations of stakeholders; amount of waste goes down, (ii) capability increases; ability to tackle more challenging performances or projects increases, (iii) capacity increases; ability to generate more throughput increases, (iv) knowledge increases ; depth and breadth of knowledge increases, (v) skills increase; abilities to set goals persist, maintain a positive outlook, etc. increase in breadth of application and in effectiveness and (vi) identity and motivation increases; individuals develop more sense of who they are as professionals; organizations develop their essences.

2.1.2 Construction Projects and Performance

Project success is almost the ultimate goal for every project. Success of construction projects depends mainly on success of performance. Many previous researches had been studied on 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. 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.

2.1.3 Construction project performance measurement models

Two models developed for measuring construction project performance are integrated performance index (Pillai et al., 2002) and key performance indicator (Construction Industry Task Force, 1998). Integrated Performance Index was developed initially 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 programme 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. 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 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.

2.1.4 Performance Measurement Theory

Mbugua et al., (1999) have identified a distinction between performance indicators, performance measures and performance measurement. According to Mbugua et al., 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; Mbugua et al., 1999). In response to calls for continuous improvement in performance, many performance measurements have emerged in management literature. Some examples include: the financial measures (Kangari et al., 1992), client satisfaction measures (Walker, 1984), employee measures (Abdel-Razek, 1997), project performance measures (Belassi et al., 1996) and industry measures (Egan, 1998). Rene 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.

2.1.5 Measurement of Project Performance

The purpose of performance measurement is to help organizations understand how decision-making processes or practices led to success or failure in the past and how that understanding can lead to future improvements. Tangen (2004) obtained that performance measurement is a complex issue that normally incorporates at least three different disciplines: economics, management and accounting. Measurement of performance has garnered significant interest recently among both academics and practitioners. Lehtonen (2001) stated that performance measurement systems are imminent in the construction firms. Karim and Marosszeky (1999) stated that performance measurement systems have been one of the primary tools used by the manufacturing sector for business process re-engineering in order to monitor the outcomes and effectiveness of implementation. Navon (2005) defined performance measurement as a comparison between the desired and the actual performances. He also stated that performance measurement is needed not only to control current projects but also to update

the historic database. Such updates enable better planning of future projects in terms of costs, schedules, labor allocation, etc.

Karim and Marosszeky (1999) defined the purpose of key performance indicators as to enable a comparison between different projects and enterprises to identify the existence of particular patterns. They used different representation values to evaluate time and cost performance such as project characteristics, procurement system, project team performance, client representation's characteristics, contractor characteristics, design team characteristics, external condition. Samson and Lema (2002) remarked that characteristics of emerging performance measurement indicators need analysis of both the organization and environment such as: nature of work, global competition, quality awards, organizational role, external demands and power of IT. The indicators should be able to identify causes of problems, address all possible performance drivers, and identify potential opportunities for improvement. Cheung et al (2004) remarked seven main key indicators for performance which are: time, cost, quality, client satisfaction, client changes, business performance, and safety and health.

Pheng and Chuan (2006) stated that project performance can be determined by two common sets of indicators. The first set is related to the owner, users, stakeholders and the general public which are the groups of people who will look at project performance from the macro viewpoint. The second are the developer, a non-operator, and the contractor which are the groups of people who will look at project performance from the micro viewpoint. Ugwu and Haupt (2007) developed and validated Key performance indicators for sustainability appraisal using South Africa as a case study. It is used four main levels in a questionnaire to identify the relative importance of Key performance indicators. The main indicators were: economy, environment, society, resource utilization, health and safety and project management and administration. Luu et al (2007) provided nine Key performance indicators which can be applied to measure project management performance and evaluate potential contractors as well as their capacity by requesting these indices.

2.1.6 Problem of Performance in Construction Industry

The failure of any construction project is mainly related to the problems and failure in performance. Moreover, there are many reasons and factors which attribute to such problem. Long et al, (2004) stated that the construction industry performance problems in developing economies can be classified in three layers: problems of shortages or inadequacies in industry infrastructure (mainly supply of resources), problems caused by clients and

consultants, and problems caused by contractor incompetence/inadequacies. Okuwoga (1998) identified that the performance problem is related to poor budgetary and time control. Long et al (2004) remarked that performance problems arise in large construction projects due to many reasons such as: incompetent designers/contractors, poor estimation and change management, social and technological issues, site related issues and improper techniques and tools. Navon (2005) stated that the main performance problem can be divided into two groups: (a) unrealistic target setting (i.e., planning) or (b) causes originating from the actual construction (in many cases, the causes for deviation originate from sources).

2.1.7 Factors Affecting Cost and Time Performance

Pheng and Chuan (2006) stated that there have been many past studies on project performance according to cost and time factors. Chan and Kumaraswamy (2002) remarked that studies in various countries appear to have contributed significantly to the body of knowledge relating to time performance in construction projects over the past three decades, while Iyer and Jha (2005) remarked that project performance in term of cost is studied since 1960s.

Chan and Kumaraswamy (1996) stated that a number of unexpected problems and changes from original design arise during the construction phase are leading to problems in cost and time performance. They found that poor site management, unforeseen ground conditions and low speed of decision making involving all project teams are the three most significant factors causing delays and problems of time performance in local building works. Okuwoga (1998) stated that cost and time performance has been identified as general problems in the construction industry worldwide. Dissanayaka and Kumaraswamy (1999) remarked that project complexity, client type, experience of team and communication are highly correlated with the time performance; whilst project complexity, client characteristics and contractor characteristics are highly correlated with the cost performance.

Iyer and Jha (2005) remarked that the factors affecting cost performance are: project manager's competence; top management support; project manager's coordinating and leadership skill; monitoring and feedback by the participants; decision making; coordination among project participants; owners' competence; social condition, economical condition and climatic condition. Coordination among project participants was identified as the most significant of all the factors having maximum influence on cost performance of projects. Chan and Kumaraswamy (2002) proposed specific technological and managerial strategies to increase speed of construction and so to upgrade the construction time performance. It is remarked

that effective communication, fast information transfer between project participants, the better selection and training of managers, and detailed construction programs with advanced available software can help to accelerate the performance.

2.1.8 Factors Affecting Quality Performance

Arditi & Gunaydin (1998) find that management commitment to continuous quality improvement, management leadership in promoting high process quality; quality training of all personnel; efficient teamwork to promote quality issues at the corporate level; and effective cooperation between parties taking part in the project are generic factors that affect process of quality.

Pheng and Chuan (2006), through case studies, has shown that total quality management a successful management philosophy in the manufacturing and service industry could be replicated in the construction industry with similar benefits. The benefits may be in terms of reduction in quality costs, and better employee job satisfaction. Iyer and Jha (2005) observe that a contractor's quality assurance system, which ensures consistent quality, is essential in preventing problems and the reoccurrence of problems. His survey also points to the lack of documentation of a quality system for the majority of the contractors.

2.1.9 Definition of Terms

Key performance indicator (KPI): is a type of performance measurement which evaluates the success of an organization or of a particular activity in which it engages.

Time overruns: is defined as the extension of time beyond planned completion dates.

Cost overruns: is the difference between the original cost estimate of project and actual construction cost on completion of works.

Project: Construction projects constructed between mid-2016 & 2018 GC (2009 & 2010 EC).

Construction: Construction of any building and water projects undertaken by Save the children International, Ethiopia country office.

Owner: Organization for whom the construction project is being undertakes.

Contractor: A natural or juridical person under contract with an owner to construct the construction projects.

Performance: The accomplishment of a given construction projects against the contractual cost, time and quality standards.

2.2. Empirical Review

Enshassi et al. (2009) in his thesis on factors affecting the performance of construction projects in the Gaza Strip, found out that the most important factors agreed by the owners, consultants and contractors were: average delay because of closure and materials shortage, availability of resources as planned through project duration, leadership skills for project manager, escalation of material prices, availability of personals with high experience and qualification and quality of equipment and raw materials in project. Bui et al., (2010) in their study 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. Amusan and Adebile, (2011) studied factors affecting construction cost performance in Nigerian construction sites. He 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.

Iyagba, Odusami and Omirin, (2003) did a research on the relationship between project leadership, team composition and construction project performance in Nigeria. The tests of the hypotheses led to the conclusion that there was significant relationship between the project leader's professional qualification, his leadership style, team composition and overall project performance. No significant relationship was found between the project leader's profession and overall project performance. Iyer and 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.

Chan and Kumaraswamy (2002) remarked that project performance measurement includes time, budget, safety, quality and overall client satisfaction. Kuprenas (2003) stated that project performance measurement means an improvement of cost, schedule, and quality in design and construction stages. Navon (2005) defined performance measurement as a comparison between the desired and the actual performances. The construction industry performance is affected by

national economies (Navon, 2005). Despite this complexity, the construction industry plays a major role in the development and achievement of goals in the society. The pace of the economic growth of any nation can be measured by the development of the physical infrastructure such as buildings, roads and bridges (Takin and Akintoye, 2004). Successful building construction projects are those projects finished on time, within budget, in accordance with specifications and to stakeholders' satisfaction (Chua et al., 1999; Puspassari, 2005, Ogunsemi, 2006; Yaman, 2007). Studies were conducted to examine factors impacting on project performance in developing countries. Shortage of skills of manpower, poor supervision, poor site management, unsuitable leadership, shortage and breakdown of equipment among others contribute to construction delays in the United Arab Emirates (Faridi and El-Sayegh, 2006). According to Ajayi et al. (2010) the choice of contractor(s) is a critical factor for the project manager and usually has a significant impact on the success or failure of a project. The performance of a contractor will definitely correlate with the performance of the contract. He further observed that the evaluation of performance has been a challenge for the construction industry for decades. Several models and methods have been proposed by researchers for the evaluation of project performance. However most of these procedures according to Ajayi et al. (2010) limit their analysis to selected measures such as cost, schedule or labour productivity. Construction performance embraces client's satisfaction, time performance, cost performance, construction quality and sustainable development. Mbachu and Nkando (2007) established that quality and attitude to service is one of the key factors constraining successful project delivery in South Africa.

Ling et al (2007) remarked that architectural, engineering and construction (AEC) firms may face difficulties managing construction projects performance in China because they are unfamiliar with this new operating environment. Kim et al (2008) stated that international construction projects performance is affected by more complex and dynamic factors than domestic projects; frequently being exposed to serious external uncertainties such as political, economic, social, and cultural risks, as well as internal risks from within the project. Puspassari (2005) identified 46 possible factors responsible for poor performance of construction contract. He further categorized these factors into eight groups as; factors caused by clients, factors caused by contractors, factors caused by consultants, factors related to subcontractors, factors related to material and labor, contractual relationship factors, project procedures and external environment factors.

2.3. Synthesis of the review

In citation of previous studies, little attention is being paid to construction performance in Ethiopia and generally on non-governmental organization implemented projects. Based on a literature review of the existing factors affecting performance of construction projects, they can be grouped as project characteristics related factors, labor and material related factors, contractual relationship, project procedures, external environment, clients' related factors and contractors' related factors. These categories form the basis by which research model developed to measure their effect on construction performance of this study. It is graphically presented as shown below.

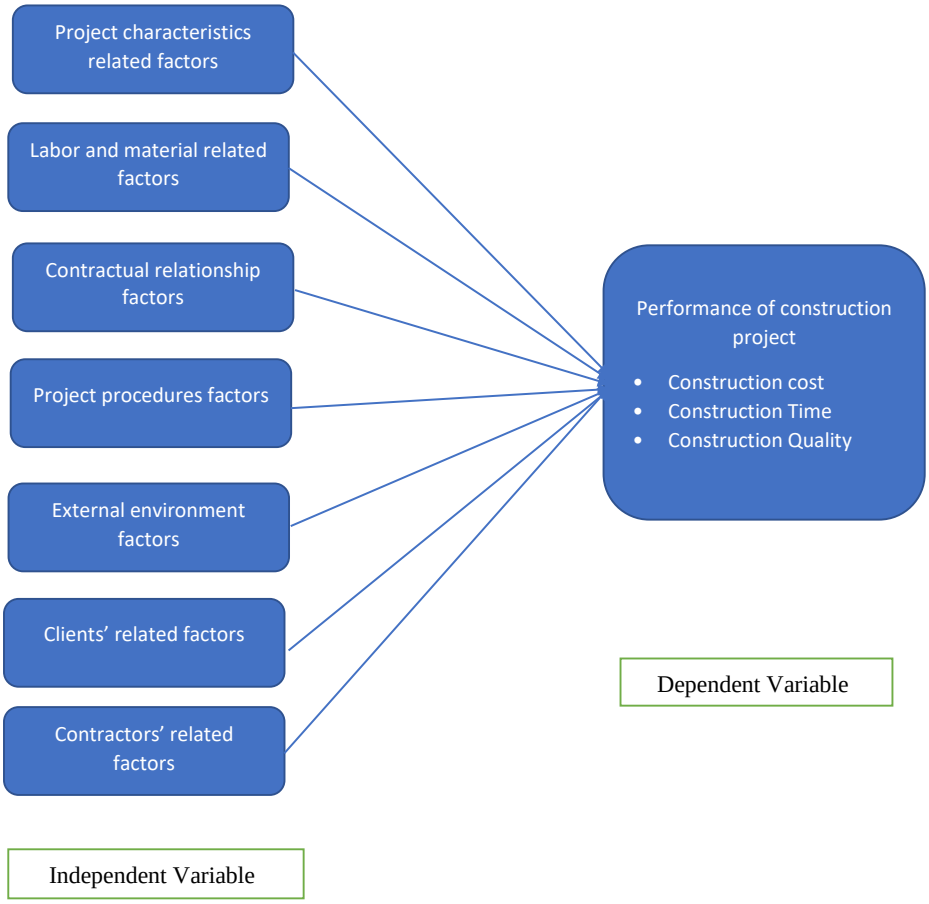

Figure 2. 1 : Conceptual Framework (Puspassari, 2005)

CHAPTER 3

RESEARCH METHODOLOGY

3.1. Introduction

Research methodology is the step by step procedure used to determine a solution to a particular problem. The methodology adopted in this research provides the procedures that are necessary for obtaining the information needed to structure the research questionnaire, collect data, analyze the collected data, and interpret and present the results. The methodologies followed in this survey are outlined in the following sections.

3.2. Research Approach

There are two basic approaches to research: quantitative and qualitative (Leedy and Ormrod, 2005). The former involves the generation of data in quantitative form which could be subjected to accurate quantitative analysis in a proper and rigorous manner and in the form of a data base from which to realize characteristics or relationships. In quantitative research, samples of a population are studied (observed or questioned) to establish its characteristics, in short, a quantitative approach attempts to produce “real answers” from “hard data”, where as a qualitative approach is concerned with subjective evaluation of opinions, behavior and attitudes. Qualitative methods are not good at giving direct answers, but are good at developing more questions, because of consistent use of “soft data” (Higgins, 2009). Therefore in this research, quantitative approach is used.

3.3. Research Design

According to Kerlinger (1986) research design is the plan and structure of investigation conceived so as to obtain answers to research questions or test the research hypothesis. The plan represents the overall strategy used in collecting and analyzing data in order to test research hypothesis.

In this study, a descriptive and explanatory research design were used, the major purpose of descriptive research is description of the state of affairs as it exists at present. Then this study describes and critically assesses the factor affecting the performance of construction projects in save the children.

3.4. Research Methods

3.4.1 Sampling techniques and sample size

3.4.2.1 Target population

The population of the study comprises of the stakeholders involved in construction projects; as owners (Save the Children Ethiopia Construction management office engineers & related program managers) and contractors who were involved in construction projects during study time considered. For this study, projects completed from 2016-2018 GC (Specifically 2009 & 2010 EC) are taken based on data availability in the construction management unit and on getting contractors involved. There was a total of 25 individuals administering construction projects on the owner side and 140 from the contractor side.

3.4.2.2 Sampling method

A two-step process is used in which the population is partitioned into strata as owner and Contractors. The strata are mutually exclusive and collectively exhaustive in that every population element should be assigned to only one stratum and no population elements should be omitted. Then systematic random sampling technique was used for selecting the respondents from each group.

3.4.2.3 Sample size

In the case of the research population, it does not mean that all members of stakeholders are possible respondents for the questionnaire. Rather the questionnaire was distributed to engineers & other professionals who know the concerned construction projects during the specified time.

The sample size is determined based on the following Slovin's sampling formula (Yemane, 1967).

$$n = N / [1 + N*e^2] \quad \text{……Equation 1}$$

Where:

- N = total number of populations (140+25=165)
- n = number of sample size
- e = error margin / margin of error, a 95% confidence level was taken and e = 0.05

So, for 140 contractor organizations: n = 99 and for 25 employer staffs, n = 18 is taken.

3.4.2 Data sources, data collection instruments and procedures

3.4.2.1 Data Source and data collection

There are two types of research data collection, primary and secondary data collection. The

primary data used in this study are collected through a questionnaire survey. The secondary data used in this research are obtained from the organization project and construction report papers. A questionnaire is designed from literature review of various factors affecting performance of construction projects and from secondary data sources to identify the most important factors that influence construction projects implemented by Save the Children administration.

3.4.2.2 Data Measurement

In order to be able to select the appropriate method of analysis, the level of measurement must be understood. In this research, ordinal scales were used. Ordinal scale is a ranking or a rating data that normally uses integers in ascending or descending order. The numbers assigned to the agreement or degree of influence (1, 2, 3, 4, 5) do not indicate that the interval between scales are equal, nor do they indicate absolute quantities. They are merely numerical labels. Based on this scale, the researcher has the following table:

Table 3.1 : Rating scale for significance level of factors on project performance

Significance Level	Extremely significant	Very significant	Moderately significant	Slightly significant	Not significant
Scale	5	4	3	2	1

3.4.2.3 Research instruments

Good questionnaire design is a key to obtaining good survey results and warranting a high rate of return (Zikmund, 2000). The questionnaire designed for this study utilizes the information sourced from the extensive literature review, the global nature of the construction industry and relevance to Save the Children Ethiopia construction project context.

The questionnaires were divided into three sections: Part A which seeks to establish general details of the respondent, Part B which contained factors affecting performance of construction projects grouped into seven includes: project characteristics related factors, labor and material related factors, contractual relationship, project procedures, external environment, clients' related factors and contractors' related factors and Part C which contained respondents judgement on overall performance of the executed construction projects in lieu of the above factors.

3.4.2.4 Piloting the research instruments

Taking into consideration the significance and need to identify and establish weaknesses in the instrument that was used in the research study, the self-administered questionnaire was pre-tested before distributing it to the respondents. The questionnaires were reviewed and then tested on a small pilot sample of respondents with similar characteristics as the study respondents. The pilot sample consisted of 5 from owner side and 15 from contractors' side who were randomly selected and are excluded from final sample. Mugenda and Mugenda (2003) suggest that the piloting sample ought to represent 10% of study sample based on the study sample size. Proposed suggestions for improvement of the questionnaire were gathered and adjustments were made to obtain a refined instrument. Piloting helps in revealing questions that could be vague which facilitates their examination until they communicate the same sense to all the subjects (Mugenda & Mugenda, 2003).

3.4.2.5 Reliability of research instruments

Reliability estimates the consistency of the measurements or more simply, the degree of uniformity of the results obtained from repeated measurements. For this purpose, the quality of data was measured, evaluated and guaranteed using appropriate techniques.

The data quality has been assured and measured through internal validity instrument in to correct research instruments application for accurately measuring the variables during the data collection procedures. Besides, data consistency was checked using reliability test (Cronbach's Alpha methods). According to Sekaran (2010), reliability less than 0.6 are considered to be poor, those in the 0.7 range, acceptable, and those above 0.8 are good. The closer the reliability coefficient gets to 1.0, the better.

Table 3.2 : Shows the Reliability Statistics/Cronbach's Alpha coefficients of the variables:

Variable	No. of Items	Cronbach's Alpha coefficients
Project characteristics related factors	5	.878
Labor and material related factors	4	.907
Contractual relationship	4	.875
Project procedures	2	.892
External environment	4	.901
Clients' related factors	6	.910
Contractors' related factors	10	.881

Cronbach`s Alpha is a statistical test used to examine the internal consistency of the attributes

determined for each dimension. As shown in above table, the value of the Cronbach's Alpha for variables was found to be above 0.7 which is an indication of acceptability of the scale for further analysis.

3.4.2.6 Validity of research instruments

Validity is the degree to which the sample of the test item represent the content that is designed to measure. Creswell (2003) notes that validity is considering if one can draw consequential and valuable inference from scores on the instrument. The research adopted content validity which refers to the extent to which a measuring instrument provides adequate coverage of the topic under study. To ensure content validity, the instruments were reviewed to enabling the content to address the purpose and avoided ambiguity. This ensured that all respondents understood the content on the questionnaire.

3.4.3 Method of Data Analysis

The relative importance index method (RII) is used to determine owner and contractors' perceptions of the relative importance of the key performance indicators in Save the Children construction projects. The relative importance index is computed as (Cheung et al, 2004; Iyer and Jha, 2005; Ugwu and Haupt, 2007): The relative importance index is computed using the following formula;

$$RII = \frac{\sum (W)}{A \times N} \quad \text{.....Equation 2}$$

Where;

- W is the weight given to each factor by the respondents and ranges from 1 to 5
- A = the highest weight = 5
- N = the total number of respondents

The factors were analyzed using the multiple linear regression analysis. Linear regression is an approach for modeling the relationship between a dependent/explained variable 'Y' and one or more explanatory variables denoted by 'X'. The case of one independent/explanatory variable is called 'simple linear regression' while for more than one independent/explanatory variable, 'the process is called multiple linear regressions, and this was used in this study. It helps to understand which among the independent/explanatory variables are related to the dependent variable, and to explore the forms of these relationships. The model was specified as follows:

$Y=\beta X + \varepsilon$ (2) **.....Equation 3**

Where,

Y = Performance of construction projects

X = the matrix of independent/explanatory variables,

β = the regression coefficients,

ε = the error term.

Y represents performance of construction projects which is dependent on the explanatory variables X1, X2, X3…Xn, ε i.e. how much of the performance of construction projects is accounted for by each of the explanatory variables and how much is unexplained as measured by the error term ε. The regression model was implicitly specified as:

$Y = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4\ X4 + \ldots\ldots + \beta n\ X7 + \varepsilon$ (3) **…….Equation 4**

More specifically, the variables specification was specified as follows:

Y = Level of performance of construction projects.

β0 = the constant

X1… Xn = the factors contributing to improving the performance of construction Projects.

X1= Project characteristics related factors, X2= Labor and material related factors,
X3= Contractual relationship factors, X4= Contractual relationship factors, X4= Project procedures factors, X5= External environment factors, X6= Clients' related factors and X7= Contractors' related factors

β1… βn = the estimates of the independent variables. I.e. the coefficients of the independent variables.

ε = the error term.

The Statistical Package for Social Sciences (SPSS) computer software version 25 was used

for this purpose.

CHAPTER 4

RESULTS AND DISCUSSION

In this chapter, results have been presented and discussed to address the research questions and objectives.

4.1. Demographic characteristics

4.1.1 Respondent representation

The overall response rate is 89% which is sufficient to find out the perceptive of the relative importance of project performance indicators.

4.1.2 Respondent demographic characteristics

Table 4. 1 : The frequency of profile of respondents

Description	Owner		Contractor	
	Frequency	Percent%	Frequency	Percent%
Job title of the respondent				
Project Manager	5	27.8%	16	18.6%
Site Engineer	7	38.9%	19	22.1%
Owner			29	33.7%
Office Engineer	4	22.2%	12	14.0%
Other	2	11.1%	10	11.6%
Total	18	100%	86	100%
Years of experience of the respondents				
0 to 1	0	0.0%	2	2.3%
1 to 5	5	27.8%	45	52.3%
5 to 10	4	22.2%	23	26.7%
More than 10	9	50.0%	16	18.6%
Total	**18**	**100%**	**86**	**100%**
Number of executed projects				
1 to 2	0	0.0%	11	12.8%
3 to 5	5	27.8%	51	59.3%
More than 5	13	72.2%	24	27.9%
Total	**18**	**100%**	**86**	**100%**

From the above table, it shows that the respondents are very much related to construction to respond to the questionnaire, most of the respondents are experienced to provide relevant data on

factors affecting construction performance. 100% of owner staffs and 87% of contractors conduct three or more construction projects in save the children. This will be ideal to get relevant information on factors affecting construction progress in the organizations.

4.2. Analysis of factors affecting the Performance of Construction Projects

The results of this part of study provide an indication of the relative importance index and rank of factors affecting the performance of construction projects in Save the Children. The following shows summary of factors ranking according to each type of target group.

Table 4. 2 : The relative importance index (RII) and rank of factors affecting the performance of construction projects

Groups/Factors	Owner		Contractor		All Response	
	RII	Rank	RII	Rank	RII	Rank
(1) Project characteristics related factors						
Type of project (WASH or Building)	0.55	33	0.75	29	0.650	32
Nature of project (Emergency/Humanitarian or Development)	0.5	35	0.785	27	0.643	35
Complexity of project	0.55	33	0.742	30	0.646	33
Size of project, Small project amount	0.65	28	0.86	15	0.755	25
Shorter completion period given for the contract	0.933	1	0.96	3	0.947	1
(2) Labor and material related factors						
Unavailability of Skillful workers	0.93	2	0.961	2	0.946	2
Improper Quality control of materials	0.753	25	0.933	6	0.843	12
Insufficient supply of materials	0.923	3	0.963	1	0.943	3
Escalation of material prices	0.913	6	0.956	4	0.935	4
(3) Contractual relationship						
Poor communication system among project participants	0.59	32	0.7	32	0.645	34
Contract type, Full contract (Material +Labor)	0.607	31	0.71	31	0.659	31
Control mechanism of the project activities, Poor	0.65	28	0.8	24	0.725	27
Overall management actions, Ineffective	0.64	30	0.8	24	0.720	29
(4) Project procedures						
Tendering method	0.8	17	0.816	23	0.808	19

Procurement method, Engineering estimate/ Two stage evaluation	0.8	17	0.83	20	0.815	18
(5) External environment						
Economic environment	0.8	17	0.853	16	0.827	17
Social environment of sites	0.822	13	0.844	17	0.833	15
Political environment	0.92	4	0.912	7	0.916	5
Physical environment of sites	0.882	8	0.946	5	0.914	6
(6) Clients related factors						
Size of client's organization, Large	0.8	17	0.866	13	0.833	15
Client's emphasize on low construction cost	0.756	24	0.836	19	0.796	20
Client's emphasize on quick construction instead of quality	0.765	23	0.82	22	0.793	22
Client's ability to make project decisions	0.844	10	0.84	18	0.842	13
Client's interference during construction	0.7	26	0.824	21	0.762	24
Delay of progress payment to contractors	0.914	5	0.912	8	0.913	7
(7) Contractors related factors						
Project team leaders working relationship with others	0.88	9	0.6	35	0.740	28
Motivating skills of the project staffs	0.87	10	0.66	34	0.765	25
Project team leaders experience	0.82	14	0.8	24	0.810	20
Project staffs commitment to meet cost, time and quality	0.9	7	0.75	29	0.825	18
Planning effort	0.87	10	0.9	9	0.885	8
Budget progress monitoring	0.8	17	0.89	12	0.845	11
Technical skill of the project staffs	0.8	17	0.9	9	0.850	10
Project leaders early and continuous involvement in the project	0.81	16	0.894	11	0.852	9
Implementing an effective safety, quality assurance and environmental program	0.82	14	0.861	14	0.841	14
Control of subcontractors works	0.76	24	0.8	24	0.780	24

As per the above relative importance index (RII), the table below shows the top ten factors affecting the performance of construction projects.

Table 4. 3 : The top ten factors affecting the performance of construction projects in Save the Children

Groups/Factors	Owner		Contractor		All Response	
	RII	Rank	RII	Rank	RII	Rank
Shorter completion period given for the contract	0.933	1	0.96	3	0.947	1
Availability of Skillful workers	0.93	2	0.961	2	0.946	2
Insufficient supply of materials	0.923	3	0.963	1	0.943	3
Escalation of material prices	0.913	6	0.956	4	0.935	4
Political environment	0.92	4	0.912	8	0.916	5
Physical environment	0.882	7	0.946	5	0.914	6
Delay of progress payment to contractors	0.914	5	0.912	8	0.913	7
Planning effort	0.87	8	0.9	10	0.885	8
Technical skill of the project staffs	0.772	22	0.933	6	0.853	9
Project leaders early and continuous involvement in the project	0.81	15	0.894	12	0.852	10

Shorter completion period given for the contract is ranked first with an average RII of 0.947. The main reason is that many construction projects done under humanitarian program have smaller time to complete to mate donors given time without considering the volume of work and local condition. This is a strong indication of the importance of proper estimation of project duration. One of the important obligations of owner is to determine the duration of project according to the volume of activates and local condition. This result is in agreement with Odeh and Battaineh (1999) as this factor affects strongly on project schedule performance. Unavailability of Skillful workers is ranked second. The main reason is especially in humanitarian projects, skill full people don't what to travel to sites with only basic facilities, inconvenient environment and usually higher expenses of living. Working with the available not qualified workers compromise quality, cost and time. This result agrees with Adnan Enshassi et al., (2010) as this factor affects strongly on project performance because it affects strongly time & cost overruns. Insufficient supply of materials is ranked third. The main reason is that for any insufficient supplying of materials on time or quantity will delay the schedule and result in increased overall cost. This result is in agreement with Koushki, P. A. & Kartam, N., (2004) as this factor affects strongly on overall project performance.

Escalation of material prices is ranked fourth. The main problem is due to devaluation of birr and shortage of hard currency that have direct and indirect impact in construction projects especially material and labor prices. Increase in materials prices affect both the owner and the

contractor which in turns leads to projects been finished with poor output, overall performance of the project. The result is in line with Enshassi et al (2009), escalation of material prices affects the liquidity of owners and the profit rate of contractors. Political environment is ranked fifth. The main reason associated with this is that for the last two to three years the country political problems was not stable that affect free flow of people and material as needed. Many projects suffer time overrun. This result agrees with Cho Y. J., Lee J. W. (2012) as this factor affects strongly on project schedule & cost performance of projects. Physical environment is ranked sixth. The main reason for this are inadequate knowledge by contractors before submitting bids and unexpected site specific situations. This also agrees with Musa et al., (2015). Delay of progress payment to contractors ranked seventh. The main reason for delay of progress payment to contractors is that almost all construction payments tendered in Addis Ababa or regional hubs needs to be reviewed at the point of tendering which usually take more time for processing. This is usually aggravated when there is comments that needs revision at lower level and since only three peoples are available to check the payments at head office along with the three weeks minimum contractual time given for processing will have impact on contractors who needed their money the soonest. This result agrees with Lim (2005) as this factor affects strongly on project schedule & cost performance of projects. Ofori (1984) also revealed the effect of chronic delay in the payments of contractors on their performance.

Planning effort by contractors is ranked eighth. The main reason is unavailability of qualified technical staffs both at office and field to do proper planning along with the quick decision-making capacity by the owners or manager on contractor side. This result agrees with Arditi, (1985) as this factor affects strongly on project performance and may even result in total project failure. Chan A. and Chan D. (2004) also obtained that the accurate construction planning is a key determinant in ensuring the delivery of a project on schedule and within budget. Technical skill of the project staffs is ranked ninth. The main reason is the technical gap in managing the project activities properly and usually reflected in either poor quality of works, delay in site completion time or result in unnecessary additional cost to project. It will also result in delay of processing payments to contractors due to many comments raised during checking by the next higher-level engineer. This result is in agreement with Adnan Enshassi et al., (2010) as this factor affects strongly on project performance because it affects strongly time & cost overruns. Project leaders early & continuous involvement in the project is ranked tenth. The main reason is that every time there is consistent project leaders involvement, will always result in improving the performance by solving any problem faced in during implementation and create

some pressure on staffs at field in following the agreed schedule. This result is in agreement with UNRWA. (2006) as this factor affects strongly on overall project performance.

Table 4. 4 : The relative importance index (RII) and rank of major groups affecting the performance of construction projects

Factors	Owner		Contractor		All Response	
	RII	Rank	RII	Rank	RII	Rank
(1) Project characteristics related factors	0.637	6	0.819	5	0.728	6
(2) Labor and material related factors	0.880	1	0.953	1	0.917	1
(3) Contractual relationship	0.622	7	0.753	7	0.687	7
(4) Project procedures	0.800	4	0.823	4	0.812	4
(5) External environment	0.856	2	0.889	2	0.872	2
(6) Clients related factors	0.797	5	0.850	3	0.823	3
(7) Contractors related factors	0.808	3	0.798	6	0.803	5

As shown in the table, Labor and material related factors, external environment and Clients related factors respectively are the top ranked factor groups that affect the performance of construction projects in save the children.

SPSS V25 was used to analyze the regression and analysis of variance (ANOVA) to assess the factors affecting performance of construction projects. This helps the researcher to understand how the typical value of the dependent variable changes when any of the independent variables varied, while other independent variables held fixed. The results are as stated below.

Table 4. 5 : The Model Summery for respondents

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.916[a]	.838	.827	.392	1.611
a. Predictors: (Constant), Contractors related factors, External environment, Project procedures, Clients related factors, Project characteristics related factors, Contractual relationship, Labor and material related factors					
b. Dependent Variable: Overall Project Performance					

The factors R2 has the value of 0.838 and expressed that 83.8% of the variation of performance of contraction projects in save the children can be explained by the variables taken into consideration. The adjusted correlation ratio shows that 0.827 of the total variation is due to the regression line, given the number of degrees of freedom. The multiple correlation coefficients(r), with a value of 0.916, represent the correlation ratio indicating the existence of link between construction performance and its main factors.

This is a satisfactory result to understand that the independent variable have effect on the dependent variable.

Multiple linear regression model assumes the residuals are independent of one another. The Durbin-Watson statistic is used to test for the presence of serial correlation among the residuals. The value of the Durbin-Watson statistic ranges from 0 to 4. As a general rule, the residuals are not correlated if the Durbin-Watson statistic is approximately 2, and an acceptable range is 1.50 - 2.50. From the table above, we can also understand that the assumption of independence of residuals is meet.

Table 4. 6 : The ANOVA results of respondents

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	76.580	7	10.940	71.126	.000[b]
Residual	14.766	96	.154		
Total	91.346	103			
a. Dependent Variable: Overall Project Performance					
b. Predictors: (Constant), Contractors related factors, External environment, Project procedures, Clients related factors, Project characteristics related factors, Contractual relationship, Labor and material related factors					

The regression analysis explains the extent to which the independent variables predict the effect of factors on construction performance. Test F shows the role of the independent variable to explain the evolution of the dependent variable. The value of test F (71.126) in the ANOVA table, the mode reaches statistical significance (sig. =.000, $p < 0.5$) shows the regression mode is valid and can be used to analyze the dependent between variables. Hence, the hypothesis that the independent variables will significantly explain the variance in dependent variables is accepted.

Table 4. 7 : The Regression coefficient of factors affecting construction project performance

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	-.625	.354		-1.767	.080		
Project characteristics related factors	.149	.057	.168	2.591	.011	.401	2.494
Labor and material related factors	-.263	.106	-.168	-2.486	.015	.369	2.708
Contractual relationship	-.128	.063	-.138	-2.034	.045	.368	2.721
Project procedures	.145	.063	.128	2.292	.024	.542	1.844
External environment	.264	.070	.200	3.776	.000	.602	1.662
Clients related factors	.339	.067	.349	5.074	.000	.356	2.806
Contractors related factors	.585	.073	.594	7.989	.000	.305	3.278
a. Dependent Variable: Overall Project Performance							

The above table showed that VIF values for all variables became less than the tolerable value, i.e. 10. And Tolerance value of all variables also became above 0.1 which indicates that this model is free from multicollinearity problem between the dependent variables.

As portrays from the above table 4.8, all the independent variables have statistically significant relationship with the dependent variable since their p-value is below the alpha level which is 0.05. Considering the standardized beta coefficients, the strongest predictor of the dependent variable (performance of construction projects) is Contractors related factors with 0.585 value. The regression analysis support that all except Labor and material related factors & Contractual relationship factors groups were positively related to performance of construction project in the same direction. That is the standard beta coefficients (β) gave a measure of the contribution of each variable to the dependent variables. A large value indicates that a unit change in this independent variable has a large effect on the dependent variable.

So from the above table the researcher drive the model as follows;

$$Y = -0.625 + 0.149X1 - 0.263X2 - 0.128X3 + 0.145X4 + 0.264X5 + 0.339X6 + 0.585X7 + \varepsilon$$

More specifically, the variables specification was specified as follows:

Y = Level of performance of construction projects.

X1… X7 = the factors contributing to improving the performance of construction Projects.

X1= Project characteristics related factors, X2= Labor and material related factors,
X3= Contractual relationship factors, X4= Contractual relationship factors, X4= Project procedures factors, X5= External environment factors, X6= Clients' related factors and X7= Contractors' related factors

4.3. Discussion

The first thing that must be discussed here should be the overall fitness of the model; this fact has been confirmed by different types of statistical results. The first way is the ANOVA test that produced a P-value of 0.000 which is below the alpha level, i.e. 0.05. That means the overall independent variables have statistically significant relationship with that of the dependent variable, i.e. Performance of construction projects.

The R (Coefficient of Correlation), which is simply measures the degree of (linear) association between the dependent variable and the independent variables jointly, 0.916 means, there is a very strong relationship between the independent variables as a whole. The adjusted R square (Coefficient of Determination), can be defined as the proportion of the total variation or dispersion in the performance of construction projects (dependent variable) that explained by the

variation in independent variables in the regression. (Gujarati, 2004) So with adjusted R Square value of 0.838, meaning, 83.8% of the variation in construction performance is explained by the linear relationship with all the independent variables. The corollary of this is that only 16.2% of the variation in construction performance is unexplained by the relationship. Thus when adjusted R square is high it means that the independent variables included in the study play an important part in affecting the dependent variable. Generally speaking, the regression model developed under the study can be considered as a good fit or predictor of construction performance of save the children.

The individual effects of the independent variables can be explained by their respective beta coefficients. As per the regression result, the construction performance and contractor related factors have the strongest positive relationship. 1-unit increment in improving contractor related factors can cause about 58.5% improving performance of construction projects. This corroborates with the views of Jamaludin et al., (2014), Assaf et al., (2001) and Chan et al., (2002) who found in their respective studies that increasing the contractor related factors would have a positive impact on construction performance. They noted that high experience and qualifications of personnel involved in a construction project will assist the project parties to implement their project goals professionally leading to better performance of quality, time, cost, productivity and safety of the project. construction planning is a key determinant in ensuring the project success. They also studied that contractor performance on the contractor's degree of involvement and how that affects their performance and found positive result.

The second variable under study was client related factors and according to the regression result, it has a positive relationship with the construction performance. a 1-unit increment on this variable will cause about 33.9% increment on construction performance. These ideas were shared in the study by Dissanayaka and Kumaraswamy (1999) that the characteristics of client enable a significant contribution to the success of a project.

The third variable was external environment, this factor has a positive relationship with the construction performance with a magnitude of 1 unit increase in improvement of external environment factors causes about 26.4% increase in construction performance. This finding also got along with that of Chen and Kumarsamy, (1997) that stated on their respective findings that the external factors could be inclement weather condition, act of God, price fluctuation, unforeseen site condition and civil disturbance. Those factors should be taken in account in order to avoid any problem within construction project process. Adelback and Johnson (2013)

identified climate conditions at site as the most important factor affecting the performance of construction projects by owner, consultants and contractors because it affects the productivity and time performance of project.

The fourth factor under study was Project characteristics related factors, and this factor has a positive relationship with the construction performance with 1-unit increment in improvement of Project characteristics related factors will cause about 14.9% increase in construction performance. The findings under the study of Chan et al., (2004) examined factors affecting the success of a construction project and project related factors is one of the identified factors crucial to project success.

The fifth factor under study was project procedure factors, and this factor has a positive relationship with the construction performance with 1-unit increment in improvement of project procedure will cause about 14.5% increase in construction performance. The findings under the study of Rosli et al., (2006) efficient procurement is very important at the very outset of the project to carefully consider all factors when selecting the most appropriate procurement approach for a construction project. This is because each system has its own feature and peculiarity that will have effect on the cost, time and quality of the project i.e. the project performance.

The sixth factor under study was labor and material related factors, and this factor has a negative relationship with the construction performance with 1-unit increment in problem associated with labor and material related factors will cause about 26.3% decrease in construction performance. The findings under the study of UNRWA (2006) stated that local construction projects suffered from poor performance especially poor contractor performance for many reasons, such as the unavailability of materials and lack of leadership skills. Any problem associated with this will have negative effect on construction performance.

The final factor considered in this study was Contractual relationship factors, and as per the result it has a negative relationship with the construction performance where a 1 unit increase in poor contractual relationship factors would impact about 12.8% decrease in construction performance. This finding supports the finding under the study of Iyer and Jha (2005) that the factors affecting cost performance are: project manager's competence; top management support; project manager's coordinating and leadership skill; monitoring and feedback by the participants; decision making; coordination among project participants; owners' competence; social condition, economical condition and climatic condition. Coordination among project

participants was as the most significant of all the factors having maximum influence on cost performance of projects. Any problem associated with this will have negative effect on construction performance.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion

This research was conducted in save the children international, a nongovernmental organization working across Ethiopia with the prime intent of identifying factors affecting the performance of its construction projects, rank this factors and see their relation with the performance of construction projects. Based on the objectives and findings of the study, the following conclusions are drawn.

Thirty-five factors were identified and listed under seven groups. These groups are project characteristics related factors, labor and material related factors, contractual relationship factors, project procedure factors, external environment factors, clients' related factors and contractors' related factors. Shorter completion period given for the contract, unavailability of skillful workers, insufficient supply of materials, escalation of material prices, political environment, physical environment, delay of progress payment to contractors, planning effort, technical skill of the project staffs and project leaders early and continuous involvement in the project were ranked the top ten most important performance factor by contractors and owners. This results are in line with many previous studies.

The ANOVA test produced a maximum P-value of 0.045 which is below the alpha level, i.e. 0.05. This means that the overall independent variables (project characteristics related factors, labor and material related factors, contractual relationship, project procedures, external environment, clients' related factors and contractors' related factors) have statistically significant relationship with that of the dependent variable, i.e. Performance of construction projects. 83.8% of the variation in save the children construction projects performance is explained by the linear relationship with all the independent variables. As per the regression result, the contractor related factors (β=0.585), Clients related factors (β=0.339) and External environment (β=0.264) have a strong positive significant relation. while Labor and material related factors and Contractual relationship factors result in negative relationship. This shows that working on contractor & owner related factors will have higher positive effect on performance of construction projects. This is aligned with previous studies. The result also showed Labor and material related factors and Contractual relationship factors result in negative

relationship with performance of construction. This implies that all poor actions in these factors will reduce the overall performance of construction projects.

5.2. Recommendation

It is necessary for construction implementing organization (owner) to evaluate the volume of works and local condition to estimate proper time before tendering and entering into contract. When the available time is small, especially during emergency projects, larger works needs to broke into possible separate unique projects and be tendered. Bigger contractors may be invited for critical construction projects that won't be separated into smaller projects. This will help in balancing quality & available time. Having skilled workers available in all sides at both office and site will solve associated problems on proper construction management, quality of work, cost control and time management. This along with sufficient supply of materials on time and in quantity will improve project performance. To attract skilled workers, the contractors needs to have some form of incentives to workers to avoid using available unskilled labors.

Solution to have reduced payment waiting time from the owner side needs an immediate action. Working on online/softcopy approval system may be one solution. Adequate planning before and during implementation time, on-time request of interim payments and taking consideration for possible change of material price during tendering time will help contractors from the small risk of escalated material prices, improve financial liquidity and the profit of contractors. Considerations on the ongoing external environment especially political instability, through different assistances (flexible schedule, technical assistance) to contractors will improve the performance of works. Effective and continuous assistance to contractors will help them in their planning and project management effort. Availability of meeting before bid submition date may help contractors to get valuable information on their price setting and understand scope of works. Contractors need to conduct site visits to reduce risk associated with physical environment especially on material & labor availability and their quality. Proper construction planning and management to ensure the delivery of a project on schedule and within budget is only possible by having technically capable skilled staffs. Contractors needs to work on that. Project leaders needs to have early & continuous involvement in the project to get on time information about their sites, to work on problems, adjusting plan to mate actual site conditions and others faced during actual implementation.

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APPENDIX

FACTORS AFFECTING CONSTRUCTION PROJECTS PERFORMANCE IN: The case of Save the Children of Addis Ababa

(Questionnaire)

Dear Respondents,

I am currently working on a research study on factors affecting the performance of construction projects in the Save the Children, in fulfillment for my MA in Project Management study in St. Marry University.

This research is aimed to investigate the main factors contribute to performance issues of construction projects in the Save the Children. Identifying the factors/variables that contribute to performance in construction projects of Save the Children and rank them in their order of severity have paramount importance to conduct analysis and subsequent recommendation of the possible solutions towards minimizing the problem.

To successfully undertake this research, it is mandatory to look into the issues from different perspectives by involving professionals who have experience in the construction sector within the Save the Children. In this respect, you are the one who can give the correct and necessary information. Hence, I kindly request you to complete the accompanying questionnaire.

I would like to confirm you that your response will be kept strictly confidential and it will be used exclusively for the purpose of this research. Besides, your quick response is vitally important in order to finalize the research timely and I would appreciate if you return the completed questionnaire within a week of your receipt of same.

Thank you very much for your time and cooperation and looking forward to receiving your response.

Yours Sincerely,

Mesfin Habtemariam

Post Graduate Candidate, MA in Project Management
School of Graduate Studies
St. Marry University
Addis Ababa

Part One: General Information: Please add (√) as appropriate:

1) Which organization do you represent?

Client [Owner] ☐

Contractor ☐ Others (specify)_____

2) Respondent Designation in the organization

Owner ☐ Project Manager ☐ Site Engineer ☐

Office Engineer ☐ Others ☐

(Specify)_____

3) Years of Work Experience

0 to 5 years ☐ 6 to 10 years ☐ 11 to 15 years ☐

16 to 20 years ☐ Above 20 years ☐

4) Number of executed projects in the save the children

1 to 2 ☐ 3 to 5 ☐

More than 5 ☐

Part Two: Factors Affecting the Performance of Construction Projects

Below are numbers of factors affecting the performance of construction projects. From your experience, please express your opinion on the importance of the following factors as key performance indicators of construction projects within the Save the Children. (Please tick (√) the appropriate box).

Groups/Factors	*Extremely Significant (5)*	*Very Significant (4)*	*Moderately Significant (3)*	*Slightly Significant (2)*	*Not Significant (1)*
(1) Project characteristics related factors					
Type of project (WASH or Building)					
Nature of project (Emergency/Humanitarian or					
Complexity of project, Small					
Size of project, Small project amount					
Shorter completion period given for the contract					
(2) Labor and material related factors					
Unavailability of Skillful workers					
Improper Quality control of materials					
Insufficient supply of materials					
Escalation of material prices					
(3) Contractual relationship					
Poor communication system among project participants					
Contract type, Full contract (Material +Labor)					
Control mechanism of the project activities, Poor					
Overall management actions, Ineffective					
(4) Project procedures					
Tendering method					
Procurement method, Engineering estimate/ Two stage evaluation					
(5) External environment					
Economic environment					
Social environment of sites					
Political environment					
Physical environment of sites					
(6) Clients related factors					
Size of client's organization, Large					
Client's emphasize on low construction cost					

Client's emphasize on quick construction instead of quality					
Client's ability to make project decisions					
Client's interference during construction					
Delay of progress payment to contractors					
(7) Contractors related factors					
Project team leaders working relationship with others					
Motivating skills of the project staffs					
Project team leaders experience					
Project staffs commitment to meet cost, time and quality					
Planning effort					
Budget progress monitoring					
Technical skill of the project staffs					
Project leaders early and continuous involvement in the project					
Implementing an effective safety, quality assurance and environmental program					
Control of subcontractors works					

Part Three: Overall performance of Construction Projects executed in Save the children

Description	***Very Good Performance (5)***	***Good Performance (4)***	***Moderately Performance (3)***	***Low Performance (2)***	***Poor Performance (1)***
Perceived Overall executed construction project performance base on Time overrun, cost overrun and quality issues) considering the above factors					

DECLARATION

I declare that this thesis entitled "**FACTORS AFFECTING CONSTRUCTION PROJECTS PERFORMANCE: THE CASE OF SAVE THE CHILDREN**" is my original work. This thesis has not been presented for any other university and is not concurrently submitted in candidature of any other degree, and that all sources of material used for the thesis have been duly acknowledged.

Mesfin Habtemariam _____

Candidate Signature & date

ENDORSEMENT

This thesis has been submitted to St. Mary's University, School of Graduate Studies for examination with my approval as a university advisor.

Chalachew Getahun (PhD) _____

Advisor Signature & date