



Addis Ababa University School of Commerce

**Assessment of Factors Affecting Effective Performance of
Construction Projects: The Case of Projects of Ethiopian
Construction Works Corporation.**

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**A Research Project Work Submitted to the School of Graduate
Studies of AAU in Partial Fulfillment of the Requirement for the
Degree of Master of Arts in Project Management**

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DECLARATION OF CANDIDATE

I, Tilahun Deneke hereby declare that this research project work entitled Assessment of Factors Affecting Effective Performance of Construction Projects: The Case of Projects of Ethiopian Construction Works Corporation is my own paper work and that it has not been submitted before anywhere either at Masters level or Undergraduate for any award. Any information used from other works has been acknowledged.

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STATEMENT OF CERTIFICATION

This is to certify that Tilahun Deneke has carried out this research project work on the topic entitled “Assessment of Factors Affecting Effective Performance of Construction Projects in The Case of Projects of Ethiopian Construction Works Corporation” under my supervision. This work is original in nature and it is sufficient for submission for the partial fulfillment for the award of Degree of Masters of Art in Project Management.

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Date _____

ASSESSEMENT OF FACTORS AFFECTING PERFORMANCE OF
CONSTRUCTION PROJECTS, IN THE CASE OF ETHIOPIAN
CONSTRUCTION WORKS CORPORATION.

By: Tilahun Deneke

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ABSTRACT

The problem of success factors on the construction industry which results in delays of project is considered to be a global phenomenon and the construction industry in Ethiopia is not exceptional. The goal of all concerned agents involved in the construction projects (owners, contractors, engineers and consultants) in either of the public or private sector is to successfully complete the project on time, within budget, with the highest quality and in the safest manner. Construction projects are frequently influenced by either success factors that help projects reach their goal as planned or delay factors that terminate or postpone project completion.

The methodology adopted in this project work was, first, to undertake a literature survey of the area. Then a questionnaire survey and an interview survey were employed for data gathering and finalizing factors affecting the projects.

This study is considered to be influential for improving the effectiveness of project performance. Performance can be assured by assessing, identifying and eliminating the factors that cause or yield poor project outcomes. Thus, project managers need better understanding of success/failure factors in order to take appropriate action.

The researcher employed a descriptive design to analyze the data collected from sample respondents. The findings of this study can be used as a guideline to successfully handle similar construction projects in the country.

Key words: project, project management, Project success, success factor, construction project.

ACCRONOMIES AND ABBREVIATIONS

BA:	Bachelor of Art
CEO:	Chief Executive Officer
CSFs:	Critical Success Factors
DBST:	Double Bituminous Surface Treatment
ECWC:	Ethiopian Construction Works Corporation.
ERA:	Ethiopian Road Authority
ERP:	Enterprise Resource Management
GDP:	Gross Domestic Product
IBM:	Information Modeling Technology
MA:	Master of Arts
NPD:	Plan Commission Data
PL:	Profit and Loss
PM:	Project Manager
PMBOK:	Project Management Guide
SPSS:	Statistical Package for Social Science

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Chapter one

1. Introduction

1.1. Back ground of the study

Project is a complex, non-routine, one-time effort limited by time, budget and resource and performance specifications designed to meet customer needs (Arslan, G. et al., 2009). A construction project is completed through a combination of many events and interactions, planned or unplanned, over the life of a facility, with changing participants and processes in a constantly changing environment. An examination of the relevant recent literatures indicates that construction projects are usually completed with large cost overruns, extended schedules and quality concerns. Since the outcomes of the capital projects have strategic implications on the success and profitability of the business, the ability to deliver based on pre-determined objectives should be critical to the company's success. Project success can be defined as meeting the required expectation of the stakeholders and achieving its intended purpose. Success criteria or a person's definition of success as it relates to construction often changes from project to project depending on participants, scope of services, project size, sophistication of the owner related to the design of facilities, technological implications, and a variety of other factors [Arslan, G., Kivrak S, 2009].

Project success requires creating a well-planned project schedule as well as understanding of the key success factors also. It helps the project manager and the stakeholders to take the right decisions and act towards the project success. Most popular CSF' accepted by research community are-project mission, top management support, project schedule/plan, client consultation, personnel, technology to support the project, client acceptance, monitoring and feedback, channels of communication, troubleshooting expertise [Munns, A. K., and Bjeirmi, B. F., 1996]. Quality can be assured by identifying and eliminating the factors that cause poor project performance. The study of project success and critical success factors (CSFs) is often considered as one of the vital ways to improve the effectiveness of project delivery. Successful construction projects greatly depend on how the project has been managed and controlled. This study is focuses on define project success criteria, clarify their difference with success factors,

analyze their importance in project management methodology and come up with a comprehensive list of critical factors that might affect project outcome. The study of project success/failure and critical success factors (CSFs) is a means of understanding and thereby improving the effectiveness of construction projects.

Since the outcomes of the capital projects have strategic implications on the success and profitability of the business, the ability to deliver based on pre-determined objectives should be critical to the company's success. Project success can be defined as meeting the required expectation of the stakeholders and achieving its intended purpose. Success criteria or a person's definition of success as it relates to construction often changes from project to project depending on participants, scope of services, project size, sophistication of the owner related to the design of facilities, technological implications, and a variety of other factors.

The purpose of this study is therefore to systematically examine the success factors for the performance of construction projects, the causes of project failure and how these can be prevented, managed, or controlled.

1.2. Statement of the problem

According to Salleh, R. (2009), Preliminary study on Critical Success Factors (CSFs) and the relationship between various attributes are essentially needed in identifying the project success. The important critical success factors will have direct impact on a construction project. All industries now a day are dynamic and the construction industry is not excluded. In fact, construction projects involve in one of the most vibrant and complex environments. The increasing of uncertainties in technology, budget and development process create a dynamic construction industry.

In Ethiopian construction works corporation (ECWC) there is no clearly determined project success factors that agreed among all influential stakeholders and internal staffs. And hence, for every finished construction project in ECWC, a number of deficiencies or delays (time over run and over budget is the norm in the performance of construction projects) occur, and continue to occur. Occasionally, new problems develop and despite efforts to implement success factors, these problems have persisted. These problems were observed in the status of high rate of

dissatisfaction among clients as well as internal staff in the performance of construction project. There are many reasons mentioned which contributed to the above problems. Some of the problems are lack of having common goals and objectives between the staff of the head office and the project, shortage of cash flow, shortage of foreign currency resulted in delay of imported materials, lack of quick response in terms of procurement and logistics', poor project monitoring and evaluation and etc. All these and other not mentioned problems emanated from lack of clear success factors for the performance of projects. The practice of the project management of the corporation showed that poor performance and poor integration management of projects.

While a body of research exists that identifies major causes of project delay and further literature identifies a range of success factors, no research was found to exist which illustrated the success factors for the performance of construction projects in Ethiopia, and how knowledge of this may allow the delivery of more successful projects. This study is also the first to assess success factors for the performance of construction projects based on the success factors considered similar for most projects and agreed by many authors regardless of the type of the project and organizational structure in order to help project parties minimize construction project problems. Constructions projects are frequently influenced by success factors' which can help project parties reach their desired goals with greater efficiency. These gaps in the research have motivated the current study. Therefore, this study is helpful to identify many success factors that influence project success and to find out the factors that contribute a lot for successful performance of projects in the projects of the corporation.

1.3. Research Questions

To operationalize the above-mentioned research problems and objectives, the following key research questions are posed:

- What are the factors that affect the performance of construction projects in the Ethiopian construction works corporation?
- How about the up to date performance of construction projects in terms of cost and schedule?

- What are the problems or factors for cost and schedule over run of the projects?

1.4. Objectives of the Study

1.4.1. General Objective

The main goal of this project work is to investigate and pinpoint critical factors for effective performance of construction projects.

1.4.2. Specific Objectives

Specifically, this study tries to assess critical factors for the effective performance of construction projects and find out which factors are most critical to the success of the project. In addition, the study further

- Identifies the factors for performance of projects in the corporation.
- Reviews the performance of projects against already established success criteria.
- Evaluate project monitoring, evaluation and feedback practice of the corporation.
- Identifies the reasons for cost and schedule overrun of projects.

1.5. Significance of the study

This paper presents initial findings of a study designed to detail the relationships among the factors in the construction project which relate to project effectiveness. In the paper, emphasis is placed on delineating those factors which tend to improve and those which tend to impede project effectiveness.

Moreover, the study is beneficial to project managers, consultants, personnel who may involve in such construction project by identifying which factors determine the success or failure of the project. Also, the results of the study will have great importance in assisting construction project companies to identify which success factors are critical in construction projects. The findings of the study also help the policy makers, planners, researcher, as an input for further investigation.

1.6. Scope of the Study

Hence, the scope of the study was limited and only confined to the assessment of factors for performance of construction projects in the case of Ethiopian Construction Works Corporation (ECWC). In this study the researcher only tries to examine factors that are considered common regardless of the project type and organizational structure after reviewing the works of many related literatures of the topic of interest.

1.7. Outline of the Thesis

In order to realize the above aims, the structure of this thesis paper is organized into the following six chapters:

Chapter one discusses with the introduction part which includes background of the study, statement of problems, objectives, key research questions, significance of the study and scope and limitation of the study.

Chapter two gives a background on the Ethiopian Construction Works Corporation in general. It reviews Construction Sector Development and its Economic Contribution in Ethiopia, and identifies the characteristics of the construction industry. This chapter also outlines the practice of project management in the Ethiopian construction industry.

Chapter three presents a review of related literatures by providing definitions and concepts of terms, briefly reviews the theoretical literatures related to the topic, discusses on the empirical issues on the effectiveness of projects from different perspectives and discusses on linkages in the literature of previous studies.

Chapter four centers on the methodology of the study, discusses on the research design, data sources, techniques of analysis employed.

Chapter five explains and discusses descriptive statistics, that is, and comparison of objectives with the results of the study; and

Chapter six provides the conclusion, policy implications/recommendations, and suggestions for further study

Chapter Two

2. Overview of Ethiopian Construction Industry

2.1. Background of Ethiopian Construction Works Corporation

Ethiopian Construction Works Corporation (ECWC) is a public enterprise which is established on December 18/2015 based on Council of Ministers Regulation No. 366/2015 with the authorized capital of Birr 20,313,608,143.90. The corporation is a result of the amalgamation of three formerly independent public enterprises, namely the Ethiopian Road Construction Corporation, the Ethiopian Water Works Construction Enterprise and the Ethiopian Prefabricated Building Parts Production Enterprise.

ECWC is governed by the Public Enterprises Proclamation No.25/1992. Its supervising authority has given to the then Ministry of Public Enterprises / currently and its policy-making body is the Board of the Corporation whose members are appointed by the government selected from different organizations.

Ethiopian Construction Works Corporation has six different sectors which take different operational activities and responsibilities. The head office of the corporation is located in Addis Ababa, around Gurd-shola. It is headed by a Chief Executive Officer (CEO) and six Deputy Chief Executive Officers and department and project heads. Basically, the corporation undertakes different types of construction projects in different regions of the country which basically includes Water Infrastructure & Irrigation-Dams-Deep Water wells Construction, Transport Infrastructure Construction and Building Infrastructure Construction. Its Core Services are further elaborated as Surface and subsurface water supply development, Clean water supply and sewerage infrastructure, Sewage and effluent treatment, Dam and irrigation construction, River diversions, Deep water wells, Reclamations, Dry port construction and other civil works , Road construction, upgrading and maintenance, Bridges construction and maintenance, Rail ways construction and maintenance, Construction of air fields and other civil works, Conventional building construction, and finishing works, Pre-fabricated building construction works, Production of Pre-fabricated building parts, PVC frames, precastbims, and stone and other wood products.

2.2. Construction Sector Development and its Economic Contribution in Ethiopia

The Ethiopian construction sector has shown a remarkable growth and is given high prominence. The role the construction industry plays in socioeconomic development is significant. It provides the basis upon which other sectors can grow by constructing the physical facilities required for the production and distribution of goods and services. The construction industry has a significant multiplier effect on the economy as a whole.

The inter relationship between the construction industry and the broader economy largely emanates from three of the industry's characteristics namely:

1. The public sector is its major client;
2. It's large size, ability to produce investment or capital goods which contribute significantly to national GDP; and
3. It is a major source of employment, directly and indirectly by its multiplier effect.

Public construction projects in Ethiopia are parts of the country's development initiative. It shared considerable amount of the country's scarce financial resources. In Ethiopia, the construction industry is the highest recipient of government budget in terms of government development program. It plays important role in contributing to economic growth of the country and creation of employment opportunities. According to the GDP data obtained from the Planning and Development Commission of Ethiopia, the contribution of the sector for economic growth has been great and large. The ten years data showed that the sector contributed to economic growth of the country with minimum of 10.9 % in the year 2009/10 and maximum of 38.7% in the year of 2012/13.

Table 1: Growth Rate of GDP by Construction Activity at Constant Prices
(2008 EFY Base year series)

Fiscal Year	Contribution (%)
2008/09	11.7
2009/10	10.9
2010/11	12.8
2011/12	31.5
2012/13	38.7
2013/14	23.9
2014/15	31.6
2015/16	25.0
2016/17	20.7
2017/18	15.7

Source: Own Compilation from NPDC, 2019

Chapter Three

3. Literature Review

In this paper, I review some of the recent literatures on factors that lead to projects successful, focusing on construction projects. First, I try to brief with definitions and concepts of terms, review the problem of construction project failure, and then look at factors that cause project failure and are therefore important for success, followed by a more in depth review of areas/factors that contribute to success.

Definitions and Concepts of Terms

3.1.1. Definition of project

Many project management scholars define what a project is. However for this study I have very interested with definition of projects given by Project Management Institute Guide of PMBOK. A project, according to the PMBOK® Guide, defined as a temporary endeavor undertaken to create a unique product, service, or result. Projects are undertaken to fulfill objectives by producing deliverables. An objective is defined as an outcome toward which work is to be directed, a strategic position to be attained, a purpose to be achieved, a result to be obtained, a product to be produced, or a service to be performed.

Projects are temporary, but their deliverables may exist beyond the end of the project. Projects may produce deliverables of a social, economic, material, or environmental nature.

International Project Management Association define project as followed, “A project is a time and cost constrained operation to realize a set of defined deliverables up to quality standards and requirements.”(International Project Management Association, 2006).

A project is a unique, transient endeavor, undertaken to achieve planned objectives, which could be defined in terms of outputs, outcomes or benefits. (Association for Project Management, 2012.)

A project is an endeavor in which human, financial, and material resources are organized in a novel way to undertake a unique scope of work, of given specification, within constraints of cost and time, so as to achieve beneficial change defined by quantitative and qualitative objectives. (J. Rodney Turner, 1999.)

Projects are most often unique endeavors that have not been attempted before and might never be attempted again. Projects have specific start and end dates. In some cases, projects may be very similar or identical and repetitive in nature, but those situations would be an exception rather than the norm. (Kerzener, 2010)

A project is any undertaking that has definite, final objectives that represent specified values to satisfy some need or desire. It is normally characterized by limitations placed on time, cost, and resources such as people, skills, equipment, and materials. A project is a cluster of activities that is relatively separate and clear cut. It has a distinct mission and a clear termination point. A project might be a part of a broader program, yet its main theme lies in identifying a nice, neat work package within a bewildering array of objectives, alternatives, and activities. (Vijay K. Verma, 1995)

3.1.2. Definition of Project management

Project management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements. Project management is accomplished through the appropriate application and integration of the project management processes identified for the project. Project management enables organizations to execute projects effectively and efficiently. Effective project management helps individuals, groups, and public and private organizations to: Meet business objectives; Satisfy stakeholder expectations; Be more predictable; Increase chances of success; Deliver the right products at the right time; Resolve problems and issues; Respond to risks in a timely manner; Optimize the use of organizational resources; Identify, recover, or terminate failing projects; Manage constraints (e.g., scope, quality, schedule, costs, resources); Balance the influence of constraints on the project (e.g., increased scope may increase cost or schedule); and Manage change in a better manner. Poorly managed projects or the absence of project management may result in: Missed deadlines, Cost overruns, Poor quality, Rework, Uncontrolled expansion of the project, Loss of reputation for the organization, unsatisfied stakeholders, and Failure in achieving the objectives for which the project was undertaken. Effective and efficient project management should be considered a strategic competency within organizations. It enables organizations to: Tie project results to business goals, compete more effectively in their markets, Sustain the organization, and Respond to the

impact of business environment changes on projects by appropriately adjusting project management plans (PMBOK® Guide, 2017.)

According to Turner (2019) the five core functions of project management can be explained as follows:

1. The project entails work, and that scope of work must be managed.
2. We assemble the resources into a temporary organization which must be managed.
3. In order to deliver the desired benefit, the asset must function in certain ways, and at required levels of performance. Therefore, the performance, or quality, of the asset must be managed. But to deliver a quality asset the work of the project must also meet certain quality standards. Quality needs to be managed.
4. In order for the project to be of value to both the client and contractor, it must cost less than the value of the benefit. Thus, cost needs to be managed. This involves managing the consumption of all resources, including people and material, not just money.
5. Time needs to be managed for several reasons. In order for the work of the project to take place effectively and as efficiently as possible, the input of the various resources needs to be coordinated. Also, there will be a time value associated with the benefit from the asset. The later it is delivered, the less its value, so the timing of the work needs to be managed to deliver the asset within a time frame that will give the desired benefit.

A Knowledge Area is an identified area of project management defined by its knowledge requirements and described in terms of its component processes, practices, inputs, outputs, tools, and techniques. Although the Knowledge Areas are interrelated, they are defined separately from the project management perspective. The ten Knowledge Areas are:

1. **Project Integration Management.** Includes the processes and activities to identify, define, combine, unify, and coordinate the various processes and project management activities within the Project Management Process Groups.
2. **Project Scope Management.** Includes the processes required to ensure the project includes all the work required, and only the work required, to complete the project successfully.
3. **Project Schedule Management.** Includes the processes required to manage the timely completion of the project.

4. **Project Cost Management.** Includes the processes involved in planning, estimating, budgeting, financing, funding, managing, and controlling costs so the project can be completed within the approved budget.
5. **Project Quality Management.** Includes the processes for incorporating the organization's quality policy regarding planning, managing, and controlling project and product quality requirements, in order to meet stakeholders' expectations.
6. **Project Resource Management.** Includes the processes to identify, acquire, and manage the resources needed for the successful completion of the project.
7. **Project Communications Management.** Includes the processes required to ensure timely and appropriate planning, collection, creation, distribution, storage, retrieval, management, control, monitoring, and ultimate disposition of project information.
8. **Project Risk Management.** Includes the processes of conducting risk management planning, identification, analysis, response planning, response implementation, and monitoring risk on a project.
9. **Project Procurement Management.** Includes the processes necessary to purchase or acquire products, services, or results needed from outside the project team.
10. **Project Stakeholder Management.** Includes the processes required to identify the people, groups, or organizations that could impact or be impacted by the project, to analyze stakeholder expectations and their impact on the project, and to develop appropriate management strategies for effectively engaging stakeholders in project decisions and execution. The needs of a specific project may require one or more additional Knowledge Areas, for example, construction may require financial management or safety and health management. (PMBOK® Guide, 2017)

Successful project management can then be defined as achieving a continuous stream of project objectives within time, within cost, at the desired performance/technology level, while utilizing the assigned resources effectively and efficiently, and having the results accepted by the customer and/or stakeholders. Because each project is inherently different and each customer can have different requirements, the activities included within the process groups may change from project to project. (Kerzner, 2017)

Projects are a key way to create value and benefits in organizations. In today's business environment, organizational leaders need to be able to manage with tighter budgets, shorter timelines, scarcity of resources, and rapidly changing technology. The business environment is dynamic with an accelerating rate of change. To remain competitive in the world economy, companies are embracing project management to consistently deliver business value.

3.1.3. Construction Project

Construction is an act or a process of constructing. It consists of a series of actions to produce either a new set of buildings and infrastructure or may involve alterations in the existing buildings and infrastructure (Radosavljevic and Bennett 2012). A construction project is a part of construction work that is being attempted or undertaken. A project involves a series of complex or interrelated activities and tasks that consume resources to achieve some specific objectives. It has to be completed within a set of specifications under a limited budget (Munns and Bjeirmi 1996; Pinto and Slevin 1988).

There are numerous challenges and problems facing the construction industry all over the world. Construction projects are famous for being over budget, late and burdened with scope creep. Many of the problems facing the construction industry are delays, over budgeting and poor quality. The traditional construction management approach has been effective in solving some of these problems. The Construction Management has been defined as the overall planning of a project by allocating the appropriate resources to finish the project on time, at budget and at targeted quality. "Scope triangle" which illustrates the relationship between the three tradeoffs in a project cost, time & quality. Successful project management can be achieved by bringing together the tasks and resources necessary to accomplish the project objectives and deliverables within the specified time constraints and within the planned budget. (Marwa Gamal Swefie Fall, 2013).

Construction industry is complex in nature because it contains large number of project parties as clients, consultants, contractors, stakeholders, shareholders and regulators. The complexity and fragmented nature of the industry and its highly casual employment of labor makes it sensitive to poor contract performance. (Helen, et, al, 2015).

The successful completion of a project results in the organization moving to the future state and achieving the specific objective. A project is usually deemed to be a success if it achieves the

objectives according to their acceptance criteria, within an agreed timescale and budget” (Association for Project Management, 2012). Projects are initiated to realize business opportunities that are aligned with an organization’s strategic goals. Prior to initiating a project, a business case is often developed to outline the project objectives, the required investment, and financial and qualitative criteria for project success.

3.2. Problem of Construction Project Failure

A large percentage of construction projects fail. In the U.S., between 65% and 80% of construction projects fail by either: (1) failing to meet their stated objectives, (2) running significantly late, or (3) costing far more than planned, or some combination of these three issues (Miller, 2013; Kaminsky, 2012). The definition of a failed project in that estimate – a project that fails significantly in the areas of scope/purpose, time and/or cost – is a common one. Some other definitions of failure that are sometimes used include failure to satisfy the customer and failure to improve the business.

Failed construction projects are a problem because they drain resources. They can be a financial burden that causes financial issues for companies.

There is a lot of interest in why some projects fail and others succeed, including the reasons or drivers of project success. Many believe project management is most important since the role of the project manager is overall management of the project, including management of the team so that it functions appropriately and performs well. Some other factors that determine project success are the skill of the project team, process followed on the project, and whether there are established, tried-and-true ways or technology to accomplish the work (i.e. the level of difficulty of the project).

3.3. Factors that Cause Project Failure are Important for Success

Some research looked at areas/factors that cause project failure, which provide insight into factors that would contribute to project success. There is a lot of research on causes of construction project failure.

Scope definition and control were major issues in the failed construction projects. I found a recent journal article that looked at the significance of scope in project failure and success. The article by Mirza, Pourzolfaghar, and Shahnazari (2013) reports that poor scope definition is a very significant contributor to project failure and that proper scope definition is important for project success. The scope outlines the work to be completed to meet objectives. The scope directs the efforts of the team and is used when making decisions throughout the project. If the scope is not well defined upfront (by failing to include the right stakeholders in scope discussions, determine requirements, and prepare a clear, well-defined scope document), there will be the need to adjust or add to the scope later to deliver a product/outcome that satisfies stakeholders' needs. In other cases, stakeholders may change their minds about what they want or think of new things that they want during the project.

Anthopoulos, Reddick, Giannakidou, and Mavridis (2016) investigated the reasons for e-government project failures using the highly publicized failure of the e-government Health care government project in the United States as a case study. A literature review provided actual reasons for past e-government project failures from which the researchers developed a taxonomy. The literature indicated that failures were due to: design-reality gaps (concern hard-soft gaps, private-public gaps, and country context gaps), missing focus (insufficient information on business need or objectives), content issues (scope problems along with changing requirements), skill issues (inadequate skills of project team), execution issues, regulatory issues, external factors, and missing user satisfaction (projects do not meet users' expectations and products not useful for public use). In addition to the reasons for failure, the researchers compiled failure factors: organizational power (organization structure and relations), politics, education, project management issues, ambiguous business needs and unclear vision, security and privacy, finance and operational cost estimates, and ICT and system development process (data, infrastructure, compatibility, and information management). Five of the 8 reasons for failure from the taxonomy applied to the Healthcare.gov project: design-reality gaps (overall planning unrealistic), missing focus, content issues (requirements changed and there was technical complexity), skill issues, and execution issues (unrealistic scheduling). Project management failure was the issue or root cause for most of the failure reasons – project definition was insufficient, there was unrealistic scheduling, and the complexities of the website

required more attention and skill. The top failure factor was also project management because of ineffective project/scope definition. Four of the 8 factors from the taxonomy applied. The researchers noted relationships between failure reasons and failure factors: execution (unrealistic scheduling) and content issues (technical complexity) triggered the corresponding failure factor ineffective project management, which impacted the establishment of realistic deadlines and successful risk analysis during planning (Anthopoulos, Reddick, Giannakidou, & Mavridis, 2016, p. 157). The factor ineffective project management was accompanied by ICT reasons such as data and complexity and by unsuccessful monitoring and measurement (falls under project management issues).

One problem with available reasons for project failure is the inclusion of reasons/factors that are symptoms of another (Arias et al. 2012; Stoica & Brouse, 2013). Arias et al. (2012) noted that there are relationships between the reasons for the failure of software development projects provided by the latest Standish Group report published in 1995 as well as items/causes in the list that are symptoms of others.

Charles O'Neil, (2019) identified 35 common causes of project failure: 20 arising from actions taken during the creation of a project, the tendering, bidding and pre-contract phase of projects; and 15 post-contract ones arising during detailed design, construction, commissioning and transition to operations. All these causes of failure are related to shortcomings in management in one way or another and always involve human input. These shortcomings are mostly at senior level: the principle stakeholders, including the client, the Bid team, design consultants, project and construction managers and services contractors. The common element is invariably the human input and not the technical processes. Generally, though, failure is referred to in terms of cost over-runs and program blow-outs for various reasons and these causes of failure are analyzed and explained to clients, owners and shareholders ad nauseam.

Finally, the researcher concluded by suggesting the remedies to overcome the project failure. By stating that if control and reporting is efficient and up to scratch all the time then properly informed decisions and mitigation should substantially reduce the risk of major failure.

The project manager's definition might be just not meeting the competing constraints criteria. Stakeholders, in contrast, might seem more interested in business value than the competing constraints once the project actually begins. Here are some stakeholders' perceptions of failure:

- The project has become too costly for the expected benefits or value.
- The project will be completed too late.
- The project will not achieve its targeted benefits or value.
- The project no longer satisfies the stakeholders' needs

According to Harold Kerzner (2017), there are numerous causes of project failure. Some of the causes are quite common in specific industries like in information technology, whereas others can appear across all industries. As per his explanation the following once are mentioned as a generic list of common causes of failure: end user stakeholders not involved throughout the project, minimal or no stakeholder backing - lack of ownership, weak business case, corporate goals not understood at lower organizational levels, plan asks for too much in too little time, poor estimates and projections, especially financial, unclear stakeholder requirements, passive user stakeholder involvement after handoff, unclear expectations, unrealistic assumptions, if they exist at all, plans based on insufficient data, no systemization of the planning process, planning performed by a planning group, inadequate or incomplete requirements, lack of resources, assigned resources lack experience, staffing requirements not fully known, constantly changing resources, poor overall project planning, changed enterprise environmental factors, causing outdated scope, missed deadlines and no recovery plan, exceeded and out-of-control budgets, lack of re-planning on a regular basis, lack of attention to the human and organizational aspects of the project, best-guess project estimates not based on history or standards, not enough time provided for proper estimating, ignorance of the exact major milestone dates or due dates for reporting, team members working with conflicting requirements, people shuffled in and out of the project with little regard for its schedule, poor or fragmented cost control, stakeholders use different organizational process assets, (which may be incompatible with the assets of project partners, weak project and stakeholder communications, poor assessment of risks if done at all, wrong type of contract, poor project management; team members, especially virtual ones,

possess, a poor understanding of project management, technical objectives more important than business objectives).

These causes of project failure can be sorted into three broad categories:

1. **Management mistakes:** These are the result of a failure in stakeholder management, perhaps by allowing too many unnecessary scope changes, failing to provide proper governance, refusing to make decisions in a timely manner, and ignoring the project manager's requests for help. These mistakes also can be the result of wanting to gold-plate the project, which is the result of not performing project health checks.
2. **Planning mistakes:** These are the result of poor project management, perhaps not following the principles stated in the PMBOK®Guide, not having a timely kill switch in the plan, not planning for project audits or health checks, and not selecting the proper tracking metrics.
3. **External influences:** These are normally failures in assessing the environmental input factors correctly. Environmental input factors include the timing for getting approvals and authorization from third parties and a poor understanding of the host country's culture and politics.

3.4. Factors of Project Management and Project Success

3.4.1. Key Factors of Project Management

According to Turner (2019) the five core functions of project management can be explained as follows:

1. The project entails work, and that scope of work must be managed.
2. We assemble the resources into a temporary organization which must be managed.
3. In order to deliver the desired benefit, the asset must function in certain ways, and at required levels of performance. Therefore, the performance, or quality, of the asset must be managed. But to deliver a quality asset the work of the project must also meet certain quality standards. Quality needs to be managed.

4. In order for the project to be of value to both the client and contractor, it must cost less than the value of the benefit. Thus, cost needs to be managed. This involves managing the consumption of all resources, including people and material, not just money.
5. Time needs to be managed for several reasons. In order for the work of the project to take place effectively and as efficiently as possible, the input of the various resources needs to be coordinated. Also, there will be a time value associated with the benefit from the asset. The later it is delivered, the less its value, so the timing of the work needs to be managed to deliver the asset within a time frame that will give the desired benefit.

A Knowledge Area is an identified area of project management defined by its knowledge requirements and described in terms of its component processes, practices, inputs, outputs, tools, and techniques. Although the Knowledge Areas are interrelated, they are defined separately from the project management perspective. The ten Knowledge Areas identified are:

1. ***Project Integration Management***. Includes the processes and activities to identify, define, combine, unify, and coordinate the various processes and project management activities within the Project Management Process Groups.
2. ***Project Scope Management***. Includes the processes required to ensure the project includes all the work required, and only the work required, to complete the project successfully.
3. ***Project Schedule Management***. Includes the processes required to manage the timely completion of the project.
4. ***Project Cost Management***. Includes the processes involved in planning, estimating, budgeting, financing, funding, managing, and controlling costs so the project can be completed within the approved budget.
5. ***Project Quality Management***. Includes the processes for incorporating the organization's quality policy regarding planning, managing, and controlling project and product quality requirements, in order to meet stakeholders' expectations.
6. ***Project Resource Management***. Includes the processes to identify, acquire, and manage the resources needed for the successful completion of the project.

7. ***Project Communications Management.*** Includes the processes required to ensure timely and appropriate planning, collection, creation, distribution, storage, retrieval, management, control, monitoring, and ultimate disposition of project information.
8. ***Project Risk Management.*** Includes the processes of conducting risk management planning, identification, analysis, response planning, response implementation, and monitoring risk on a project.
9. ***Project Procurement Management.*** Includes the processes necessary to purchase or acquire products, services, or results needed from outside the project team.
10. ***Project Stakeholder Management.*** Includes the processes required to identify the people, groups, or organizations that could impact or be impacted by the project, to analyze stakeholder expectations and their impact on the project, and to develop appropriate management strategies for effectively engaging stakeholders in project decisions and execution.

The needs of a specific project may require one or more additional Knowledge Areas, for example, construction may require financial management or safety and health management. (PMBOK® Guide, 2017)

There has been a lot of research on the role of project leadership or project management (PM) on project success. Successful project management can then be defined as achieving a continuous stream of project objectives within time, within cost, at the desired performance/technology level, while utilizing the assigned resources effectively and efficiently, and having the results accepted by the customer and/or stakeholders. Because each project is inherently different and each customer can have different requirements, the activities included within the process groups may change from project to project (Kerzner, 2017).

Projects are a key way to create value and benefits in organizations. In today's business environment, organizational leaders need to be able to manage with tighter budgets, shorter timelines, scarcity of resources, and rapidly changing technology. The business environment is dynamic with an accelerating rate of change. To remain competitive in the world economy, companies are embracing project management to consistently deliver business value.

Research by Mir and Pennington (2014) mentioned above found that Lifecycle Management Processes, an enabler of high project management performance, explained around 30% of the variation in project success and had a positive relationship with project success.

I selected Mir and Pennington (2014) because it is a recent paper that shows statistically that the performance of the project manager is important for project success. The researchers developed three propositions and seven hypotheses on the relationship between project management and project success. These propositions and hypotheses all stated a positive relationship between project management (performance of the project manager as well as five enablers of high project manager performance from the Project Management Performance Assessment (PMPA): PM Leadership, PM Staff, PM Policy and Strategy, PM Partnerships and Resources, and Project Life Cycle Management Process, and one additional area in the PMPA: PM Key Performance Indicators) and project success (overall project success and then the individual success elements: project efficiency, impact on the customer, impact on the team, business success, and preparing for the future). The study sample included professionals working in UAE organizations who were asked to complete a questionnaire. Regression analysis found that project manager performance explained 44.9% of the variation in project success with a positive relationship between project manager performance and project success (indicated by a β of 0.672). Mir and Pennington noted that this result was consistent with previous research, specifically Din et al (2011), Stefanovic (2007), and Stefanovic and Shenhar (2007). The next significant explanatory variable was management of Key Performance Indicators (KPIs), which explained 33.4% of the variation in project success and had a positive relationship with project success. This result was also consistent with project management literature, which advocates defining the targets and using measures (performance indicators) to achieve desired results. Variables PM Staff, PM Leadership, and PM Lifecycle Management Processes individually explained around 30% of the variation in project success and each had a positive relationship with project success. The research by Mir and Pennington corroborated findings of previous research on the contribution of PM staff and their training as well as PM Leadership to project success. There were many more significant findings. One more is: the PM performance variables explain more of the variation in (the success element) Impact on Project Team more than any other success element. This means that project performance (or the perception of project success) can have a major

impact on project teams, motivating the team and increasing commitment to the project. Performance variables such as management of PKIs and PM Leadership influence the engagement of teams.

3.4.2. Project Success Criteria

Project success factors are elements of the project or its management that can be influenced to increase the chance of achieving a successful outcome. The reverse, pitfalls, are management mistakes which increase the chance of failure (J. Rodney Turner, 1999).

Turner further stated that there are two components of project success:

1. Success criteria: The dependent variables by which we will judge the successful outcome of the project.
2. Success factors: The independent variables which will influence the successful achievement of the success criteria.

In order for a project to be successful, you must agree the success criteria with all the key stakeholders before you start. This is a necessary condition for project success, not a sufficient condition; unfortunately, there is nothing that will guarantee project success. To meet this condition, you must make an attempt to identify who most of the key stakeholders are. There are several reasons why it is important to agree the success criteria before you start, including:

- You want everybody to have the same vision of the end point of the project. If people have been working towards different end points, even inadvertently, it is impossible to pull them all together at the end.
- You want everybody to be applying the same success factors, following the same project strategy, and following the same road to its successful achievement. You don't want the project team members all chasing off in different directions.
- Even quite small differences in interpretation of the success criteria can lead to quite different outcomes, even down to whether you treat time, cost, or quality as more important.

3.4.3. Success Factors Influencing Project Performance

Various project success factors have been identified in different projects around the world. Community involvement, project objectives, technical innovation, uncertainty, politics, schedule

duration urgency, financial contract, legal factors and implementation process were established as the critical success factors in projects (Morris and Hughes, 1987). Shamas-ur-Rehman and Ogunlana (2009) studied in critical success factors in large scale construction projects in Thailand. Their study emphasized that success factors vary across various projects. Their findings revealed project planning and control, project personnel and involvement of client as critical factors influencing project success. Ann et al. (2006) in their study, investigated on CSFs in construction project briefing. Briefing process is prerequisite to achieving success in project performance. This process involves the interpretation of clients' actual views and requirements to project participants. Their study considered open and effective communication, clear and precise briefing documents, clear intention and objectives of client and clear project goal and objectives as critical success factors. Ugwu et al. (2007) identified nine top critical success factors that would act as enablers for successful implementation of ICT projects in construction as cost of development, top management support, availability of appropriate tools, development team knowledge and understanding of construction processes, ease applications, clear definition and understanding end user, clear communication, standardization issues and change management of organization level. Marterella (2007) reviewed over 50 business processes and disclosed eight critical sales success factors influencing business performance as selection, performance management, skills assessment, defined solution offerings, demand creation, qualifying, proposal clarity and existing client expansion. Park (2009) investigated a set of ten common factors and 188 individual factors influencing whole life performance of South Korean projects.

The study was focused on identifying the most critical individual factor in each common factor. The result identified the following individual factors in each common factor; clarity of contract, fixed construction period, precise project budget estimate, material and quality, mutual and trusting relationships, leadership and team management, then finally management of work safety on site.

The study of project success and the critical success factors (CSFs) is considered to be a mean for improving the effectiveness of project. Performance can be assured by identifying and eliminating the factors that cause poor project outcomes. Thus, project managers need better

understanding of critical success/failure factors and how to measure them. Construction projects are frequently influenced by success factors' which can help project parties reach their intended goals with greater efficiency. Many critical success factors such as factors related to project manager's performance, factors related to organization, factors related to project, factors related to external environment became apparent from this study. (Sumesh, et,al, 2015.)

Researches on project success show that it is impossible to generate a universal checklist of project success criteria suitable for all projects. Success criteria will differ from project to project depending on participants, scope of services, project size, and sophistication of the owner related to the design of facilities, technological implications, and a variety of other factors. On the other hand, common threads relating to success criteria often develop not only with an individual project but across the industry as we relate success to the perceptions and expectations of the owner, designer, or contractor (Sumesh, et al., 2015).

Cooke-Davies (2002) eliminates a conceptual difference between 'success criteria' and 'success factors'. He stresses that success criteria belong to specific measurement which needs to be formulated in order to conclude whether project succeeds or fails. However, success factors are more about particular levers that can be used by project manager to increase a probability of successful outcome of a project.

Project success means different things to different people. Each industry project team or individual has a definition of success. Pariff and Sanvido (1993) consider success as an intangible perceptive feeling, a measuring criterion that varies with management expectation and varies among persons and with the phases of project. Actually, owners, designers, consultants, contractors as well as sub-contractors have their own project objectives and criteria for measuring success. Definition on project success may change according to project type, size, and sophistication, project participants and experience of owners etc.

Project achieves success by meeting user requirements or delivering values to various stakeholders such as project managers, project team members, project sponsors, client or end users whom are indirectly or directly involved in the project or able to influence its result or outcome. Different stakeholders associate success to different indicators. Project managers

associate success with meeting time and cost target within given scope, whilst users may associate success with their perceived satisfaction and expectation (Stuckenbruck, 1986).

Success factors are those factors in the project most conducive to the project team and in the project environment that will underpin the project and the likelihood for the project to be successful. Typical success factors would be top management support, ability to coordinate and synergy of team. Success factor are not related to the time, cost & quality elements used in the success criteria. “Success factors are perceived as levers that can be operated by project managers to increase chances of obtaining the desired outcomes” (Westerveld, 2003).

Baker, Murphy, and Fisher (2008) concluded that “project success is something much more complex than simply meeting cost, schedule, and performance specifications. Although certain criteria might be relevant in measuring the success of most projects, they should be adapted to size, complexity, duration, project phases, type and stakeholders’ requirements”. They further stated critical success factors of a project are ability to coordinate, application of project management techniques, client acceptance, client consultation, communication, executive acceptance, external environment, lesson learnt, monitor & control, organization structure, organization adaptability, personnel, project manager leadership & competence, Project mission, Project schedule & plan, quality management, risk management, Synergy of team, technical task ability and top management support.

The paper by Miller (2013) reported that managers have more people/staff worries than technical worries on human resources construction projects. The success implementation of project is not predominantly affected by a particular group of factor but perhaps an interaction of a few factors from different groups. A combination of factors determines the success or failure of a project. (Savolainen, Ahonen, & Richardson, 2012)

Beleiu, Crisan, and Nistor (2015) developed an elaborated list of success factors that have the highest influence on project success. They concluded that clearly defined goal and directions, competent project team members, clearly defined roles and responsibilities, Communication and consultation with stakeholders and Compliance with the planned budget, time frame and performance criteria to be the five critical success factors that have the highest impact on project success

Pinto and Slevin's (1988) List 10 Success Factors as: -

- Project mission which includes clearly defined goals and direction
- Top management support which includes resources, authority, and power for implementation
- Schedule and plans which focuses on detailed specification of implementation process
- Client consultation includes communication with and consultation of all stakeholders
- Personnel includes recruitment, selection, and training of competent personnel
- Technical tasks include ability of the required technology and expertise
- Client acceptance of selling of the final product to the end users
- Monitoring and feedback basically focus on timely and comprehensive control
- Communication includes provision of timely data to key players
- Troubleshooting means ability to handle unexpected problems

The first systematic classification of critical success factors in the area of project management is provided by Schultz, Slevin and Pinto (1987). They identify two groups of factors – strategic and tactical – which influence project performance at various stages of project life cycle. The “strategic” group consists of factors as project mission, top management support, and project scheduling. The “tactical” group includes factors as client consulting, human resource selection and personnel training. Tactics is the deployment of wide variety of human, technical and financial resources to achieve strategic plans.

Sumesh Babul, et al (2015) concluded that CSFs can be grouped under seven main categories. These include: (1) Project Management Factors; (2) Procurement-related Factors; (3) Client-related Factors; (4) Design team-related Factors; (5) Contractor-related factors; (6) Project Manager-related Factors; and (7) Business and Work Environment related Factors.

Ling Keng Zheng (2017) identified Corporate understanding, Common understanding with stakeholders on success criteria, Executive commitment, Organizational adaptability, Communication, Project manager selection criteria, Project manager leadership, Environment, Commitment to planning & control, Project mission /common goal/ direction, Top management

support, Client consultation / acceptance, Monitor performance and feedback, and Personnel / teamwork as project success factors.

Turner (1999) identified success in to the following four stages of the management process:

1. Establishing the Project. These are factors in the way the project is set up within the parent organization. Align Project Plans with Business Plans. Project plans must be derived from the business plans. A mistake often made is to start with detail planning, and then finding it difficult to link the project back to corporate plans. Start at the top and work down.

Define Procedures for Managing Projects. Projects use transient teams to undertake novel assignments. The teams form quickly in order to undertake the task successfully. A properly structured start-up process is therefore important. A consistent, companywide approach to project management can also help. However, it is necessary to obtain a balance between the need for a company-wide approach and the need to respect the individuality of project types.

Communicate Priorities to the Parties Involved. When priorities are not communicated, People assign their own, usually different, priorities, with the result that there is no coordination, and no work is done. Agree the success criteria with the stakeholders before you start.

2. Planning the Project. The following factors are among those that determine how the work is defined and, the time and cost schedules calculated and communicated to the project team. Develop Project Plans Developed on Multiple Levels. The use of breakdown structure is how we ensure the work delivers the required benefit. The usual pitfall is to plan at a detailed level only; computer software unfortunately encourages this. Sometimes work is planned only at a very high level, and there is no coordination.

3. Organizing and Implementing the Project. These are factors in building the project organization and assigning work to people.

Obtain Cooperation. It is not uncommon on projects to wonder if you all work for the same organization, as covert objectives get in the way of the overt objectives. Cooperation is achieved in two ways: by building a clear vision for the project; and by negotiating agreement to the plans.

Obtain Commitment of the Resource Providers. Project managers often use resources on secondment from other managers. They will not willingly release their resources if they are not committed to the project.

Ensure Resources are Available When Required. It is not adequate just to send the resource providers a plan and expect their people to be available at some point. Even if they are committed, you must ensure they understand the requirements. This is helped by using simple plans, by discussing the requirements of the plan with the resource provider, and by negotiating their release. They must also plan to release their resources at the required time.

Define Management Responsibility. When defining roles on projects, it is common to consider only those people who do the work: cutting metal or writing code. However, people have other roles which consume time or can delay the project. These tend to be management roles, especially those which cause delay. These roles include taking decisions, managing information, and managing progress.

Ensure Good Communication. Surprisingly, poor communication on projects is sometimes caused by too much rather than too little. Communication out of a project is often achieved by sending every piece of information to everyone involved. People soon learn only a few documents are relevant to them, so all go straight in the bin. The project manager must define those who need information, so that when people receive something, they know they ought to read it. If some other person wishes to be included in the circulation, they must negotiate inclusion on the responsibility chart. Similarly, committees are often used for communication into a project. Once invited people tend to stay on the committee, even if they are no longer required. Committees grow organically. Worse still, it is those people who have least to contribute who do most of the talking at meetings, as they talk to justify their presence. Channels of communication into a project must be clearly defined and limited, and any additions discussed and negotiated.

Differentiate between Technical Management and Project Management. It is still common to hear design managers refer to themselves as project managers, especially on information systems projects. Often, these “project managers” are not good at delegating work. They believe, quite

rightly, they can do the work better than anyone else, and so surround themselves with idle people while they work themselves into an early grave. It is my view that an industry has truly matured in the management of projects when they stop calling design managers project managers, and stop using design engineers as such. Project management is an integrative function and design management is a specialist function.

4. Controlling the Project. Finally, factors in monitoring and controlling progress are: -

Understand the Purpose of Control. The purpose of control is not to hold meetings. It is also not to punish people for failing to achieve the plan. If people believe that is the purpose of control, they will withhold information. The purpose is to monitor progress, to compare progress to the plan, and to take necessary action to achieve the project's goals. That requires people to be open and honest about progress on the project. If people know they are reporting progress because it is time to report progress, and the information will be used to help and support them, they will be more willing to give a true picture of progress.

Monitor Progress against the Plan. Control was lost because people were not reporting progress against the plan. Control will only be effective if there is a common basis for control, which means a common plan. This is achieved most effectively by reporting progress on a copy of the plan.

Hold Effective Review Meetings. To be effective formal review meetings must be held, with controlled attendance, fixed criteria for reporting, and at fixed intervals. Discussing progress at the coffee machine may be part of good leadership, but it is not of good control. At the other extreme, large meetings where most people are not interested in what others are saying waste time. People must only be invited if they have something to contribute. Holding review meetings at two or more levels of the planning hierarchy can aid this. The meetings must have a fixed agenda, which means reporting against fixed criteria, including the plan. Without a structure people will report progress in a way which puts them in the best light. Finally, people sometimes hold meetings only when they have something to discuss. By then control is reduced to damage limitation. Meetings must be held at fixed intervals, although the frequency may vary depending on the risk and the point in the project life cycle.

Combine Responsibility with Authority. The manager had no direct authority over the syndicates, and was not able to use other sources, including that obtained by negotiating agreements. Without authority for control, the manager cannot take action to achieve the project's goals.

Kumar Neeraj Jha, 2013 in his book of “Determinants of Construction Project Success in India”, identified project success and failure factors in terms of schedule, quality, cost, and non-dispute criterion. A total of six factors were extracted are:-

1. Project Manager's Competence

Project manager's competence considered as a key to success of the project. A competent manager has the technical capability and monitoring capabilities. He shows his trust in his project team by way of delegating the authority to his team. He organizes resources through constant persuasion with his higher ups, he takes active part in construction control meetings held at site level, he acts as a catalyst in training his human resources in the skill demanded by the project; he makes his people committed for the project through effective leadership and by acting in nonpartisan ways. All these attributes can be thought of originating from Project Manager's competence, hence the name.

2. Top Management Support

Top management supports the project by taking appropriate action whenever the project faces operational difficulties. Top management extends support to the project by selecting a project manager of proven track record at an early stage and by keeping short and informal line of communication. Also, a supportive top management backs up the project plan prepared by site management team. Taking part in construction control meetings and making the resources available for the planned duration also show support for the project.

3. Monitoring, Feedback and Coordination

Looking at the attributes under this factor it is difficult to give a common name. However, this factor has the attributes mainly focusing on monitoring, feedback and coordination among project participants. Monitoring, feedback and coordination are given importance by most of the

studies for the successful outcome of a project and identified as key factor responsible for success of many projects.

4. Favorable Working Condition

This factor comprises of attributes like scope and nature of work well defined in the tender, favorable social environment, favorable climatic condition at the site, monitoring and feedback by client.

5. Commitment of All Project Participants

Project participants include internal and external participants. For the project to be successful not only internal factors are needed but external factors like political and economic environment are also needed. Delegating authority viz. top management delegating to project manager, which in turn delegates down to other team members also show the team commitment.

6. Owners Competence

Taking timely decisions, and regular monitoring and feedback of the progress of the project are some of the characteristics of a competent owner. The negative loading of attributes training the human resources in the skill demanded by project under this factor is bothersome and no meanings could be attached to this.

Sumesh, et,al, (2015) stated the significance of critical success factors as it can reduce organizational ambiguity, reflect the implicit, collective drivers of key managers, are reflective of what good managers do well to move the organization toward its mission, are the essential areas of activity that must be performed well to achieve the mission, objectives or goals for business or project, it is a common point of reference that direct and measure the success of business or project, help everyone in the team to know exactly what's most important and helps people perform their own work in the right context and pull together towards the same overall aims, are likely to be more dynamic and to reflect current operating conditions because of the many sources of CSFs, provide a key risk-management perspective for the organization to consider, can be valuable for course correction, it takes into account the changing environment with which organizations and managers must deal, give organization/company a competitive

edge and is the bottom line of success in fulfilling the responsibility of a project management companies and make the project management company prosper.

The project implementation process is complex. It usually involves attention to a broad Variety of human, budgetary, and technical variables. From a Project Management perspective, critical success factors (CSFs) are characteristics, conditions, or variables that can have a significant impact on the success of the project when properly sustained, maintained, or managed. There is a very close link between the type and scope of projects and respective Critical Success Factors (CSF).

3.4.4. Cost and schedule overrun of projects

Delays happen in most construction projects, whether simple or complex. In construction, delay could be defined as the time overrun either beyond the contract date or beyond the extended date of completion. Construction project delays have a debilitating effect on the parties to a contract in terms of a growth in adversarial relationships, distrust, litigation, arbitration, cash flow problems, and a general feeling of apprehension towards each other. Delays caused by the employer, such as late issue of drawings and specifications, frequent change orders, and incorrect/inadequate site information, generate claims from both the main contractor and subcontractors which often entail lengthy court battles with huge financial repercussions. Delays caused by contractors can generally be attributed to poor managerial skills, lack of planning and a poor understanding of financial principles, all of which have led to the downfall of many a contractor. Because of its overriding importance for the employer (in terms of performance) and the contractor (in terms of money), time the source of frequent disputes and claims leading to arbitration and litigation. To control this situation, a contract is formulated to identify potential delay situations in advance and to define and fix obligations to preclude such controversies (Roger Gibson, 2015).

Construction delays are occurring in every phase of a construction project and are common problems in construction projects in Ethiopia. Moreover, it is well known that the delays in construction projects are the major causes of project failure. As discussed by Worku Koshe et al., 2016, if the delay is not identified and the corrective project management decision is not taken in time a project may incur extra cost and extension of project time, which gives rise to

dissatisfaction to all the parties involved and nowadays it's becoming a major obstruction for their development for developing countries like Ethiopia.

The findings by Werku Koshe et al., 2016 also shows that the main critical factors that cause construction delays in Ethiopian cases are: (1) Difficulties in financing project by a contractor; (2) Escalation of the materials price; (3) Infective project planning; (4) Scheduling or resource management; (5) Delay in progress payments for completed works, (6) Lack of skilled professionals in the field of construction management in the organization, and (7) Fluctuating labor availability season to season /seasonal labors availability.

Lee, Y. D,et,al, 2008 also clearly tried to identify the problems related to delays and cost overruns during construction phases are poor site management and supervision, poor project management assistance, financial difficulties of owner, financial difficulties of contractor and design changes are the five most frequent, severe and important causes.

3.5. Conceptual Framework

This research work focuses on the assessment of factors for the performance of construction projects. The following picture depicts the overall conceptual framework so as to demonstrate the relationship between dependent and independent variables as well as how success or failure will be verified.

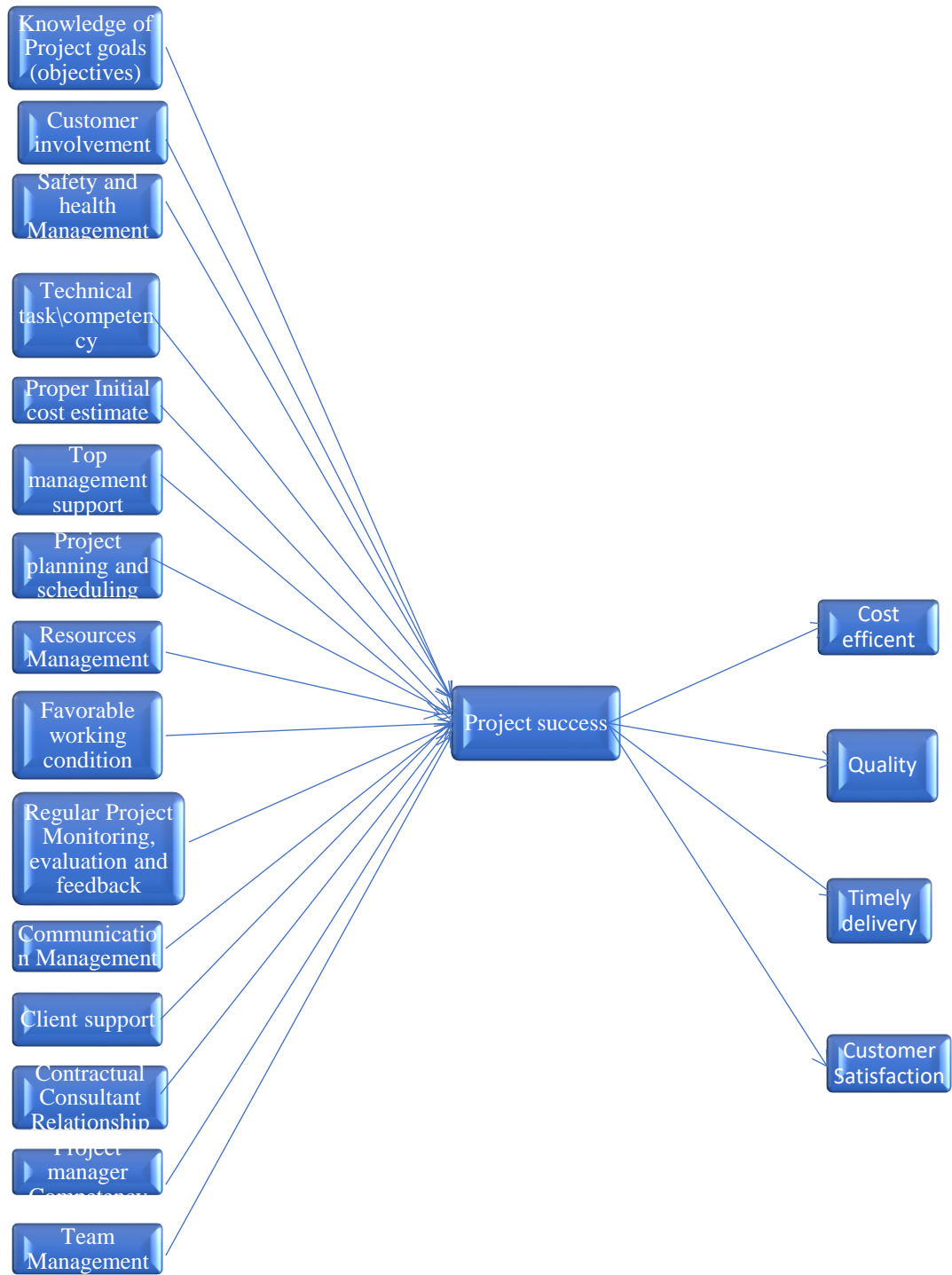


Figure 1 conceptual framework

As can be illustrated in the above diagram there are two types of variables; dependent and independent variables. The dependent variable (project success) can be influenced and affected by the independent variables (Knowledge of Project goals (objectives), scope management, customer satisfaction, safety and health management, technical task\competency, proper initial cost estimate, top management support, project planning and scheduling, resources management, favorable working condition, regular project monitoring, evaluation and feedback, communication management, client support. contractual consultant relationship, project manager competency, and team management. The success (failure) of projects can be measured by using four constraints of projects (timely delivery, cost efficient, quality, and customer satisfaction.

3.6. Empirical Review

This part of literature review will discuss related articles and journals to the topic under study. In 2011 Ogwueleka defines the success factors are as inputs to management system which can lead directly or indirectly to project success. It tries to investigate the critical success factors influencing project performance in Nigeria. The purpose was to identify success factors existing in projects and also to examine the important index of these success factors on project performance in Nigeria. Twenty-two success factors were selected from the literature for the research with sample size of 188 professionals. The data obtained from the questionnaire are analyzed using frequency and severity. The reliability test on the data using Cronbach's alpha displays, sixteen success factors were necessary for true satisfaction of successful project implementation in Nigerian Construction Industry. Based on the result, objective management, management of design, technical factors, top management support and risk management were selected as the most critical success factors in project performance. The findings are focused to assist practitioners' gain better understanding on the key areas based on prioritized success factors in order to improve performance in project delivery.

According to Arslan and Kivrak (2008) achieving success is a highly critical issue for the companies to survive in a competitive business environment. The construction industry is also an area where there is strong competition due to a large number of construction contractors. There have been many factors such as qualified employees, quality workmanship and financial management that can lead to company success in the construction industry. The aim of their study was to investigate the critical factors leading to construction company success. Within this context, a survey was carried out among 40 Turkish construction companies which are located in the Northwest region of Turkey. In the

survey, top-level managers and owners of the companies were interviewed. The interviews took place over a five-month period between January and May 2007. Finally, the ranking of the critical success factors has been determined by using the Simple Multi Attribute Rating Technique (SMART). Based on the results, business management, financial conditions and owner/manager characteristics were determined as the most important factors to company success.

Takim and Adnan (2008) provide an empirical analysis of measures of success in terms of effective performance in the development of construction projects in Malaysia. A survey was conducted in Malaysia among the four project stakeholders: The Government, private clients, consultants, and contractors. In total 93 respondents completed the questionnaire. Lists of effectiveness of success measures were identified for the respondents to identify their level of success criticality to the Malaysian construction projects. The data were analyzed by means of statistical analysis i.e. ranking of variables based on the mean values, Analysis of Variance and factor analysis techniques. The first finding revealed that the level of success criticality with regards to project efficiency performance in the development of construction projects is the specific requirements and priorities of different project stakeholders. The second finding shows the project 'results' achieved in the development of construction project. These are presented by the five principal factors namely: Learning and Exploitation; Client Satisfaction; Stakeholder Objectives; Operational Assurance and User Satisfaction. It is anticipated that the findings reported in this paper could be important for future strategies and guidelines for the development of projects in Malaysia.

Saif Ul Amin, et,al, (2016) stated that Projects of construction companies often experience poor performance in terms of cost overruns, quality defects, delay and time. They analyzed and examined the reasons of poor performances. Their prime objective was to determine the strength of relationship between the different elements of project management performance indicators and project success. They employed a survey questionnaire to investigate the specific characteristics of project performance indicators in construction and their impact on project success. The data was collected from professionals and managers of Construction Companies of Pakistan. A collection of 193 completed questionnaires were analyzed using SPSS. Multiple Regression analysis and correlation were applied and the outcomes depict that project management performance indicators have positive association with project success. Their finding

shows that project management is one of the important factors which have strong influence on success of project in construction industries of Pakistan. Their findings also prove that PM leadership, PM staff and PM KPIs are the major factors which influence the project success. PM leadership has the main responsibility to handle the project and all its resources efficiently and effectively so that they project succeeds at the end. Their study is most beneficial for team leaders and project managers in construction organizations to adjust their focus on key components of project management that helps in the project success.

Finally from the above mentioned literatures it was tried to find out sixteen variables used to assess the factors that can affect the performance of construction projects.

Chapter Four

4. Research Methodology

4.1. Introduction

This chapter presents the elements of methodology that were applied in the study. The chapter covers research design, sampling procedure, data collection methods and instruments, and data analysis.

4.2. The Research Design

A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with in procedure. In fact, the research design is the conceptual structure within which research is conducted; it constitutes the blueprint for the collection, investigation and analysis of data (Kothari 2004).

According to Kothari (2004) a good design is often characterized by adjectives like flexible, appropriate, efficient, and economical. Generally, the design which minimizes bias and maximizes the reliability of the data collected and analyzed is considered a good design. The design which gives the smallest experimental error is supposed to be the best design in many investigations. Similarly, a design which yields maximal information and provides an opportunity for considering many different aspects of a problem is considered most appropriate and efficient design in respect of many research problems.

This study adopted explanatory key-informant interview and descriptive survey research designs. For the descriptive survey research design, the collected sample data were analyzed using descriptive statistics. In this stage the questionnaire was coded and analyzed using MS-excel computer program and used frequency, percentage, cross tabulation and figures to give a big picture of the data and to show summary of the analysis and to facilitate interpretation of the data. The results of explanatory key-informant interview were used to make informative, simple to understand and hence to triangulate the entire results.

4.3. Sampling Design

Project success means different things to different people. Each industry project team or individual has a definition of success. Project success is an abstract concept, and determining whether a project is a success or a failure is highly complex (Chan et al, 2002a). However, the concept of project success can be evaluated through performance measures that can be developed from research literature where various success criteria can be identified.

For this study the critical factors that determine the successful performance of construction projects will be identified from the projects undertaken by the Ethiopian construction works corporation. All building, road and water infrastructure projects are the population of the study. In the corporation there are 9, 12 and 9 building, water and road construction projects respectively in different parts of the country. Out of the total 30 projects 6 water, 4 building and 4 road constructions projects are selected by using stratified sampling. Out of employees of management team and engineering professionals of the project 6 respondents were selected by using purposive sampling technique from each sampled project. Totally 84 sample respondents were selected. *(The name of projects in each sector attached in annex 3)*

Purposive or judgmental sampling enables to use judgment to select cases that will best enable to answer the research questions and to meet the research objectives. (Saunders, et al, 2009). The researcher believed that taking the project management team and engineering professionals as a respondent would provide the necessary information regarding project management practice, success and failure story of the projects. In addition, the project management team and engineering professional are on the front line of the project, knowledgeable about the project activities, gave the researcher a chance to capture relevant data, easily evaluate the performance of the project against its plan and identify the problems and suggest possible solution to overcome the problem.

Once the samples were drawn, the questionnaires were distributed to the respondents in person and through email at their respective project offices and collected in similar fashion. Furthermore, the selected projects are currently fully operational and have a minimum of more than two years since commencement.

4.4. Process of data collection

The data for this study were obtained from primary and secondary sources. Primary data was collected through structured questionnaires prepared for this study and conducted (presented) for each sample of respondents. Secondary data were obtained from the documents of ECWC, Clients & consultant office, different related organization, other educational, financial institution libraries and internet.

4.5. Assessment Tools

Project success factors are the elements of a project that can be influenced to increase the likelihood of success; these are independent variable that makes success more likely. Project success criteria are the measures by which judge the successful outcome of a project; these are dependent variable which measure project success. Success factors are those inputs to the management system that lead directly or indirectly to the success of the project or business. (Sumesh Sudheer Babul, et.al. 2015)

The study approach involves both literature search and the use of structured questionnaire, which was considered to be the most appropriate tool to reach the population of the study with limited time and from a distance at a time. The questionnaire will be designed to assess the opinion of employees and leaders of the project related with identifying the factors for successful performance of projects. Interview questions also forwarded to clients, consultants and contractors at the head office level in Addis Ababa to triangulate the information or data obtained from the questioner.

The survey instruments include structured questionnaires that administered with the help of personal and email communication. A discussion will be made with leaders of contractors, consultants and clients who are directly related with the projects. Relevant documents of the project will be used. The questionnaires were prepared in English and conducted personally.

The questionnaires designed to collect information on whether there is Common understanding of Project Goals, Support of the head office Top management, Workable Project planning, Availability of project Resources /timely delivery or supply of logistics, Competency of Technical staff, Practice of project Monitoring and Evaluation, Communication, satisfaction of

internal staff, satisfaction of external customer, safety & health management, Feasibility study, Scope change, Project Managers competency, Experience of project manager and Integrity management.

In this research, the researcher chooses to use the semi-structured face-to-face interviews with clients, contractors and consultant representatives in the respective organization. The motive of the interview question is to make the finding of the research more concrete and to triangulate the issues raised by three parties of the projects. It also helps to assess the practice of integration management among three parties of the projects. In terms of consultant the interview questions focuses on identifying the basic reasons for projects scope change, design change, how they managed the cost and time overrun of projects, the relation among three parties at construction site, how the consultant evaluate the project management practice of contractor, what can the consultant suggest to contractors overcome the problem of time & cost overrun of projects.

It is also tried to assess the perception of clients by using the following interview questions - Existence of project management office at the head office and project level, the office equipped and facilitated with key and experienced personnel, the practice of Regular project monitoring & evaluation and feedback, the reason for cost & time overrun of projects, how they manage the performance of consultant, the practice of joint meeting at project site and head office level, the problem of delay in making contractor payment and the problem of compensation payment related to write off way.

The interview question forwarded to the contractor are to mention the problem associated with cost and time overrun of projects, the reason for frequent contract amendments, the practice of claim management for the time lost, the practice of project management, the management of problems related to consultants, the reason for why project managers leave the project, the practice of Project monitoring, evaluation, controlling and giving feedback to projects, and problems related to timely delivery of resource to the project.

4.6. Methods of Data Analysis

The data collected through questionnaires, interviews as well as secondary data collection methods were analyzed using qualitative methods. The data were mainly analyzed using descriptive method of analysis. The analysis involved comparisons of data obtained from the

data collected from primary sources with the data available from secondary sources such as reports of the project. Generalizations were also made based on the results of the study. The data collected will be coded, and analyzed through SPSS (statistical package for social sciences).

4.7. Validity and Reliability of the Study

For the sake of increasing both the reliability and validity of data, triangulation method was used. This is mainly because to cross check the responses obtained through different sources such as questioner and reports. Generally, to ensure the quality of research and make it credible; the researcher gave due care to both validity and reliability issues of the data. The questionnaires reliability was checked by the Cronbach's alpha test coefficient using SPSS software. As reliability measures gives greater confidence that the individual variables are consistent in their measurement. The researcher calculated Cronbach's alpha with a commonly used value 0.70 to measure the reliability of all variables addressed on the questioner. Out of fifteen variables 11 scores Cronbach's alpha 0.70 and more than 0.70 indicates that the instrument is reliable

Table 2: Reliability analysis for success factors under study.

S.No	Success factors	Cronbach 's alpha
1	Customer satisfaction	0.71
2	Safety and health	0.70
3	Initial cost estimate	0.83
4	Top management support	0.80
5	Project planning and scheduling	0.71
6	Favorable working condition	0.70
7	Communication	0.71
8	Client	0.77
9	Consultant	0.73
10	Project manager	0.83
11	Team	0.71

Thus, the score supports the presence of good internal consistency among the items and promise the reliability and acceptability of the study items. To ensure the validity, the researcher made use of different literature for both the questionnaire and the interview questions. The instruments were developed after the researcher studied the literature on the research area.

4.8. Ethical Consideration

The study was conducted by considering ethical responsibility, and also the study was ethically clear from department of Project Management, school of commerce of Addis Ababa University. Since the researcher used the data from project management team and engineering professionals' employees which was collected through questionnaire, permission was obtain from the employees. To maintain the confidentiality of the information provided by the respondents, the respondents were instructed not to write their names on the questionnaire and assure of that the responses was used only for academic purpose and kept confidential. Brief description of the central objectives or purpose of the study and the potential benefit of the research outcome to respondents are clearly given in the introductory part of the questionnaire so as to motivate them and participate in the study and provide pertinent information about the company under study. Finally, respondents are included in the study based on their free will.

Chapter Five

5. Data Presentation, Analysis and Interpretation

5.1. Introduction

This chapter deals with presentation, analysis and interpretation of data obtained through questionnaire, interview and document review. The results of the study are presented in the form of figures and tables by using Statistical Package for Social Science Version 16 (SPSS-16). The data was obtained from progress report of the projects, yearly financial reports of the corporation, National bank of Ethiopia, National Planning and Development Commission, client and consultant progress report of projects and from interview of clients, consultant and contractor representatives.

The questionnaires were distributed for 84 participants and 3 (3.9%) of the participants did not return the paper and 4(5.2%) participant response were incomplete and thus rejected. Similarly, clients' such as ERA, Ministry of Water, Irrigation and Energy and building construction clients representatives as well as the main consultants of Dam and irrigation related projects is Ethiopian construction design and supervision agency official is also interviewed. Finally, at ECWC head office road, dam and irrigation and building sector leaders are also interviewed to consolidate the findings.

5.2. Characteristics of Sample Respondents

Description of the characteristic of the target population gives some basic information about the sample population involved in the study. Thus, the following tables contains about the general and educational characteristics of respondents in the study area.

5.3. Demographic Profiles of Respondents

In this section the respondents' profile is presented. It includes gender, age, level of education, work experience and working positions.

Table 3: Demographic Characteristics’ of Respondents

GENDER	MALE	FEMALE			TOTAL
	66	11			77
AGE	20 - 29	30 - 39	40 - 49	> 50	
	29	36	9	3	77
LEVEL OF EDUCATION	DIPLOMA	DEGREE	MASTERS		
	3	61	13		77
WORK EXPERIENCE	1 - 5 YEARS	6 - 10 YEARS	11 - 15 YEARS	> 15 YEARS	
	21	28	15	13	77
WORKING POSITION	PROJECT MANAGER	PROJECT & SITE ENGINEER	OFFICE ENGINEER	MANAGEMENT TEAM	
	14	31	14	18	77

As shown in the above table out of the total 77 respondents, 66 (85.7%) were male and 11 (14.3%) were female. This implies that the number of male respondents were greater than females’ respondents who participated in the study. The basic cause of this is the participation or involvement of females as of engineering professionals and in the management team of projects is small as compared to males.

Regarding age of respondents out of the total 77 respondents, 29 (37.7%) are within 20-29 years of age category, whereas 36 (46.8%) are in the range of 30-39 years of age and the rest 12 (15.6%) are within of the age greater than 40 years category. Majority of the respondents 65 (84.4%) were in the range of 20 - 39 years of age can easily understand their respective projects failure and success.

With respect to educational level, respondents who have acquired degree are 61 (79.2%), at master’s level are 13 (16.9%), and Diploma holder are 3(3.99%). This shows that the majority of the respondents 96.1% have degree and master level of education. The academic qualification of the respondents indicating that the respondents are well qualified to understand and respond to

the factors and issues under study. In addition this indicates the corporation obtains qualified personnel. As a result, there shall be a good opportunity for the project to utilize the qualification of its staff to the realization of its objectives.

In terms of work experience of respondents 21(27.3%) have below 5 years of experience. However, the majority 56(72.3%) have a work experience more than 6 years. As a result, it can be inferred that the projects have experienced staff that easily mention the problems of project performance and suggest possible solutions to overcome the problems.

The current working positions of the respondents' shows that the project manager, project engineer and office engineer constitute equal number 14(18.2%) each. Out of total 77 respondents, this comprises the total of 42 (54.6%). The rest are site engineers and project management team /leaders/ which comprises 17 (22.1%) and 18 (23.4%) respectively. This shows that the sample respondents are from different occupational level can better understand the performance of projects.

Key-Informant Interview Discussions and Descriptive Analysis of Key Factors

Explanatory Key-Informant Interview Discussions

The explanatory research was done by exploring and discussing the response of open-ended questions with the person in charge of the construction projects in the study area. And hence put purely and explored in a detailed manner the responses obtained from the opinion of the individuals how he/she thought of the issues of interest in the following ways.

5.4. Descriptive Analysis and Discussions

The descriptive analysis was done by examining the responses of the sample respondents for the issues of interest obtained from the view point of project success factors. To highlight the major results of the survey, summary and brief descriptions on survey results/data are given in this analysis as well as put in annex part. Thus, the detailed analysis and discussions on the factors affecting project performance in the study area are presented below.

5.5. Data analysis Approach

In the research questioner it was tried to find out risk encountered in the projects, and scope change management. In addition to these, respondents are requested to indicate the degree of implementation (importance) and frequency of occurrence of success factors. The degree of implementation is categorized into five scales. Before the start of the analysis, weightings have been assigned to each of the categories. For degree of its occurrence the weightings assigned are 5 for strongly Agree, 4 for Agree, 3 for Neutral, 2 for Disagree, and 1 for strongly Disagree.

5.6. Scope Change Management

According to Harold Kerzner (2009) Very few projects are completed within the original scope of the project. Scope changes are inevitable and have the potential to destroy not only the morale on a project, but the entire project. Scope changes *must* be held to a minimum and those that are required *must* be approved by both the project manager and the customer/user.

Scope change is one of the major problems that affect the timely completion of project. The issues of scope change may be raised from three parties of the project, either from clients, consultant or contractors. In all projects under the study contracts were amended more than four times due to scope change. The following table shows how the problem of scope change is serious in water infrastructure projects and the contracts were amended up to four times. This made the final contract to exceed initial contract by 262% in Tendaho Dam and Irrigation project.

Table 4: Contract Amendments in different Projects

R.No	Project Name	Initial Contract	First Amendment	Second Amendment	Third Amendment	Fourth Amendment	Variation from Initial Contract
1	Tendaho Dam & Irrigation	840,254,274.70	1,726,172,145.26	2,272,435,130.37	2,760,033,815.68	3,042,070,072.21	262%
2	Megech Dam Construction	2,451,953,789.37	5,654,431,490.95	5,667,130,760.53	5,882,416,559.15		140%
3	Rib Dam & Irrigation	2,401,708,620.61	4,631,831,780.50	3,613,477,436.99	3,781,967,404.04		57%
4	Gidabo Dam Construction	599,848,305.00	874,072,825.00	1,063,858,326.00	992,198,408.00	1,075,313,282.00	79%
5	Kuraz River Diversion	461,657,833.12	723,745,763.07				57%
6	Kong Begondi R/ Project	592,720,176.00	1,544,757,865.00	1,309,639,361.00			121%
7	Dima Rad Road Project	684,508,886.00	725,620,303.00	616,777,258.00			-10%
8	Jinka Mendere Road project	1,214,208,380.00	1,373,268,271.00				13%
9	Dulecha Awash R/Project	693,519,819.00	717,244,619.75				3.43%
10	Mazoria Hadero	288,252,845.00	400,446,580.00				39%
11	Meles Leadership Academy	283,617,445.68	402,540,002.00				42%
12	Islamic	158,759,369.95	159,043,374.00				1%
13	Ict Building	191,678,183.00	219,862,340.00				15%
14	Ict Landscape	35,334,470.82	51,448,813.00				46%
15	Nigat	37,364,373.96	39,588,306.00				6%

In Gidabo project also the contract was amended up to four times the same too Tendaho. The final contract amount inflated the original one by 79%. Megech Dam project due to scope change the contract revised up to three times and the initial contract amount increased by 141% from the original one. In Rib Dam project the original contract amount increased by 57%. Scope change in water infrastructure project seems a culture and increases the project completion time and budget of the project. I have tried to find out the main problems of scope change from interview of client, consultant and contractor. The contractor mentioned problems are: -

- Most of the water infrastructure projects lack detailed feasibility study. This resulted in lack of detailed design. There for the contractor is forced to stop the work until the new or revised design is submitted by the consultant.
- In the initial contract document the work volume were small as compared to the actual work performed. Until the contract is amended the contractor experienced problems of delay Payment. Delay payment becomes the source of many problems for contractors. Such as delay in resource supply, poor cash flow, delay payment for machinery rentals and even salary delay for employees of the corporation and projects are some to mention.
- Political leader interference & lack of professional freedom of consultants is the main source of problem for scope change. This is more explained as Political leaders forced the consultants and contractors to undertake the project work without having full design. Consultants were not given enough time to undertake feasibility study and prepare initial contract document just as to begin the project work
- Lack of foreign currency hindered to get the specified material from the market forced the contractor to request the material specification change based on the material available in the market.

According to the interview made with the consultant's representative of Design Corporation (water related projects) the reasons for scope change are: -

- In our country all mega projects are undertaken by the initiation of government. The government urged the consultant to prepare design and contract document without having primary data for design preparation. Every dam and irrigation projects design demands survey data, geotechnical investigation, geophysics study, hydrology, soil test, metrology data and socio economical study of the project area. These all studies require enough time

to collect the necessary information from the project site. Therefore, the consultant prepares initial design and contract document just to start the project work. Both the contract and the design are subject to modification. In addition to this when the project execution is going on the government also changes the initial idea of the project. The best examples for this are the consultant representative mentioned are Wolenchiti and tendaho project.

- The experience of these two projects shows after a long time taken design preparation and when design is ready for implementation the corporation forced to change the design.
- Working without having detailed and deep planning and feasibility study leads to scope change.
- The reasons for design change are political interference. Consultant has lacks professional freedom and forced to prepare the initial design without having detailed design inputs. This factor makes the design to be modified during the execution of projects. There for the design was prepared by using superficial information of the project site.

The client of dam and Irrigation projects is the Ministry of Water, Irrigation and Energy agrees on the reason for scope change of projects mentioned by contractors and consultants. In the interview with client representative the guiding force that made political leaders to speed up projects work were to alleviate the countries poverty problem and to boost the national economy. However, most of the fast track projects of the country experienced cost and time overrun as well as still not functional as it was planned. To mention best example are sugar projects, and fertilizer factory.

The problem of scope change is also exhibited in road infrastructure and building projects. In road construction projects out of sampled projects the contract amendment made three times in kong Begundi and Dima Rad projects. As shown on the table the final contract amount of Kong project increased by 121%, from initial one. According the interview made with ERA representative the main reason for this amendment was Scope change occurred due to change of gravel road to DBST and to some extent the design problem. This also changed the length of the road from 35 to 64 KM. In contrary as shown on the above table the contract amendment of one

project that is Dima Rad exhibits contract size decreased from the original contract. This shows the design issues of road project better managed as compared to water infrastructure projects. In selected sample building projects, the scope changes increased initial contract amount from 1% up to 49%. The big change occurred in Meles leadership academy and ICT land scape project where the change is 42% and 49% respectively. The respondents mentioned the problems associated with scope change are: -

- Lack of detailed feasibility study from the very start.
- Supplementary or additional work that has not been included in the original contract.
- Lack of specified material on the market forced to change specification of the material basically finishing material.
- Missing of specification & bill of quantity during the preparation of contract document.
- Failure of proper planning.
- Failure of design.
- Client interest/ financial constraint of clients.
- Demand from the local administration or local community to construct intercity road which were not part of the main contract. This basically related to connecting additional town section at the end of the project (adoption of town section and additional road /Dulecha, Jinka, and Kong road projects). This is associated with late entertainment of customer requirements.
- Lack of enough materials along the road.

These all factors made the projects to delay in its performance and increases the cost of project.

5.7. Factors affecting performance of construction projects

To get opinion of project staffs and concerned bodies of projects about the factors for effective performance of construction projects sixteen factors are identified from different literature and were forwarded to respondents. The analysis of response of respondents presented as follows.

Table 5: Knowledge of overall Project goals (objectives)

S. N	Statements	Mean	SD
1	Overall Project goals and objectives are clear	4.17	0.750
2	Roles and responsibilities of stakeholders are clearly defined	3.79	0.978
3	Project goals were attainable with in the time frame	2.48	1.273
	Grand mean and standard deviation	3.48	1.00

Source: Own Survey, 2020

As presented in the table 5 the mean and standard deviation scores of the respondents for most items under knowledge of project goal ranges from (2.48 and 1.273) up to (4.17 and 0.750). From which, for the first two variables the mean scores are more than the grand mean of 3.48, showing agreement by more participants. The mean score for the variable Project goals were attainable with in the time frame is 2.48 shows disagreement of the respondents. This implies the time estimate during goal setting were unrealistic.

The response of the majority shows that the project goals are not attainable with in the time frame. Most of sampled projects have not been accomplished according to their initial plan can be a true witness for this agenda. According to the data collected from contractors' office in each sampled project contract schedules were revised in different times and time extensions were allowed. There for the initial time allotted to attain the project goals was not enough to accomplish the projects.

Table 6: Time Extension of Projects

S. No	Project Name	Project Type	Contract Period in Calendar Days				Total	Time Elapsed (%)
			Initial Contract	First Amend	Second Amend	Third Amend		
1	Tendaho	Dam & Irrigation	730			3000	3730	410
2	Gidabo	>>	730	1825			2555	250
3	Rib	>>	1460	1643			3103	112
4	Megech	>>	1460	803	693		2956	102
5	Kuraz Dam & Irrigatn	>>						
6	Kong Begundi	Road	1095	876			1971	80
7	Dima Rad	>>	985.5	584			1569.5	59
8	Jinka Mender	>>	730	437			1459	100
9	Mazoria Hadero	>>	438	547.5			985.5	125
10	Dulecha Awash	>>	949				on progress	
11	Meles	Building	343	797			1140	232
12	Islamic	>>	540	719			1259	133
13	ICT Village/IT Park/ land scape	Land Scape	120	1088			2004	1570
14	ICT building	>>	540	1176			1716	218
15	Nigat	>>	460	1017			1477	221

Source: Own Survey, 2020

In all sample projects there is schedule variation. The variation in water infrastructure projects ranges from the maximum of 410% Tendaho and minimum of 102% in megech. In road projects the range is between 125% of mazoria and minimum of 59.3% in Dima. The building projects shows maximum of 1570 % in ICT land scape project and minimum of 133% in Islamic building project. In ICT land scape project, the initial work schedule estimate is 120 calendar days. But it increased to 2004 days, 1570% increment. In the interview with the building contractor representative the reason mentioned are design, poor client follow up, interest of client to change the design, delay payment to contractor, initial estimate of time schedule was not realistic to the actual work and absence of contract management office in client side made the consultant negligent not to give attention to the project work and not timely solve the project issues related to consultant.

Table 7: Schedule performance of projects since 2009E.C

SN	PROJECT NAME	progress of 2009	progress of 2010	progress of 2011	PROGRESS1 difference b/n 2010 &2009	PROGRESS1 difference b/n 2010 &2011
1	NIGAT	12.9	68.39	77.19	56.09	8.8
2	MELES	3	26.49	61.99	23.49	35.5
3	ISLAMIC	11.9	30.28	66.48	18.38	36.2
4	ICT BUILDING	3.72	18.26	24.42	14.54	6.16
5	ICTLANDSCAPE	58.81				
6	GIDABO	82.3	94.09	100	11.79	5.91
7	RIB	99.8	99.84	100	0.04	0.16
8	MEGECH	19.7	34.84	44.22	15.14	9.38
9	KONG	49.6	59.4	63.55	9.8	4.15
10	DIMA	23.5	37.75	49.01	14.25	11.26
11	MAZORIYA	36.1	38.58	24	2.48	14.58
12	DULECHA	3.99	14.98	25.18	10.99	10.2
13	JINKA	9	17.74	23.67	8.74	5.93

Source: Own Survey, 2020

I tried to analyze yearly progress performance of Projects by comparing three-year progress data from yearly performance report of the corporation. In the above table as shown the good thing is there is improvement from year to year. However, the problem that I observe is except three projects Islamic, Meles and Mazoria the variation or difference of progress between years or

from 2010 to 2011 shows not progressive. This indicates the problem that mentioned in scope change and others contribute a lot to the interrupted performance.

Table 8: Customer (end users of the project) satisfaction

S. No	Statements	Mean	SD
1	Customers were clearly defined	3.71	0.944
2	Customer were adequately involved throughout the project	3.17	1.197
3	Customers are satisfied in the performance of the project	2.73	1.242
4	The customer requirement clearly communicated before the project began	2.43	1.141
	Grand mean and standard deviation	3.01	1.131

Source: Own Survey, 2020

To assess customer satisfaction four variables are included in the study. As presented on the table the grand mean and standard deviation is 3.01 and 1.131 respectively. Most of respondents show agreement in defining of customer. The response for Involvement of customers throughout the project shows relatively agreement but needs improvement. However, satisfaction of customers on the performance of the projects and communication of customer requirement before the project began response shows disagreement. This is because the mean and standard deviation of both variables are below the grand mean of 3.01. According to the interview with the clients of ERA and Ministry of Water, Irrigation and Energy representatives, they blamed contractors for not jointly working with customers of the project. This problem becomes source of cost for contractors in Megech dam and Kong road projects. Involvement of customers enables contractor to have access to the local materials, having access of local indigenous knowledge or learning, protect the project from any security related issues are some of the benefits the project can obtain from the customers.

Table 9: Safety and health management

S. N	Statements	Mean	SD
1	The project risks related to Safety and health are clearly identified in the project plan	2.71	1.099
2	The identified project risk of Safety and health is clearly communicated among all the project teams	2.60	1.115
3	Risk mitigation plan is prepared and communicated among project staff	2.56	1.070
4	All the safety materials /personal protective equipment's/ are fully available for the concerned project staff	2.04	0.616
5	All safety policy, directives and other working procedures or manuals are in place	1.83	0.497
6	Safety engineering department and experts are available on the project	1.78	0.805
	Grand mean and standard deviation	2.25	0.867

Source: Own Survey, 2020

Health and safety processes play a vital role in minimizing the number of risks on a construction site and, as such they should be implemented from the start. Having proper health and safety measures in place and making sure the workforce is aware of these measures enables: -

- Risks associated with the working condition can be reduced significantly.
- If it is not properly managed business could lose a significant amount of man hours and productivity, which can affect the profitability of the company.
- Significantly reduces the chances of risk occurrence and having effect on the business productivity.
- At the same time keeping the working team happy and healthy.
- It also improves the productivity and quality of the product.

Therefore, Proper management of workers Safety and health plays important role for successful performance of projects.

To assess the practice of proper safety and health management at projects six variables are included in the questioner. The grand mean and standard deviations are 2.25 & 0.867 respectively. Out of six variables, three variables (the project risks related to safety and health are clearly identified in the project plan, the identified project risk of safety and health is clearly communicated among all the project teams, and risk mitigation plan is prepared and

communicated among project staffs) scores mean and standard deviation greater than the grand mean. This shows relatively good practice. However, the mean score of the rest three variables are below the grand mean. This indicates there is poor performance in making personal protective equipment's, poor or lack of legal documents, and not assigning of safety engineers at project site. Since the corporation the largest public construction companies need to have the legal documents of health and safety. According to the interview of the contractor representative currently the corporation by appreciating the problem has issued the policy document and directives of environmental, organizational health and safety of employees. It was in the process to implement integrated management system.

According to Helen (2005). the law In relation to OHS exists to identify the responsibility of the parties involved in industrial or commercial activities. It imposes responsibilities on employers to protect the health and safety of their employees when they are at work and protects the right of people to participate in the paid workforce without suffering injury or ill health as a result. As such, the law should be of primary importance in providing a 'level playing field' and ensuring that employers do not profit from failing to provide adequate protection for their employees. OHS law also ensures that, if people do suffer a work-related injury or illness, there are mechanisms by which they may obtain compensation and undergo rehabilitation to enable them to resume participation in the workforce and the community at large.

It was tried to collect information in the questioner of risk occurred in the sampled projects. Except from the building construction projects, in the two sectors the risk occurred were basically associated with explosion of oxygen cylinder, traffic accident (Gidabo) , flood hazard occurred during the project execution of the project that damaged 21 km main canal, blustering (Megech), collusion of heavy tracks & damage of light vehicles by falling of big rock from high level (Megech), failure of water tank, sliding of stone/rock and high ponding of water (Megech), stone fall on quarry site(Mazonia), high speed wind having much amount of dust and including heavy rain (Dulecha), because of not using of safety measures (protective equipment) during heavy crusher maintenance loss of life (Dulecha), slide of excavated soil and thunderstorm(Kong), land slide, high flood and heavy rainfall.(Jinka).

Table 10: Technical task (competency)

S. No	Statements	Mean	SD
1	The required technology is available in the project/corporation	2.38	0.960
2	The project manager has sufficient experience, technical knowledge and skill	3.81	0.904
3	The other project personnel's have enough knowledge to operate with the existing technology	3.49	0.898
	Grand mean and standard deviation	3.23	0.921

Source: Own Survey, 2020

To assess the practice of technical competency three variables are included in the study. n technical competency. Grand mean and standard deviation are 3.23 and 0.921. The mean for availability of the required technology in the project (corporation) is 2.38, which is below the grand mean shows poor in possessing the required technology that is necessary for effective performance of projects. Whereas the of the other two variables are greater than the grand mean shows better performance.

The majority response shows the corporation lacks the required technology in road, building and water infrastructure projects. To fill this gap the corporation basically uses rental mechanism to solve the shortage of construction machinery and equipment. The management of rental machinery and equipment by itself a headache and is one of the sources of rental customers dissatisfaction and hindering the better performance of projects.

Initial cost estimate

Initial cost estimate is one of the factors for proper execution and profitability of construction projects. This requires detail understanding and information of projects site or area in terms of availability of local materials, labor, distance from the main city to transport different factory materials, etc. To assess this, two variables are included in the study are the initial project estimate (cost & schedule) complete & realistic before performance began, and during project execution the actual cost & time schedule are compatible with the initial estimate.

Table 11: Initial cost estimate

S. No	Statements	Mean	SD
1	the initial project estimate (cost & schedule) complete & realistic before performance began	2.03	0.827
2	During project execution the actual cost & time schedule are compatible with the initial estimate	1.96	0.768
	Grand mean and standard deviation	2.00	0.798

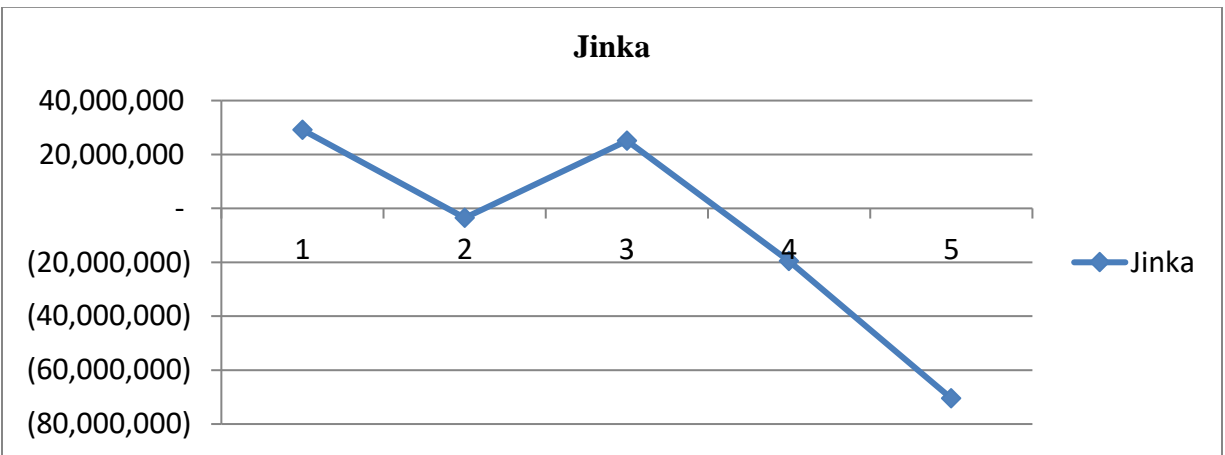
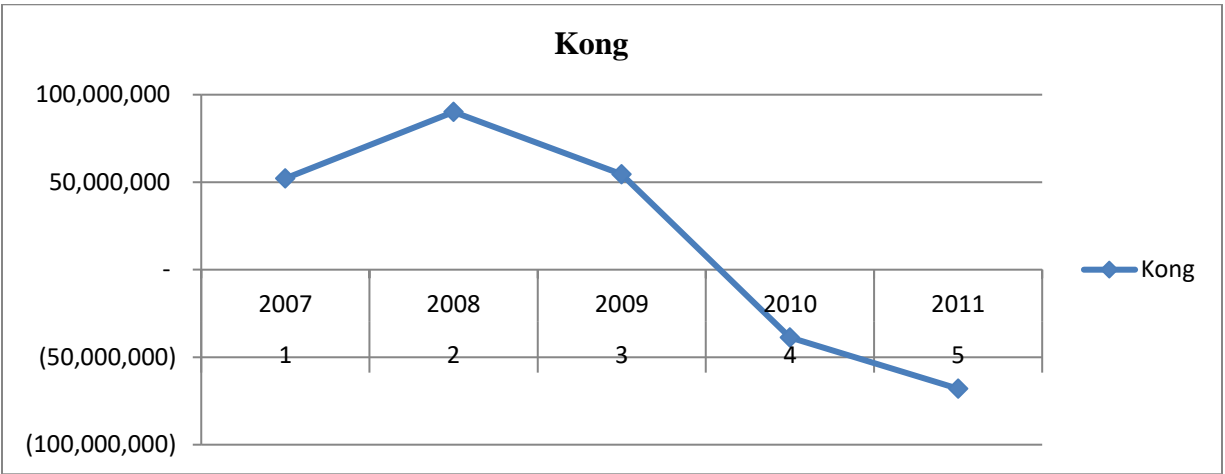
Source: Own Survey, 2020

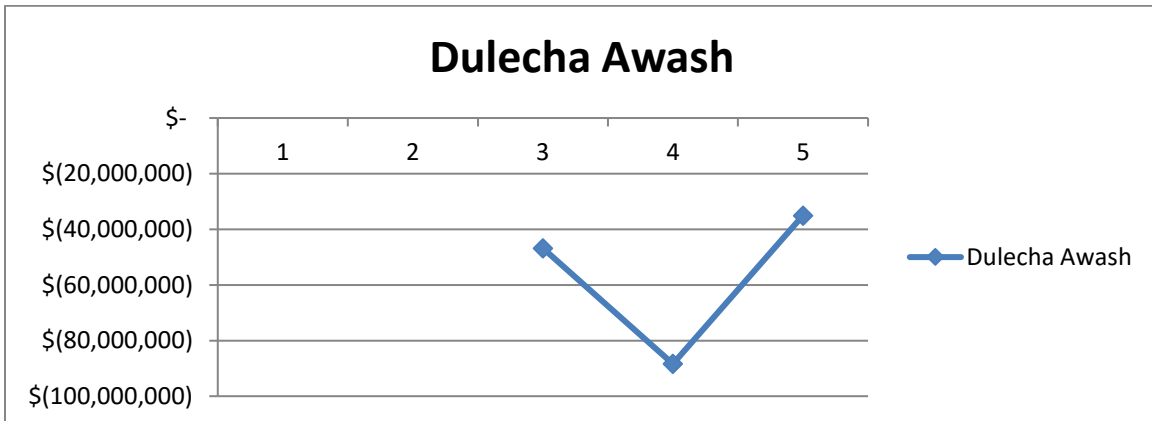
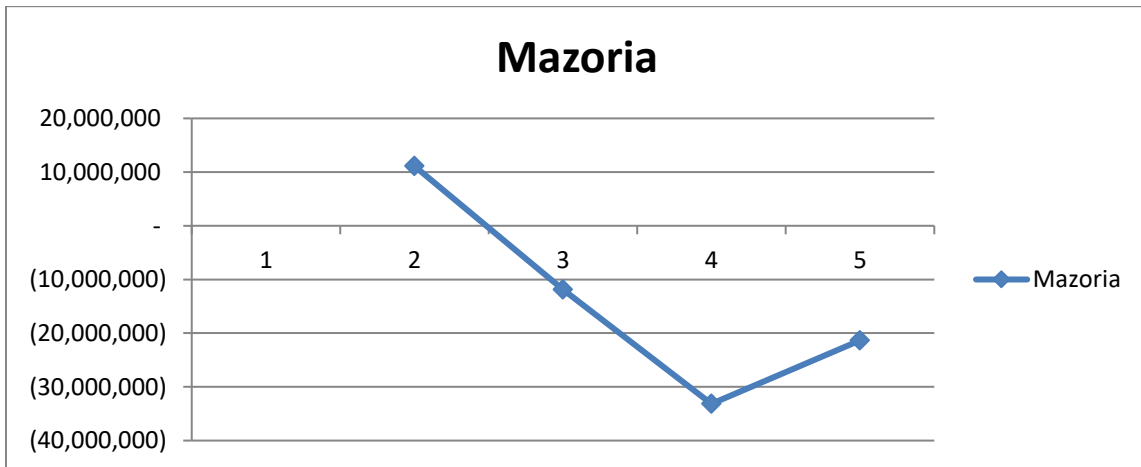
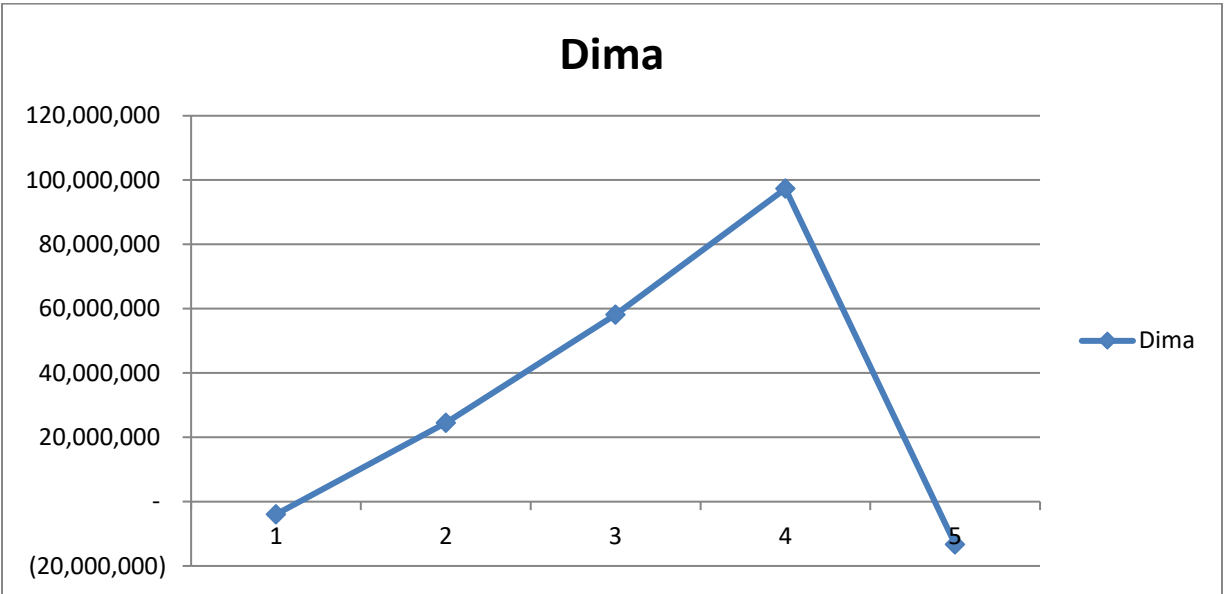
The grand mean and standard deviation for initial cost estimates are 2.00 and 0.798. The mean of the two variables are below the grand mean. This implies disagreement and shows there is a problem of initial cost and schedule estimate. According to road sector contractor most of road projects are the victims of this problem. The financial report of consecutive years that shows profit and loss statement of the corporation reveals that the road projects are in loss.

s.no	Budget year	Project Name					
		Kong	Jinka	Dima	Mazoria	Dulecha Awash	
1	2007	52,092,048.44	29,127,082.83	(3,971,096.09)			
2	2008	90,125,000.00	(3,575,364.98)	24,466,182.00	11,108,305.31		
3	2009	54,606,743.00	25,087,145.68	58,098,196.00	(11,894,935.38)	(46,865,418.54)	
4	2010	(38,637,920.48)	(19,587,832.30)	97,323,498.07	(33,155,056.80)	(88,382,650.94)	
5	2011	(68,017,379.55)	(70,470,035.07)	(13,277,308.78)	(21,366,711.44)	(35,023,509.40)	
		MELES	ISLAMIC	ICT land scape	NIGAT	ICT Village/ park/	
2	2008		(616,127.67)		(359,196.49)		
3	2009	457,182.36	(2,140,476.12)	(968,007.17)	(544,621.16)		
4	2010	7,942,181.27	(87,410.47)	10,082,163.62	1,249,211.58		
5	2011	17,809,486.00	4,775,965.77	(1,074,231.54)	(468,862.35)		
		Tendaho Dam	Megech Dam	Rib Dam	Gidabo Dam		Kuraz Dam
	1997	(13,417,018.72)					
	1998	(23,164,486.49)					
	1999	(49,902,207.68)		(2,738,751.46)			
	2000	(56,781,132.61)	(2,520,747.98)	(6,754,426.59)			
	2001	(209,748,889.03)	(1,154,834.19)	(4,085,691.32)			
	2002	175,209,979.71	(58,099.40)	(12,808,530.15)	6,957,760.88		
	2003	102,684,232.37	(121,620.04)	(7,397,161.49)	12,367,839.80	12,660,199.10	
	2004	(32,012,784.38)	(1,294,157.81)	(48,917,524.13)	(20,625,451.38)	20,015,100.60	73,721,591.54
	2005	206,052,956.69	(12,268,430.79)	(226,791,051.59)	319,767.64	66,515,330.51	16,455,634.15
	2006	458,256,046.41	(53,953,828.99)	85,704,902.34	(29,394,208.15)	72,087,479.37	74,163,005.91
	2007	1,081,091,515.70	193,122,578.91	924,232,316.62	(17,334,306.36)	28,667,277.54	21,187,114.22
	2008	44,343,031.45	117,549,411.05	153,599,902.24	(47,819,059.88)	27,934,837.02	(62,606,289.80)
	2009	404,787.59	111,642,173.76	34,204,252.98	190,698,254.08	44,030,336.49	311,848,844.32
	2010		110,130,937.55	(27,755,472.65)	(228,256,499.32)	(62,470,000.01)	(189,882,050.38)

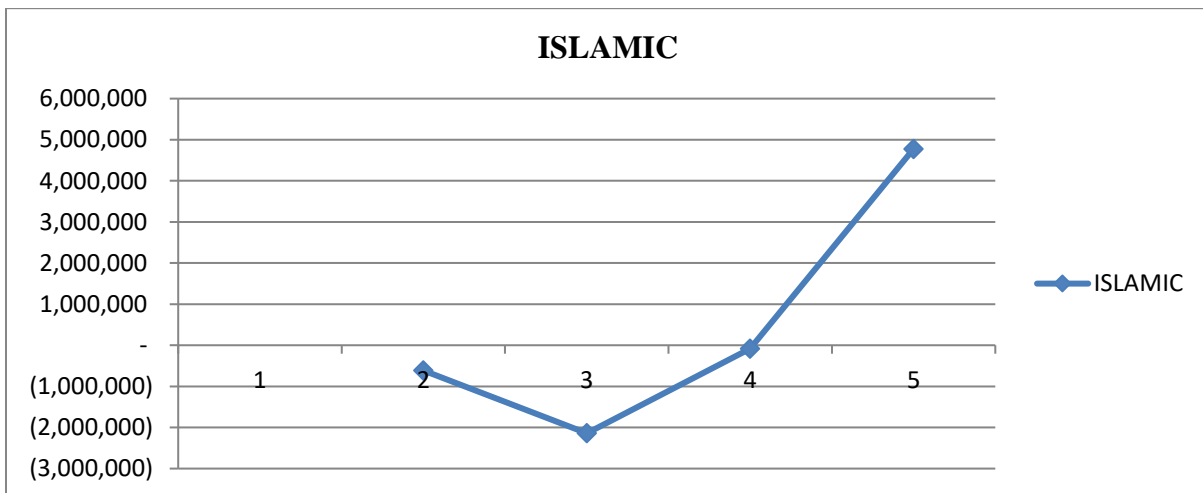
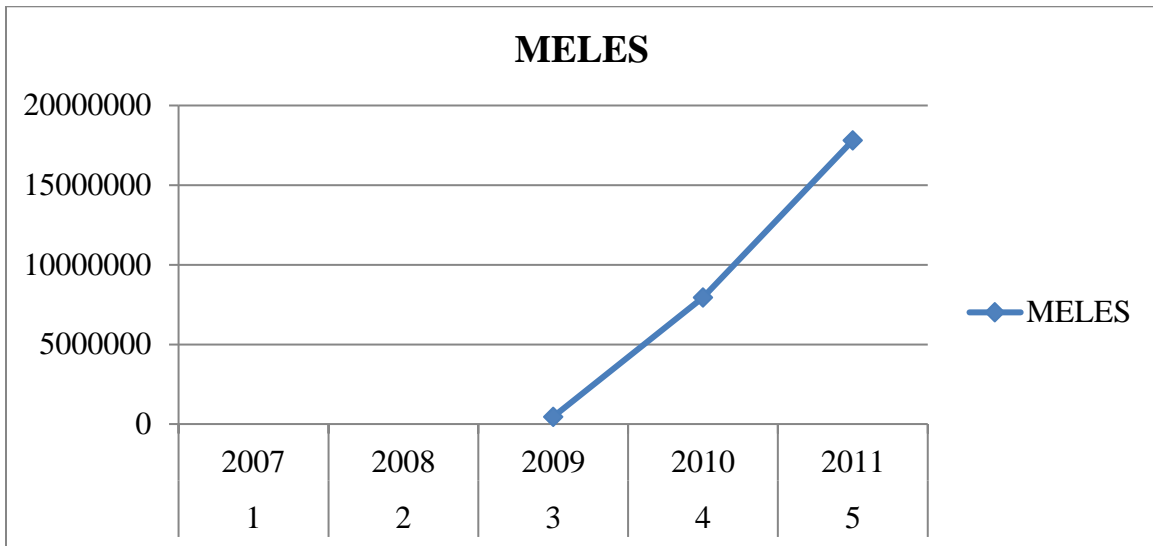
Source: Own Survey, 2020

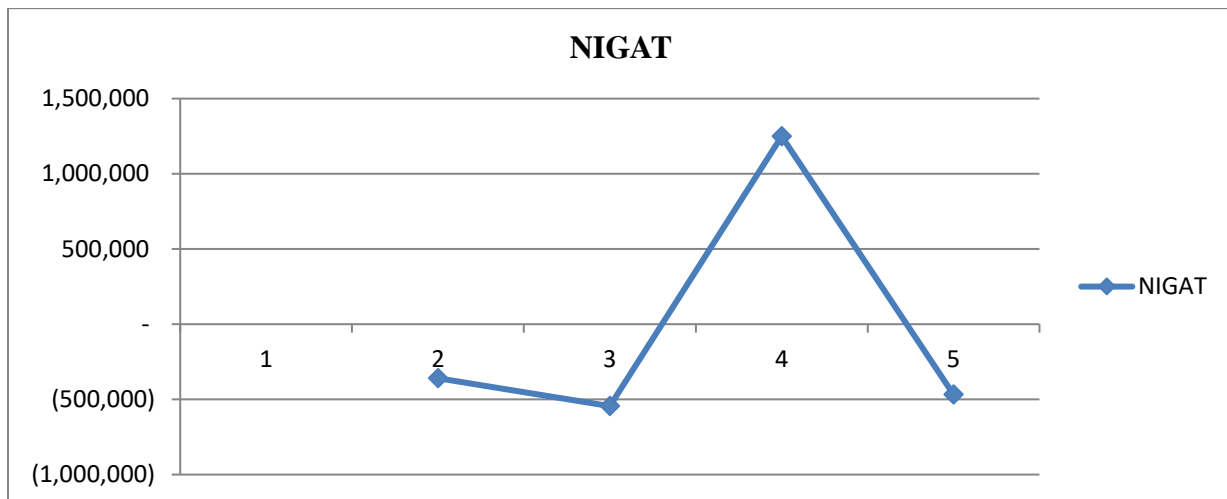
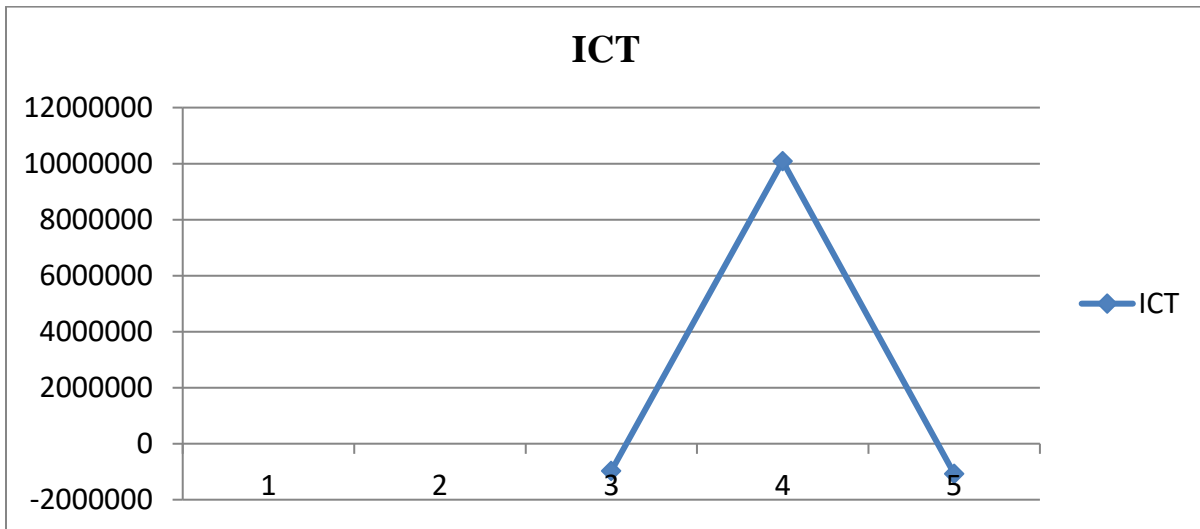
5.8. Profit and loss trend in road projects.



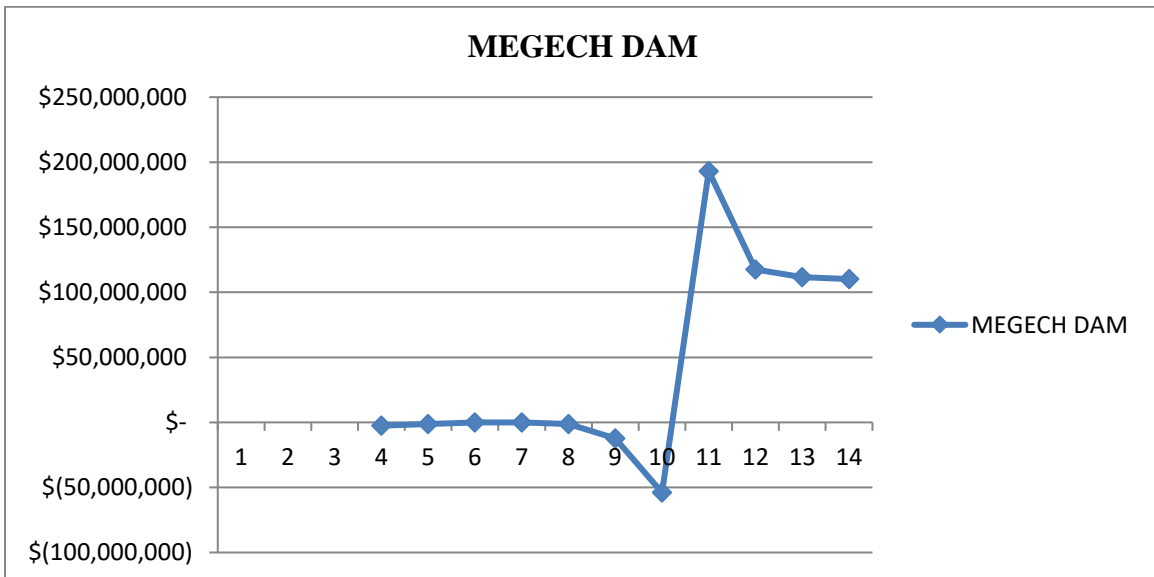
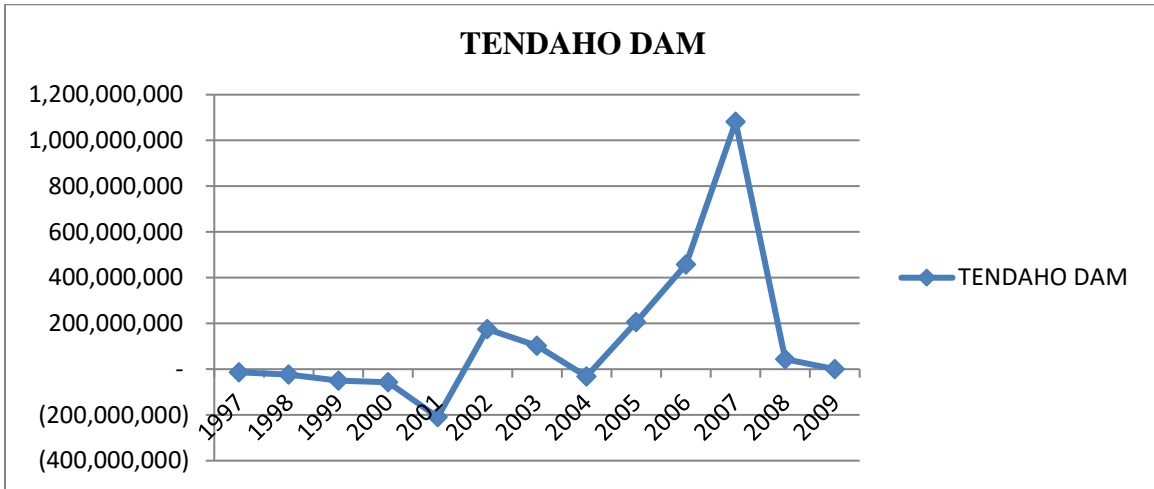


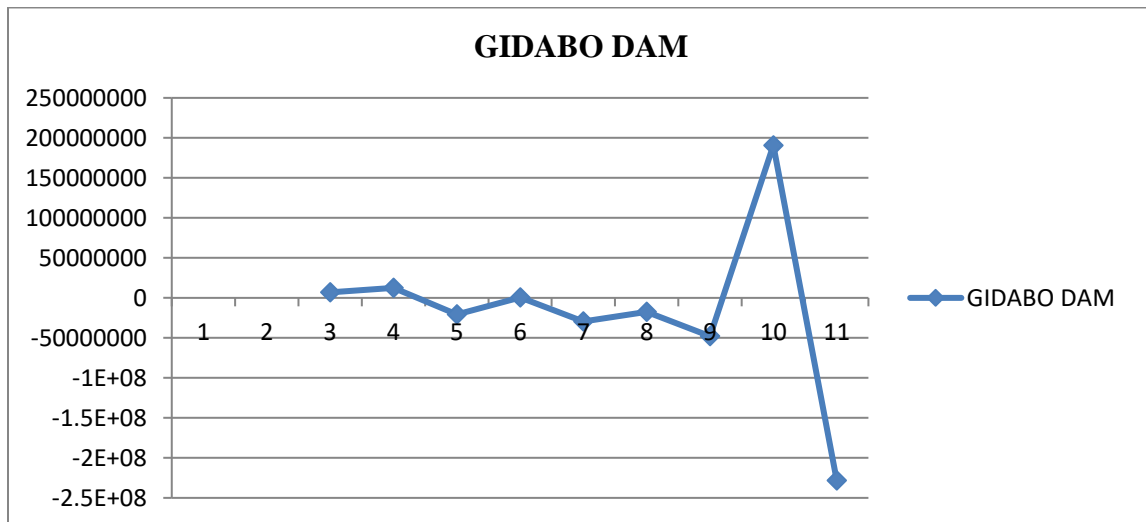
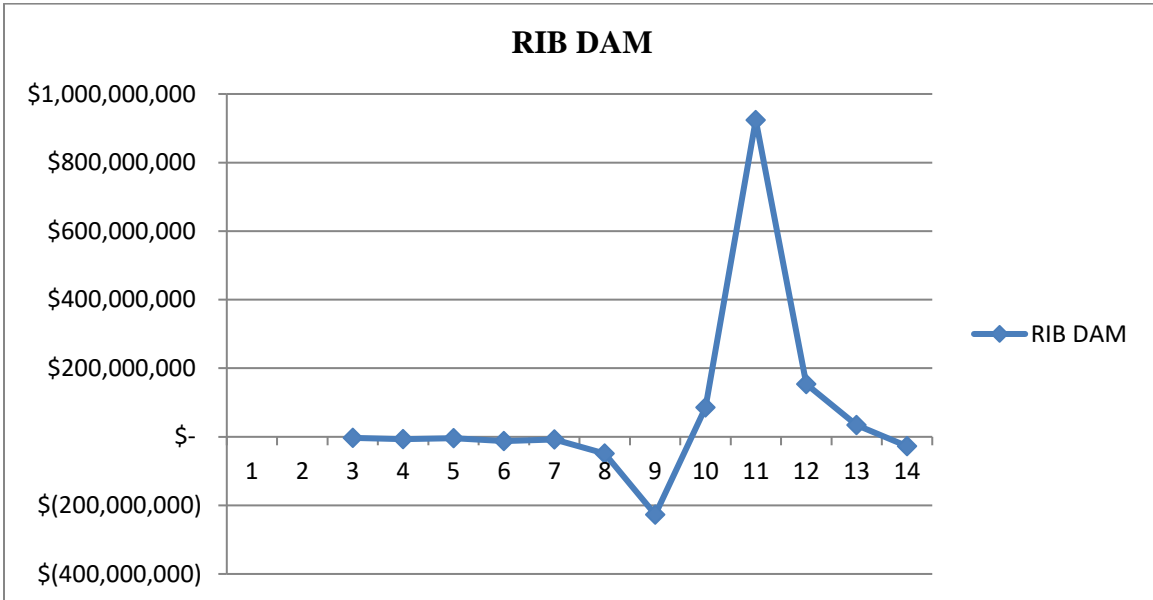
5.9. Profit and loss trend in Building projects.

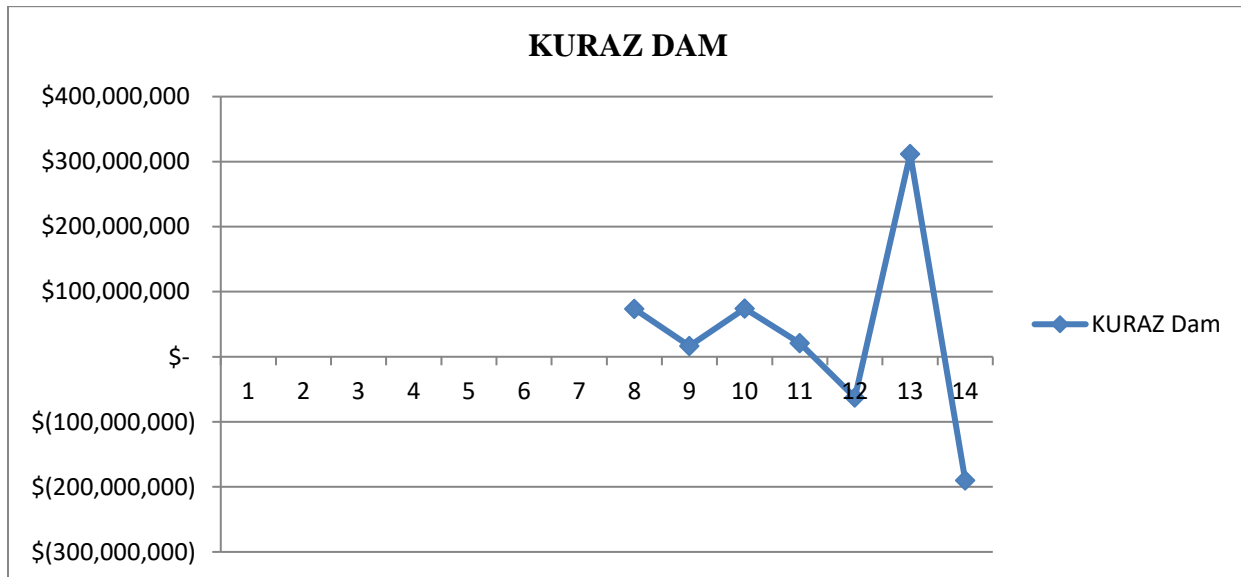
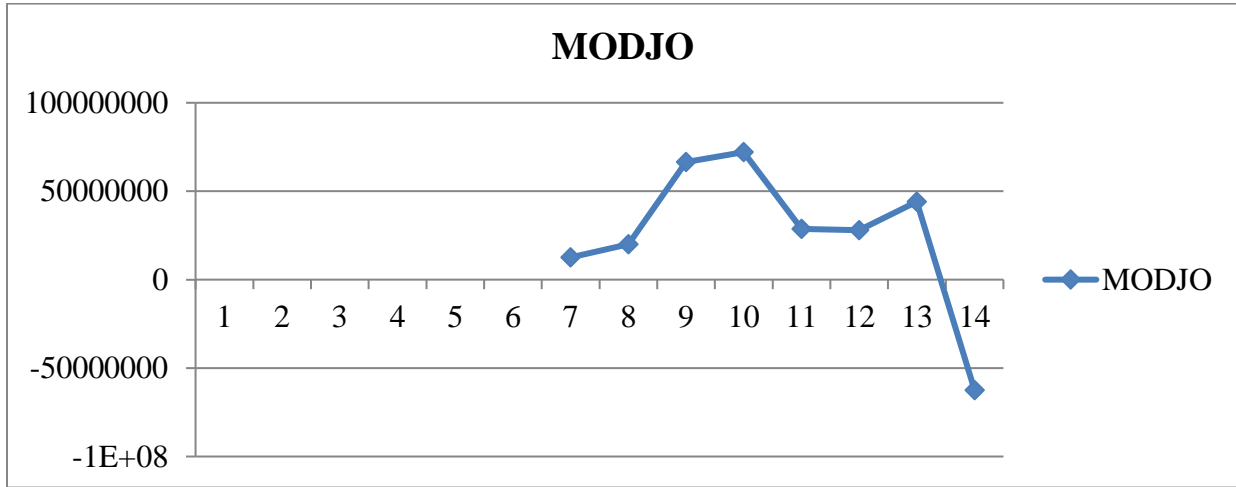




5.10. Profit and loss trend in water projects.







The data of water projects in the above table shows profit and loss for maximum and minimum of 13 & 7 years respectively. All the three-sector data of PL shows since commencement of projects. In most of water projects large amount of profit occurred as a result of contract amendment; which enables the contractor to get back payment in that particular year boosts the amount of profit.

Table 13: Top management support

S. No	Statements	Mean	SD
1	top management supports the project with commitment and encouragement	3.19	1.181
2	The top management assigned strong, clearly identified the project leadership	3.34	1.165
3	Strong Project Monitoring and feedback given by top management	2.65	1.010
4	Top management's enthusiastic support to the project manager (PM) and project team at site	2.90	1.131
5	Delegating authority to project manager by top management	3.25	1.137
	Grand mean and standard deviation	3.07	1.125

Source: Own Survey, 2020

To assess the support of top management to projects five variables are be part of the study. The grand mean is 3.07. Out of five variables two variables score the mean value less than the grand mean. This implies poor Project Monitoring and feedback giving practice & poor enthusiastic support to the project manager (PM) and project team at site. However, the mean score of the rest three variables are greater than the grand mean shows better top management support. According to the interview especially with the road and water sector top management representative assures that monitoring and evaluation of project is not satisfactory and not regularly done. To undertake continuous and periodic project monitoring, the issues which were raised by projects in the past monitoring time have to be solved before the next monitoring. But solving of project problems' (issues) was poor at the head office. This did not encourage to regularly monitoring projects. The practice of giving feedback regularly is also poor. This is not encouraging to monitor projects without solving the problems of projects. The supporting problems of the head office basically were poor supplies of resource, and finance. The resources are mainly factory materials, construction equipment's, and machineries.

Table 14: Project planning and scheduling

S. No	Statements	Mean	SD
1	The project plan consists of clear work item with budget	3.48	1.008
2	The plan included methods and frequency of communication among stakeholders and other personnel	2.90	1.046
3	The project plan incorporates monitoring and evaluation activity	2.84	1.113
4	The project has realistic time schedules that is achievable	2.23	0.902
	Grand mean and standard deviation	2.86	1.017

Source: Own Survey, 2020

Planning and scheduling practice of the construction projects were part of the study. The assessment shows the grand mean is 2.86. The response for the practice of project plan consists of clear work item with budget shows positive response. Two variables response (*The plan included methods and frequency of communication among stakeholders and other personnel, & the project plan incorporates monitoring and evaluation activity*) implies slightly good but demands further improvement. Negative response revealed for the variable *projects has realistic time schedules that are achievable*. The mean score for this variable is 2.23 below the grand mean of 2.86.

5.11. Resources management

Project resource management is the processes of planning the resources necessary to meet the objectives of the projects, and to satisfy the clients' requirement. Without proper resource management, projects can fail behind schedule, or can become unprofitable. The objective here is to ensure the adequate and timely supply of resources and at the same time maximizing the utilization of resources between projects. With regard to these four variables are included to assess resource management practice of the corporation/projects.

The analysis shows the grand mean of 2.35 which shows poor performance of resource management.

Out of four variables the mean score for the variable *availability of skilled personnel* is 3.38 which are greater than the grand mean of 2.35. The mean score of the two variables (all the required resources are available on time & the procurement process is efficient to deliver the

material or service on time) are 1.84 and 1.78 below the grand mean shows very poor resource management with these respects. The response for having sufficient resource planning to adequately obtain resource for the job shows the mean score 2.38 which is slightly greater than the grand mean score of 2.35. I have tried to find out the reasons for poor resource management by interviewing the procurement and supply main department executive officer. The reasons mentioned were lack of foreign currency, delay of payment for suppliers which demotivated them to participate for the next bid, poor cash flow, lack of specified items on the market, unclear specification, and lack of integration among procurement committee are some to mention.

Table 15: Resources management

S. No	Statements	Mean	SD
1	All the required resources are available on time	1.84	0.488
2	There is availability of skilled personnel	3.38	0.932
3	The project deploys sufficient resource planning to obtain adequately skilled resource for the job	2.38	0.932
4	The procurement process is efficient to deliver the material or service on time	1.78	0.448
	Grand mean and standard deviation	2.35	0.7

Source: Own Survey, 2020

5.12. Favorable working condition

For the sake of this study four factors assessed are favorable climatic condition at the site, favorable social environment, favorable political and economic environment and favorable camping accommodation for employees. All road and water infrastructure projects are located far away from the head office. Employees of these two types of projects live in a camp. It is obvious that favorable camping accommodation increases the motivation of employees to work hard in the project. This will increase the success of projects. As shown on the above table the grand mean is 3.13. The mean score of two variables (climatic condition at the site & camping accommodation) are slightly above the grand mean. However the mean score for favorable social, political and economic environment (3.00 & 3.12) are below the grand mean.

Table 16: Favorable working condition

S. No	Statements	Mean	SD
1	Favorable climatic condition at the site	3.16	1.268
2	Favorable social environment	3.00	1.246
3	Favorable political and economic environment	3.12	1.135
4	Favorable camping accommodation for employees	3.2	1.1
	Grand mean and standard deviation	3.13	1.187

Source: Own Survey, 2020

5.13. Project Monitoring, evaluation and feedback

Monitoring is the day-to-day management task of collecting and reviewing information that reveals how an operation is proceeding and what aspects of it, if any, need correcting. It is a continuing function that uses the systematic collection of data on specified indicators to inform management and the main stakeholders of an ongoing projects operation of the extent of progress and achievement of results in the use of allocated resources and budgets. Evaluation is the systematic and objective assessment of an on-going or completed projects operation, its design, implementation and results. The aim is to determine the relevance and fulfillment of objectives, as well as efficiency, effectiveness, Impact (overall Goal) and sustainability. An evaluation should provide information that is credible and useful, enabling the incorporation of lessons into management decision-making.

Three variables are included to assess the practice of monitoring and evaluation. As shown on the table below the grand mean is 2.72. Out of three variables the mean score of two variables (regular and careful progress monitoring and review throughout the project & gives periodic feedback) are 2.40 and 2.12 below the grand mean shows poor monitoring and evaluation practice. But the reporting of project performance mean score is 3.64 above the grand mean implies better reporting practice.

Table 17: Monitoring, evaluation and feedback

S. No	Statements	Mean	SD
1	There is a regular and careful progress (time, scope, and cost) monitoring and review throughout the project	2.40	0.936
2	There is a necessary report on the project performance relative to established objectives (e.g., budgets, cost, and quality)	3.64	0.958
3	Corporation gives periodic feedback on project performance & takes corrective action.	2.12	0.917
Grand mean and standard deviation		2.72	0.937

Source: Own Survey, 2020

5.14. Communication management of projects

Project Communication Management Are the processes that are required to ensure timely and appropriate planning, collection, creation, distribution, storage, retrieval, management, control, monitoring, and the ultimate disposition of project information. Importance of Communications Management are the project manager should effectively and efficiently communicate with stakeholders, managing communications is very vital for any project and a failure in communication can have a negative impact on the project. Project managers spend most of their time (about 90%) communicating with team members and other project stakeholders internal or external to the organization.

To assess management of communication three variables are included in the questioner. The grand mean is 3.10. The mean score of existence of communication plan and communication effectiveness (3.27 & 3.14) are greater than the grand mean. However, clear and easy line of communication channel mean score is below the grand mean.

Table 18: Communication Management

S. No	Statements	Mean	SD
1	The communication plan is in place in the project/corporation	3.27	1.059
2	There is effective communication between project stakeholders, team, and personnel	3.14	1.035
3	There is a clear and easy channel of communication	2.90	1.033
	Grand mean and standard deviation	3.1	1.042

Source: Own Survey, 2020

5.15. Client Support

A client is anyone who has construction work carried out for them. A close relationship between client and contractor is important for any construction project success. A good working relationship should be based on trust and understanding between all parties and if managed correctly beneficial to both parties. Client relationship not managed appropriately it can have a detrimental effect on the relationship and costing both time and money.

The main clients of ECWC are ERA for road construction, Ministry of Water, Irrigation and Energy for Dam and Irrigation projects and different Building projects clients.

Client's project monitoring, evaluation and giving feedback to contractor initiate contractor to be more focused on the project work. As shown on the table below the grand mean is 2.92.

Table 19: Client support

S. No	Statements	Mean	SD
1	There is periodic project Monitoring, evaluation and feedback by client	3.21	1.068
2	There is Understanding of operational difficulties by the client engineer & taking appropriate decisions	2.91	1.114
3	Clients solved any compensation issues of the project	2.55	1.176
4	Client interference in the project work is supportive	2.99	1.282
	Grand mean and standard deviation	2.92	1.16

Source: Own Survey, 2020

Out of four factors in the client support, periodic project Monitoring, evaluation and feedback, & interference in the project work (3.21 & 2.99) shows agreement whereas the mean score for the factor solving of any compensation issues of the project below the grand mean shows the common problems of

clients in all projects under study. Compensation issue is the basic problem of all of the road, water and building construction projects. This affects the successful performance projects and source of cost overrun for contractors. All party of construction should act according to the contract. The interference of client without contractual agreement has a negative effect for the successful performance of projects. According to the interview with clients of water infrastructure projects (Ministry of Water, Irrigation and Energy) assigned representative at each project site. In road and building projects client representatives are consultants. This helps clients to have periodic project monitoring and evaluation.

5.16. Consultant relationship

Feasibility studies are preliminary studies undertaken in the very early stage of project. The purpose is to establish whether the project is viable, identify feasible option, etc. The assessment carried by consultant companies and the client decide whether or not to proceed to the next stage. Five consultants' related factors are included in the study. The grand mean is 2.36, which is below the average 2.5. All the factors such as feasibility study that is realistic to the project situation, Submit complete design & specification, Solve any design & other consultant related problems on time, estimate of contract schedule & work volume is realistic, Consultant staff is fully authorized to solve problems on the project site shows poor performance that affects project success.

In the interview with the consultant of water project, the time given to undertake detailed feasibility study was not enough and we were forced to prepare a feasibility study that was not fully describe the project. This is the source of design problem also. However, in the road and building projects the problem is minimal. The reason mentioned for this problem were initially projects were initiated as a fast track projects by political leaders (water projects) and in building projects the problem is basically clients and consultants own problem.

Making decision on time and solving of problems such as design, approval of material and, payment and other consultant concerned issues at project site affects the prompt delivery of the project.

Table 20: Consultant

S. No	Consultant	Mean	SD
1	The project has detailed feasibility study that is realistic to the project situation	2.35	1.109
2	Consultant Submit complete design & specification	2.55	1.130
3	Consultant Solve any design & other consultant related problems on time	2.31	0.921
4	Consultant estimate of contract schedule & work volume is realistic	2.40	0.877
5	Consultant staff is fully authorized to solve problems on the project site	2.2	1.1
	Grand mean and standard deviation	2.36	1.027

Source: Own Survey, 2020

5.17. Project manager

The traits of project manager are: - PM has to be enthusiastic and optimistic about all his projects, He had excellent relationships with all his client and project staff, He knew how to work with people and showed his appreciation for good work on his project, He knew what was expected from him and was dynamic in moving forward with the next series of tasks. The following personal attributes demonstrate the profile of a good project manager: Self-confident, Problem solver, Good listener, Able to gain the respect of the team, an effective communicator, Capable of reacting dynamically and making decisions quickly, considered a professional, a team player and Knowledgeable about project management. (Jason Charvat, 2002)

To assess the competency of project manager seven variables are included in this study. The grand mean is 3.9. All the variables except delegation of authority and making financial decisions have the mean score greater than the grand mean. This shows the corporation has project managers with good competency.

Table 21: Project manager

S. No	Project manager	Mean	SD
1	PM has strong Coordinating ability and mutual relationship with his team members, client, consultants and sub-contractor	3.97	0.668
2	Project manager's has authority to take financial decision, selecting key team members, etc.	3.70	1.001
3	PM is Effective in monitoring and giving feedback	3.97	0.688
4	PM Coordinating ability and mutual relationship of with top management is strong	4.03	0.725
5	Project manager's has good technical capability	3.92	0.957
6	PM delegate authority to various members of his team	3.71	0.958
7	Developing and maintaining a short and informal line of communication among project team	4.01	0.698
		3.9	0.814

Source: Own Survey, 2020

In my questioner I have tried to get information regarding the reasons why project manager leaves a project. It is recommendable managing projects by one competent project manager from initiation up to closing of project. Rather when one project manager leaves a project, the replacement of the new project manager is costly for contractors. In terms of this the rotation or leaving of project manager is common in road construction project. For example, in Jinka Mender project it reaches 5 in number. This by itself is a factor to delay the performance of projects.

5.18. Team management

What sets project teams apart is that a group of people, who may never have worked together before, have to come together quickly and effectively in order to achieve a task which nobody has done before. The novelty, uniqueness, risk, and transience are all inherent features of projects. Because the team is novel, it has no perceived identity, and no set of values or norms to work to. It takes time to develop the identity and norms, which delays achievement of the team's objective. (Turner, 2009). The assessments of team management in the projects were studied by incorporating six factors related to team management. The grand mean is 2.73. out of six variables four variables (regularly give feedback to each other, effective meetings which are well facilitated, Turnover of key personnel is low, & overtime payment and other benefit package is attractive)

scores mean value less than the grand mean. The mean values of culture of team work and understanding of strength and weakness of the teams have mean value greater than the grand mean shows relatively better performance.

Table 22: Team

S. No	Team	Mean	SD
1	There is a culture of team work in the project/corporation	3.00	1.192
2	team members understand the strength and weakness of the teams	3.25	1.028
3	team members regularly give feedback to each other	2.52	1.083
4	team members have effective meetings which are well facilitated	2.65	1.144
5	Turnover of key personnel is low in the project / organization	2.73	1.131
6	The practice of overtime payment and other benefit package is attractive	2.22	0.955
		2.73	1.089

Source: Own Survey, 2020

Regarding turnover of key personnel, the response shows how the problem is chronic. According to the report of human resource department the turnover data for the last 3 and half years indicates the problem. As shown on the table below the total average employee turnover rate of the corporation from 2009 to 2012(1/2years) is 8.35%.

Table 23: turnover data of Employees

No	Termination reasons	Budget Years				Total number
		2009	2010	2011	2012(1/2 year)	
1	Retirement	156	108	146	122	532
2	Own resignation	131	183	255	188	757
3	Dou to death	22	30	15	11	78
	Total number	309	321	416	321	1367

Source: Own Survey, 2020

Most of employees leaving the corporation are the professionals, sub-professionals and equipment operators. These employees are highly skilled, seniors, more experienced, key and core staffs of the company. They are not easily gain in the market.

Chapter Six

6. Summary Conclusion and Recommendation

This section forwards the conclusions of the research based on the major findings stated in the previous chapter data analysis and discussion. Brief conclusions are summarized to the findings and finally helpful recommendation for the research problems will also be forwarded.

6.1. Conclusions and Recommendation.

- The major finding of the analysis part of this research shows that the trend or tendency of using construction project management in the project/ corporation is poor. Most of the response indicates the application of project management science is lagging behind in the organization. To be competent in this dynamic market the implementation of project management for this company is not negotiable.
- Knowledge of Project goals /objective response shows positive for variables of overall goals are clear and stakeholders' roles and responsibilities clearly defined. However, the problem observed is the time allotted to achieve the given goal was not enough. This indicates goal setting in terms of allocating time and schedule has a problem. This should be solved by applying realistic estimation of time. The project time estimation initially done by consultant. As a contractor the time estimate of consultant should be verified by using past experience and applying the new construction methodology that will help to shorten the length of project duration. To have a good time estimate, the corporation has to secure the final design of the project and the design has to be reviewed before commencement of project execution.
- In terms of customer the variables included in the study are identification, involvement and satisfaction. With regard to Identification and definition of customer the response is positive. Involvement of customers throughout the project is slightly good but needs more improvement to get more customer ownership of the project. Customer requirement communication before the project began and Customer satisfaction in the performance of project needs further work to improve. This is because of the fact that almost all projects are lagging behind from its schedule in one hand and late

entertainment of customer requirement (common problem in Road project) is a source of cost for the corporation. Late customer requirements are initially the problem of consultant and client which emanated from failure in the design preparation from the very start. In accommodating late customer requirement, the corporation should request the current or up to date market price rather than the contract price already working on.

- The response of safety and health issue management shows poor performance. In all of the variables included in the study the response shows negative which denies the existence of the service. The corporation should work in Identification of Risks related to safety and health, should communicate the identified risk with its employees, need to have a mitigation plan, make available safety materials /PPE/ for all concerned staffs, and should have its own safety related legal document such as safety policy, directives and manuals as a working procedure. In addition, strengthening of existing un functional health and safety working section is required. Appointment of safety engineer in all construction project will help the company to take preventive actions there by saving the extra costs incurred in the time of hazard management. These will help protect the loss of life or damage of productive persons of the project which occurs in the execution of projects, thereby decreases the wastage of time of the project and hence increases the successful performance.
- With regard to technical competency assessment the availability of the required technology response shows negative, while the response for the sufficiency of experience, technical knowledge and skill of project manager and the other project personnel's knowledge to operate existing technology shows positive. There for corporation hast to work to possess the required technology related to construction works such as machinery and equipment, implementation of ERP (Enterprise Resource Management), IBM / Information Modeling Technology /, project management System, etc. to improve existing back ward processes.
- This study shows the initial project estimate (cost & schedule) is poor. The estimate and the actual cost & time spent are not compatible. This problem is common in the road projects where the corporation own the project by competing with other companies in the bidding processes of ERA. There for it is recommendable to have detail preliminary study

and project site information before estimating the project cost and schedule. This problem currently made the corporation to pay a cost and leads the project in to loss.

- Top management support includes the head office management. The assessment is done to check the support of top management in terms of showing commitment and encouraging the project teams, assignment of strong project leadership, project monitoring and giving feedback, enthusiastic support to the project manager (PM) and project team at site, and delegation of authority to the project managers and down ward to project management team. The response shows positive support with regard to commitment and encouragement, assignment of strong project leadership and delegation of authority to the project managers. However, the support of top management in relation to project monitoring and giving feedback and giving enthusiastic support to the project manager (PM) and project team at site needs further improvement.
- The problem related to planning identified are methods and frequency of communication with stakeholder and other personnel, and monitoring and evaluation strategy of projects are not considered part of planning. It is better to incorporate communication with stakeholder and monitoring and evaluation activity part of planning enables the project to provide to date information and to get the required support from stakeholders and to take corrective actions when deviation against plan occurs.
- To assess resource management practice of projects five variables are included in the study are timely delivery of resource, availability of skilled personnel, resource planning, and efficiency of procurement process. The response for almost all variables shows poor resource management except availability of skilled personnel. It is serious problems of the corporation. All types of project included in the sample complain and blame the resource delivery system of the corporation. Therefor corporation should work hard to establish efficient and integrated resource management system, delegating more procurement related authority to projects. The main problems mentioned for poor resource management are lack of hard currency, and cash flow. To solve the problem of foreign currency it is advisable to introduce the role of corporation and the consequence of the problem to concerned government bodies. The problem resulted in making idle labor and leading the company to more loss. Since the company is public enterprise the

government should give due attention to solve the scarcity of hard currency. On the other hand, it is better to get the material from local market or from local supplier, because local suppliers can have better access to import materials than Government Company. The other remedy to solve the problem is to make long term credit supply agreement with genuine suppliers. This requires strong credit management. These enable corporation to ensure adequate and timely supply of resources at the same time maximizing the utilization of resources between projects.

- In the study the assessment of the practice of regular monitoring and review of projects, reporting of the project performance against budget, cost and quality, and Giving feedback and taking corrective action was done. The result shows that positive response for reporting of the project performance, however for the other two, regular monitoring and review of projects and giving feedback and taking corrective action performance is poor. Corporation has to work to improve its project monitoring and evaluation activities (practices) of project.
- The assessment of communication management is done by incorporating variables of the existence of communication plan in the project / corporation, effectiveness of communication among project stakeholder, teams and personnel, and existence of clear and easy channel of communication. The positive response showed in the above two variables except existence of clear and easy channel of communication. This is basically associated with water and road infrastructure projects. These projects are located in remote areas of the country and far away from the capital city of Addis Ababa and communication channel is a problem for them. Corporation has to solve this problem closely working with Ethio telecom to make the projects accessible to different types of communication channels.
- The study shows there is a problem associated with the consultant. The response for all variables included in the study such as delivering of detailed feasibility study that is realistic to the project situation, Submitting of complete design & specification, timely solving of problems such as design, payment and other consultant concerned issues at project site, consultant estimate of contract schedule and work volume is realistic, and Consultant staff is fully authorized to solve problems on the project site are not

satisfactory or shows poor performance. The reason for poor performance is in one hand the consultant its own problem on the other hand the push factor imposed from political leaders.

- Consultants are recommended to facilitate and hasten orders delivered to contractors, issue site instruction on time to obtain better time performance, timely approval of payment and material according to the condition of contract. What I observed is the contractor lacks capacity to present the claim related to consultant failure. This is because of the problem of contractor more outweighs than the problem of consultant. To solve such types of problems the clients need to have a project office which is equipped with knowledgeable of contract management personnel. This staff helps to solve problems of contractor and consultant at project site.

To mitigate the problems of political leaders / urgency of the project in design preparation/ it is advisable for Consultant Company to solve the data collection by using drone technology. This technology enables the consultant to have survey data of the project site with in short period of time. The Ethiopian design corporation had experience of drone technology when the corporation undertakes design works of two projects in Nigeria. According to the interview with design corporation representative, in these two projects the Algerian company undertaken surveying works by using drone technology. The drone technology not only makes survey data collection easy but also solves the problems of jungle site clearance. To make the site accessible for survey work the jungle must be cleared by using labor works. The labor work is risky and time consuming because most of irrigation and dam projects are found in lowland parts of the country and are not accessible.

The contractor should work based on the contract document and have to exercise the claim management for the failure of consultants. The corporation should establish joint monthly meeting at the head office with the concerned clients and consultants of the respective projects, since most of the head office of consultant and clients are found in Addis Ababa.

- The variables used to assess the project manager project management practice are project manager ability and relationship with project stakeholders, Project manager's has

authority to take financial decision, selecting key team members, Project manager ability of project monitoring and giving feedback, Project manager relationship with top management, Project managers technical capacity, Delegation of authority down wards to project management team, informal line of communication among project team. The response of respondents for all variables shows positive response. But it has to be supported in updating the project managers' capacity by using different types of training.

- The practice of team management is assessed in terms of variables which includes existence of team work culture in the corporation or projects, team members understand the strength and weakness of their team, team members giving feedback to each other, the effectiveness of meeting trend of project team, turnover of key personnel, and the practice of attractiveness of overtime payment and other benefit package.

The response shows slightly positive response for existence of team work culture and team members understand the strength and weakness of their team. However, the response for other variables shows disagreement. This indicates poor team management in the project /corporation/. This associated with lack of or poor project management in the corporation in one hand and the poor performance management system of the corporation; where employees are not evaluated against their performed output. No systems established to manage the performance of employees. This requires due attention of the corporation management to place the project management with its full package.

- The corporation has tough challenges from local private and foreign contractors. The corporation has many resources of machinery and man power. As a huge public construction company, it is unable to dominate and lead the construction market of the country. Now a day the Chinese contractors dominate the countries construction market in building, water and transport infrastructure construction. This is a very chronic threat to the corporation unless it changes its methodology and equipped with the necessary technology it is difficult to exist in the market. In the dynamic construction industry no one wants inefficiency. The company has to be competitive. Therefore, what I recommend is realistic implementation of project management and performance management system in the corporation has to be the top agenda of the corporation strategic management.

6.2. Recommendations

- To exist in this dynamic construction market and to compete with the local and foreign contractors the corporation has to implement the project management in its all construction sectors.
- The main problem observed in this study shows that in the corporation lack of proper project management leads to poor implementation of the integration management and poor alignment of different function.
- The main problem of projects or corporation is the lack or poor practice of project management. Even the existing backward and more mechanical management system lacks integration and alignment. No one is responsible for poor performance of projects and there is no accountability system established in place. Construction project performance relies on different dimensions of project management. Among those, integration management is the most important since it starts with the integration of processes and people within a construction project or corporation.
- The corporation has to differentiate its source of problems (internal and external). Most of the problems contributed for unsuccessful performance of projects are internal to the company such as lack of or poor project management, goals with unrealistic time estimate, poor safety and health management (the existing systems more focused on hazard management), poor initial cost estimate, poor project monitoring, evaluation and giving feedback, poor project planning in terms of estimating time and cost, poor resource management system, and poor team management. The external problems perceived in the study are problems associated with consultants and clients. The problem of client is delay payment, write off way problem, and entertainment of late customer requirement in the project site (which should be done in the initial stage of the project). The problem of consultant should be solved by really applying the contract document and regular periodic progressive three-party joint meeting at project site with the project team and at higher official levels at the head office level.

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Annex 1. Questioner

**ADDIS ABABA UNIVERSITY
SCHOOL OF COMMERCE
MASTERS OF PROJECT MANAGEMENT**

Questioner prepared for respondents for the assessment of factors for successful performance of construction projects. The case of Ethiopian Construction Works Corporation / ECWC/.

Dear Respected Respondents,

My name is Tilahun Deneke and I am carrying out a project work **to assess the factors for successful performance of construction projects** in the case of Ethiopian Construction Works Corporation /ECWC/. The information you provide is used for research purpose only, and will be kept confidential at all levels. Considering your experience in project works, your participation in this survey will significantly contribute to the accuracy and usefulness of the research outcome. I appreciate taking your time to complete the survey. I kindly request you to remember that the quality of this work is completely dependent up on your frank opinions. Please consider each statement carefully before you give it an evaluation. If you have any query, please do not hesitate to contact me. I am available at your convenience through Tel. +251960369366

Instruction: -

No need to mention your name (anonymous)

Part I: Demographic data/ Respondent Profile/

Please put tick mark (√) on your choice(s).

1. Please indicate your gender: Male Female
2. Age of respondents (year): 20-29 30-39 40-49 50 and above
3. Level of education: Certificate Diploma BA/BSC MA/MSc
4. Job title.....
5. Work Experience: Less than 5 6-10 years 11-15 years Over 15 years
6. Your area of experience A) more of building B) more of water infrastructure C) road infrastructure D) design works E) others (please specify) -----
7. Would you specify the project currently you worked on -----?

8. Occupational level

A) project manager	G) other project personnel
B) human resource manager	H) leader staff at the sector/corporation
C) project engineer	I) engineering staff at the sector/corporation
D) site engineer	J) supportive staff at the sector/corporation
E) supportive staff	K) others (please specify
F) office engineer	

10. Organization

- Ethiopian Construction works corporation/contractor/
- Consultant
- Client
- Other

General information

1. Are there any success criteria that established among three parties/contractor, client, and consultant in the project? A) Yes B) No

2. For the above question if your answer is yes would you mention success criteria of the project

-

3. How many project managers are involved in this project from the time of commencement? ----

4. Is there any project managers who leave this project? A) Yes B) No

5. For the above question if your answer is yes would you mention the reason why project manager leave the project-----

6. Is there any hazard that occurred in the execution of the project? A) Yes B) No

7. For the above question if your answer is yes would you mention the fatalities by loss of life and property damage in kind and monetary terms /the time period is up to the end of Ethiopian fiscal year 2011 E.C/-----

8. Is there any scope change occurred in the execution of the project?

A) Yes B) No

9. For the above question if your answer is yes would you specify the scope change occurred?

10. Why the scope change occurred?

11. Is there any plan for scope change management?

A) Yes B) No

12. How can you manage the scope change?-----

13. What is the effect of scope change to three parties? Contractor, consultant & clients

Part II

The purpose of the following survey is to get opinion of project staffs and concerned bodies of project about the factors for successful performance of construction projects. The survey is completely anonymous. Please think of your project experience in relation to successful and failed projects give answers for the following questions. Project success means the project achieves all its objectives; failure means the project did not achieve its entire objective.

1. Please briefly tell us what in your understanding makes project successful

2. Please briefly describe a project which was a success in your organization

Part III: General Success Factors of Project Management

1. Do you know the goal of your project /organization/ you are currently working?

- A) Yes B) No

2. For the above question if your answer is yes please specify the goal of the project. -----

3. How do you know the goal of the project?

- a) From project charter
- b) From contract document
- c) From joint meeting of contractor, consultant and client
- d) From media
- e) From other sources ----- (please specify the source)

Part IV

Based on literature review a list of critical success factors (CSFs) that could impact on the successful performance of construction projects are summarized as follows. Please you are expected to indicate your opinion on the degree of relevance /importance of each of the CSFs on the scale 1 up to 5.

To what extend do you think the following factors are critical to successful Project completion. (5= Strongly Agree, 4= Agree, 3= Neutral, 2= Disagree, 1=Strongly Disagree)

1) Over all Project goals/objectives

S. No	Project goals/objectives	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	Overall Project goals and objectives are					
2	Roles and responsibilities of stakeholders are clearly defined					
3	Project goals were attainable with in the time frame					

2) Customer /end users of the project / satisfaction

S. No	Customer satisfaction	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
4	Customers were clearly defined					
5	Customer were adequately involved throughout the project					
6	Customers are satisfied in the performance of the project					
7	The customer requirement clearly communicated before the project began					

3) Safety and health

S. No	Safety and health	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
8	The project risks related to Safety and health are clearly identified in the project plan					
9	The identified project risk of Safety and health is clearly communicated among all the project teams					
10	Risk mitigation plan is prepared and communicated among project staff					
11	All the safety materials /personal protective equipment's/ are fully available for the concerned project staff					
12	All safety policy, directives and other working procedures or manuals are in place					
13	Safety engineering department and experts are available on the project					

4) Technical task\competency

S. No	Technical task/competency	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
14	The required technology is available in the project/corporation					
15	The project manager has sufficient experience, technical knowledge and skill					
16	The other project personnel's have enough knowledge to operate with the existing technology					

5) Initial cost estimate

S. No	Initial cost estimate	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
17	the initial project estimate (cost & schedule) complete & realistic before performance began					
18	During project execution the actual cost & time schedule are compatible with the initial estimate					

6) Top management support

S. No	Top management	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
19	top management supports the project with commitment and encouragement					
20	The top management assigned strong, clearly identified the project leadership					
21	Strong Project Monitoring and feedback given by top management					
22	Top management's enthusiastic support to the project manager (PM) and project team at site					
23	Delegating authority to project manager by top management					

7) Project planning and scheduling

S. No	Project planning and scheduling	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
24	The project plan consists of clear work item with budget					
25	The plan included methods and frequency of communication among stakeholders and other personnel					
26	The project plan incorporates monitoring and evaluation activity					
27	The project has realistic time schedules that is achievable					

8) Resources

S. No	Resources	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
28	All the required resources are available on time					
29	There is availability of skilled personnel					
30	The project deploys sufficient resource planning to obtain adequately skilled resource for the job					
31	The procurement process is efficient to deliver the material or service on time					

9) Favorable working condition

S. No	Favorable working condition	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
32	Favorable climatic condition at the site					
33	Favorable social environment					
34	Favorable political and economic environment					
35	Favorable camping accommodation for employees					

10) Monitoring, evaluation and feedback

S. No	Monitoring, evaluation and feedback	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
36	There is a regular and careful progress (time, scope, and cost) monitoring and review throughout the project					
37	There is a necessary report on the project performance relative to established objectives (e.g., budgets, cost, and quality)					
38	Corporation gives periodic feedback on project performance & takes corrective action.					

11) Communication

S. No	Communication	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
39	The communication plan is in place in the project/corporation					
40	There is effective communication between project stakeholders, team, and personnel					
41	There is a clear and easy channel of communication					

12) Client Support

S. No	Client	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
42	There is periodic project Monitoring, evaluation and feedback by client					
43	Clients solved any compensation issues of the project					
44	Client support the project by assigning representative at the project site					
45	Client interference in the project work is supportive					

13) Consultant

S. No	Consultant	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
46	The project has detailed feasibility study that is realistic to the project situation					
47	Consultant Submit complete design & specification					
48	Consultant Solve any design & other consultant related problems on time					
49	Consultant estimate of contract schedule & work volume is realistic					
50	Consultant staff is fully authorized to solve problems on the project site					

14) Project manager competency

S. No	Project manager	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
51	PM has strong Coordinating ability and mutual relationship with his team members, client, consultants and sub-contractor					
52	Project manager's has authority to take financial decision, selecting key team members, etc.					
53	PM is Effective in monitoring and giving feedback					
54	PM Coordinating ability and mutual relationship of with top management is strong					
55	Project manager's has good technical capability					
56	PM delegate authority to various members of his team					
57	Developing and maintaining a short and informal line of communication among project team					

15) Team Management

S. No	Team	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
58	There is a culture of team work in the project/corporation					
59	team members understand the strength and weakness of the teams					
60	team members regularly give feedback to each other					
61	team members have effective meetings which are well facilitated					
62	Turnover of key personnel is low in the project / organization					
63	The practice of overtime payment and other benefit package is attractive					

- **Would you please mention any other success factors that are considered to be crucial for the performance of your project that are not included in this questioner-----**

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THANK YOU

Annex 2. Names of Projects in Each Sector.

S. no	Water infrastructure Construction Projects	
1	Rib Dam construction	
2	Megech Dam Construction	
3	Wolkait Dam and Irrigation	
4	Gidabo Dam and Irrigation	
5	Tendaho Dam Project	
6	Kessem Dam Project	
7	Kuraz Dam Project	
8	Bole Bulbula water Supply	
9	Semera university water supply	
10	Kuraz Canal construction	
11	Modjo dry Port	
12	Ardjo dedesa Canal	

S.No	Road Construction Projects	
1	Kong Begundi	
2	Dima Rad	
3	Jinka Mender	
4	Mazoria Hadero	
5	Kuraz Access	
6	Adama Awash Arba	
7	Dulecha Awash	
8	Kuraz Canal	
9	Awash Bridge	

S.No	Building Construction Projects	
1	Nigat Kirkos Building	
2	Islamic Building	
3	ICT Building	
4	Meles Zenawi Leadership Academy	
5	Bolosa Building	
6	Prime Minister Office construction	
7	ICT landscape	
8	Micililand Building Project	
9	Kotebe University Building	

Annex 3. Interview Questions

ADDIS ABABA UNIVERSITY
SCHOOL OF COMMERCE
MASTERS OF PROJECT MANAGEMENT

Interview Questioner prepared for respondents for the assessment of factors for successful performance of construction projects. The case of Ethiopian Construction Works Corporation / ECWC/.

Dear Respected Respondents

My name is Tilahun Deneke and I am carrying out a project work **to assess the factors for successful performance of construction projects** in the case of Ethiopian Construction Works Corporation /ECWC/. The information you provide is used for research purpose only, and will be kept confidential at all levels. Considering your experience in project works, your participation in this survey will significantly contribute to the accuracy and usefulness of the research outcome. I appreciate taking your time to complete the survey. I kindly request you to remember that the quality of this work is completely dependent up on your frank opinions. Please consider each statement carefully before you give it an evaluation. If you have any query, please do not hesitate to contact me. I am available at your convenience through Tel. +251960369366

The interview questions for consultants

- What are the basic reasons for projects scope and design change?
- How do you evaluate the cost and time overrun of projects?
- How about the relation among three parties at construction site?
- How can contractors overcome the problem of time & cost overrun of projects?
- How do you evaluate the project management practice of ECWC?

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The interview questions for clients

- Is there project management office at the head office and project level?
- How do you monitor & evaluate projects and the practice of giving feedback?
- Your project experienced the cost and schedule overrun. What are the reasons for cost & time overrun of your project
- How do you manage the performance of consultant?
- Is there a regular joint meeting at project site and head office level?
- Most of the time there is a delay in making payment to contractor. This is creates a cash flow problem for contractor. Why payments delay?
- The write-off way is the major problems of contractor. what is the problem to solve the issue in concerned projects?

ADDIS ABABA UNIVERSITY
SCHOOL OF COMMERCE
MASTERS OF PROJECT MANAGEMENT

Interview Questioner prepared for respondents for the assessment of factors for successful performance of construction projects. The case of Ethiopian Construction Works Corporation / ECWC/.

Dear Respected Respondents

My name is Tilahun Deneke and I am carrying out a project work **to assess the factors for successful performance of construction projects** in the case of Ethiopian Construction Works Corporation /ECWC/. The information you provide is used for research purpose only, and will be kept confidential at all levels. Considering your experience in project works, your participation in this survey will significantly contribute to the accuracy and usefulness of the research outcome. I appreciate taking your time to complete the survey. I kindly request you to remember that the quality of this work is completely dependent up on your frank opinions. Please consider each statement carefully before you give it an evaluation. If you have any query, please do not hesitate to contact me. I am available at your convenience through Tel. +251960369366

For Contractors

- Your entire project exhibits time and cost overrun. What is the problem associated with this?
- All water projects exhibit contract amendments more than two times. What is the basic reason for contract amendment? Whose problem is it among three parties?
- Is there the practice of claim management for the time lost?
- How about the practice of project management in your sector?
- How do you manage problems related to consultants?
- Why project managers leave the project?
- Project monitoring, evaluation, controlling and giving feedback practice of your sector is not satisfactory. Would you mention the reason?
- Timely delivery of resource to the project is the main problem. What are the problems? How can this problem be solved?
- Road projects are in loss. This loss is accumulated. Is there no mechanism to mitigate the loss from the very start? Now how the problem will be solved?

ANNEX 4. FREQUENCIES

Knowledge of overall project Goals

Overall Project goals and objectives are clear				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	1	1.3	1.3	1.3
Disagree	2	2.6	2.6	3.9
Neutral	4	5.2	5.2	9.1
Agree	46	59.7	59.7	68.8
Strongly Agree	24	31.2	31.2	100.0
Total	77	100	100.0	

Roles and responsibilities of stakeholders are clearly defined				
	Frequency	%	Valid %	Cumulative %
Disagree	13	16.9	16.9	16.9
Neutral	7	9.1	9.1	26.0
Agree	40	51.9	51.9	77.9
Strongly Agree	17	22.1	22.1	100.0
Total	77	100.0	100.0	

Project goals were attainable with in the time frame				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	14	18.2	18.2	18.2
Disagree	40	51.9	51.9	70.1
Neutral	5	6.5	6.5	76.6
Agree	8	10.4	10.4	87.0
Strongly Agree	10	13.0	13.0	100.0
Total	77	100.0	100.0	

2) Customer /end users of the project / satisfaction

Customers were clearly defined				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	2	2.6	2.6	2.6
Disagree	10	13.0	13.0	15.6
Neutral	6	7.8	7.8	23.4
Agree	49	63.6	63.6	87.0
Strongly Agree	10	13.0	13.0	100.0
Total	77	100.0	100.0	

Customer were adequately involved throughout the project				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	6	7.8	7.8	7.8
Disagree	24	31.2	31.2	39.0
Neutral	5	6.5	6.5	45.5
Agree	35	45.5	45.5	90.9
Strongly Agree	7	9.1	9.1	100.0
Total	77	100.0	100.0	

Customers are satisfied in the performance of the project				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	11	14.3	14.3	14.3
Disagree	34	44.2	44.2	58.4
Neutral	2	2.6	2.6	61.0
Agree	25	32.5	32.5	93.5
Strongly Agree	5	6.5	6.5	100.0
Total	77	100.0	100.0	

The customer requirement clearly communicated before the				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	15	19.5	19.5	19.5
Disagree	38	49.4	49.4	68.8
Neutral	1	1.3	1.3	70.1
Agree	22	28.6	28.6	98.7
Strongly Agree	1	1.3	1.3	100.0
Total	77	100.0	100.0	

3) Safety and health Management

The project risks related to Safety and health are clearly identified in the project plan				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	6	7.8	7.8	7.8
Disagree	40	51.9	51.9	59.7
Neutral	3	3.9	3.9	63.6
Agree	26	33.8	33.8	97.4
Strongly Agree	2	2.6	2.6	100.0
Total	77	100.0	100.0	

The identified project risk of Safety and health is clearly communicated among all the project teams				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	9	11.7	11.7	11.7
Disagree	40	51.9	51.9	63.6
Neutral	3	3.9	3.9	67.5
Agree	23	29.9	29.9	97.4
Strongly Agree	2	2.6	2.6	100.0
Total	77	100.0	100.0	

Risk mitigation plan is prepared and communicated among project staff				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	11	14.3	14.3	14.3
Disagree	34	44.2	44.2	58.4
Neutral	11	14.3	14.3	72.7
Agree	20	26.0	26.0	98.7
Strongly Agree	1	1.3	1.3	100.0
Total	77	100.0	100.0	

All the safety materials /personal protective equipment's/ are fully available for the concerned project staff				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	11	14.3	14.3	14.3
Disagree	54	70.1	70.1	84.4
Neutral	10	13.0	13.0	97.4
Agree	2	2.6	2.6	100.0
Total	77	100.0	100.0	

All safety policy, directives and other working procedures or manuals are in place				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	17	22.1	22.1	22.1
Disagree	56	72.7	72.7	94.8
Neutral	4	5.2	5.2	100.0
Total	77	100.0	100.0	

Safety engineering department and experts are available on the project				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	29	37.7	37.7	37.7
Disagree	42	54.5	54.5	92.2
Agree	6	7.8	7.8	100.0
Total	77	100.0	100.0	

4) Technical task\competency

The required technology is available in the project/corporation				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	9	11.7	11.7	11.7
Disagree	47	61.0	61.0	72.7
Neutral	4	5.2	5.2	77.9
Agree	17	22.1	22.1	100.0
Total	77	100.0	100.0	

The project manager has sufficient experience, technical knowledge and skill				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	1	1.3	1.3	1.3
Disagree	10	13.0	13.0	14.3
Neutral	4	5.2	5.2	19.5
Agree	50	64.9	64.9	84.4
Strongly Agree	12	15.6	15.6	100.0
Total	77	100.0	100.0	

The other project personnel's have enough knowledge to operate with the existing technology				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	1	1.3	1.3	1.3
Disagree	16	20.8	20.8	22.1
Neutral	6	7.8	7.8	29.9
Agree	52	67.5	67.5	97.4
Strongly Agree	2	2.6	2.6	100.0
Total	77	100.0	100.0	

5) Initial cost estimate

the initial project estimate (cost & schedule) complete & realistic before performance began				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	16	20.8	20.8	20.8
Disagree	51	66.2	66.2	87.0
Neutral	3	3.9	3.9	90.9
Agree	6	7.8	7.8	98.7
Strongly Agree	1	1.3	1.3	100.0
Total	77	100.0	100.0	

During project execution the actual cost & time schedule are compatible with the initial estimate				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	18	23.4	23.4	23.4
Disagree	50	64.9	64.9	88.3
Neutral	3	3.9	3.9	92.2
Agree	6	7.8	7.8	100.0
Total	77	100.0	100.0	

6) Top management support

top management supports the project in exhibiting commitment to work and encouragement				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	4	5.2	5.2	5.2
Disagree	27	35.1	35.1	40.3
Neutral	4	5.2	5.2	45.5
Agree	34	44.2	44.2	89.6
Strongly Agree	8	10.4	10.4	100.0
Total	77	100.0	100.0	

The top management assigned strong, clearly identified the project leadership				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	4	5.2	5.2	5.2
Disagree	21	27.3	27.3	32.5
Neutral	7	9.1	9.1	41.6
Agree	35	45.5	45.5	87.0
Strongly Agree	10	13.0	13.0	100.0
Total	77	100.0	100.0	

Strong Project Monitoring and feedback given by top management				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	2	2.6	2.6	2.6
Disagree	49	63.6	63.6	66.2
Neutral	2	2.6	2.6	68.8
Agree	22	28.6	28.6	97.4
Strongly Agree	2	2.6	2.6	100.0
Total	77	100.0	100.0	

Top management's enthusiastic support to the project manager (PM) and project team at site				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	5	6.5	6.5	6.5
Disagree	35	45.5	45.5	51.9
Neutral	3	3.9	3.9	55.8
Agree	31	40.3	40.3	96.1
Strongly Agree	3	3.9	3.9	100.0
Total	77	100.0	100.0	

Delegating authority to project manager by top management				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	2	2.6	2.6	2.6
Disagree	29	37.7	37.7	40.3
Neutral	1	1.3	1.3	41.6
Agree	38	49.4	49.4	90.9
Strongly Agree	7	9.1	9.1	100.0
Total	77	100.0	100.0	

7) Project planning and scheduling

The project plan consists of clear budget and cost figures				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	1	1.3	1.3	1.3
Disagree	19	24.7	24.7	26.0
Neutral	6	7.8	7.8	33.8
Agree	44	57.1	57.1	90.9
Strongly Agree	7	9.1	9.1	100.0
Total	77	100.0	100.0	

The plan included methods and frequency of communication among stakeholders and other personnel				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	4	5.2	5.2	5.2
Disagree	43	58.8	58.8	61.0
Neutral	4	5.2	5.2	66.2
Agree	25	32.5	32.5	98.7
Strongly Agree	1	1.3	1.3	100.0
Total	77	100.0	100.0	

The project plan has monitoring and evaluation strategy				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	4	5.2	5.2	5.2
Disagree	39	50.6	50.6	55.8
Neutral	2	2.6	2.6	58.4
Agree	29	37.7	37.7	96.1
Strongly Agree	3	3.9	3.9	100.0
Total	77	100.0	100.0	

The project has realistic time schedules and assignments				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	10	13.0	13.0	13.0
Agree	52	67.5	67.5	80.5
Neutral	3	3.9	3.9	84.4
Agree	11	14.3	14.3	98.7
Strongly Agree	1	1.3	1.3	100.0
Total	77	100.0	100.0	

8) Resources Management

All the required resources are available on time				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	15	19.5	19.5	19.5
Disagree	60	77.9	77.9	97.4
Neutral	1	1.3	1.3	98.7
Agree	1	1.3	1.3	100.0
Total	77	100.0	100.0	

There is availability of skilled personnel				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	1	1.3	1.3	1.3
Disagree	20	26.0	26.0	27.3
Neutral	6	7.8	7.8	35.1
Agree	49	63.6	63.6	98.7
Strongly Agree	1	1.3	1.3	100.0
Total	77	100.0	100.0	

The project deploys sufficient resource planning to adequately obtain resource for the job				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	7	9.1	9.1	9.1
Disagree	51	66.2	66.2	75.3
Neutral	2	2.6	2.6	77.9
Agree	17	22.1	22.1	100.0
Total	77	100.0	100.0	

The procurement process is efficient to deliver the material or service on time				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	18	23.4	23.4	23.4
Disagree	58	75.3	75.3	98.7
Neutral	1	1.3	1.3	100.0
Total	77	100.0	100.0	

9) Favorable working condition

Favorable climatic condition at the site				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	10	13.0	13.0	13.0
Disagree	20	26.0	26.0	39.0
Neutral	1	1.3	1.3	40.3
Agree	40	51.9	51.9	92.2
Strongly Agree	6	7.8	7.8	100.0
Total	77	100.0	100.0	

Favorable social environment				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	9	11.7	11.7	11.7
Disagree	27	35.1	35.1	46.8
Neutral	1	1.3	1.3	48.1
Agree	35	45.5	45.5	93.5
Strongly Agree	5	6.5	6.5	100.0
Total	77	100.0	100.0	

Favorable political and economic environment				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	5	6.5	6.5	6.5
Disagree	26	33.8	33.8	40.3
Neutral	5	6.5	6.5	46.8
Agree	37	48.1	48.1	94.8
Strongly Agree	4	5.2	5.2	100.0
Total	77	100.0	100.0	

Favorable camping accommodation for employees				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	7	9.1	9.1	9.1
Disagree	16	20.8	20.8	29.9
Neutral	9	11.7	11.7	41.6
Agree	43	55.8	55.8	97.4
Strongly Agree	2	2.6	2.6	100.0
Total	77	100.0	100.0	

10) Monitoring, evaluation and feedback

There is a regular and careful progress (time, scope, and cost) monitoring and review throughout the project				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	6	7.8	7.8	7.8
Disagree	52	67.5	67.5	75.3
Neutral	1	1.3	1.3	76.6
Agree	18	23.4	23.4	100.0
Total	77	100.0	100.0	

There is a necessary report on the project performance relative to established objectives (e.g., budgets, cost, and quality)				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	2	2.6	2.6	2.6
Disagree	14	18.2	18.2	20.8
Agree	55	71.4	71.4	92.2
Strongly Agree	6	7.8	7.8	100.0
Total	77	100.0	100.0	

Corporation gives periodic feedback on project performance & takes corrective action.				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	16	20.8	20.8	20.8
Disagree	47	61.0	61.0	81.8
Neutral	4	5.2	5.2	87.0
Agree	9	11.7	11.7	98.7
Strongly Agree	1	1.3	1.3	100.0
Total	77	100.0	100.0	

11) Communication

The communication plan is in place in the project/corporation				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	3	3.9	3.9	3.9
Disagree	24	31.2	31.2	35.1
Neutral	1	1.3	1.3	36.4
Agree	47	61.0	61.0	97.4
Strongly Agree	2	2.6	2.6	100.0
Total	77	100.0	100.0	

There is effective communication between project stakeholders, team, and personnel				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	3	3.9	3.9	3.9
Disagree	26	33.8	33.8	37.7
Neutral	6	7.8	7.8	45.5
Agree	41	53.2	53.2	98.7
Strongly Agree	1	1.3	1.3	100.0
Total	77	100.0	100.0	

There is a clear and easy channel of communication				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	2	2.6	2.6	2.6
Disagree	38	49.4	49.4	51.9
Neutral	4	5.2	5.2	57.1
Agree	32	41.6	41.6	98.7
Strongly Agree	1	1.3	1.3	100.0
Total	77	100.0	100.0	

12) Client support

There is periodic project Monitoring, evaluation and feedback by client				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	4	5.2	5.2	5.2
Disagree	23	29.9	29.9	35.1
Neutral	5	6.5	6.5	41.6
Agree	43	55.8	55.8	97.4
Strongly Agree	2	2.6	2.6	100.0
Total	77	100.0	100.0	

Clients solved any compensation issues of the project				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	15	19.5	19.5	19.5
Disagree	32	41.6	41.6	61.0
Neutral	4	5.2	5.2	66.2
Agree	25	32.5	32.5	98.7
Strongly Agree	1	1.3	1.3	100.0
Total	77	100.0	100.0	

Client interference in the project work is supportive				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	12	15.6	15.6	15.6
Disagree	23	29.9	29.9	45.5
Agree	38	49.4	49.4	94.8
Strongly Agree	4	5.2	5.2	100.0
Total	77	100.0	100.0	

13) Consultant

The project has detailed feasibility study that is realistic to the				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	15	19.5	19.5	19.5
Disagree	41	53.2	53.2	72.7
Neutral	2	2.6	2.6	75.3
Agree	17	22.1	22.1	97.4
Strongly Disagree	2	2.6	2.6	100.0
Total	77	100.0	100.0	

Consultant Submit complete design & specification				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	13	16.9	16.9	16.9
Disagree	34	44.2	44.2	61.0
Neutral	6	7.8	7.8	68.8
Agree	23	29.9	29.9	98.7
Strongly Agree	1	1.3	1.3	100.0
Total	77	100.0	100.0	

Consultant Solve any design & other consultant related problems on time				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	7	9.1	9.1	9.1
Disagree	55	71.4	71.4	80.5
Agree	14	18.2	18.2	98.7
Strongly Agree	1	1.3	1.3	100.0
Total	77	100.0	100.0	

Consultant estimate of contract schedule & work volume is realistic				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	6	7.8	7.8	7.8
Disagree	48	62.3	62.3	70.1
Neutral	9	11.7	11.7	81.8
Agree	14	18.2	18.2	100.0
Total	77	100.0	100.0	

Consultant staff is fully authorized to solve problems on the project site				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	22	28.6	28.6	28.6
Disagree	37	48.1	48.1	76.6
Neutral	2	2.6	2.6	79.2
Agree	15	19.5	19.5	98.7
Strongly Agree	1	1.3	1.3	100.0
Total	77	100.0	100.0	

14) Project manager

PM has strong Coordinating ability and mutual relationship with his team members, client, consultants and sub-contractor,				
	Frequency	%	Valid %	Cumulative %
Disagree	2	2.6	2.6	2.6
Neutral	12	15.6	15.6	18.2
Agree	49	63.6	63.6	81.8
Strongly Agree	14	18.2	18.2	100.0
Total	77	100.0	100.0	

Project manager's has authority to take financial decision, selecting key team members, etc.				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	4	5.2	5.2	5.2
Disagree	5	6.5	6.5	11.7
Neutral	14	18.2	18.2	29.9
Agree	41	53.2	53.2	83.1
Strongly Agree	13	16.9	16.9	100.0
Total	77	100.0	100.0	

PM is Effective in monitoring and giving feedback				
	Frequency	%	Valid %	Cumulative %
Disagree	5	6.5	6.5	6.5
Neutral	4	5.2	5.2	11.7
Agree	56	72.7	72.7	84.4
Strongly Agree	12	15.6	15.6	100.0
Total	77	100.0	100.0	

PM Coordinating ability and mutual relationship of with top management is strong				
	Frequency	%	Valid %	Cumulative %
Disagree	4	5.2	5.2	5.2
Neutral	7	9.1	9.1	14.3
Agree	49	63.6	63.6	77.9
Strongly Agree	17	22.1	22.1	100.0
Total	77	100.0	100.0	

Project manager's has good technical capability				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	1	1.3	1.3	1.3
Disagree	10	13.0	13.0	14.3
Neutral	2	2.6	2.6	16.9
Agree	45	58.4	58.4	75.3
Strongly Agree	19	24.7	24.7	100.0
Total	77	100.0	100.0	

PM delegate authority to various members of his team				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	1	1.3	1.3	1.3
Disagree	10	13.0	13.0	14.3
Neutral	13	16.9	16.9	31.2
Agree	39	50.6	50.6	81.8
Strongly Agree	14	18.2	18.2	100.0
Total	77	100.0	100.0	

15) Team Management

There is a culture of team work in the project/corporation				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	7	9.1	9.1	9.1
Disagree	29	37.7	37.7	46.8
Neutral	2	2.6	2.6	49.4
Agree	35	45.5	45.5	94.8
Strongly Agree	4	5.2	5.2	100.0
Total	77	100.0	100.0	

Team members understand the strength and weakness of the teams				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	2	2.6	2.6	2.6
Disagree	25	32.5	32.5	35.1
Neutral	4	5.2	5.2	40.3
Agree	44	57.1	57.1	97.4
Strongly Agree	2	2.6	2.6	100.0
Total	77	100.0	100.0	

Team members regularly give feedback to each other				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	10	13.0	13.0	13.0
Disagree	41	53.2	53.2	66.2
Neutral	3	3.9	3.9	70.1
Agree	22	28.6	28.6	98.7
Strongly Agree	1	1.3	1.3	100.0
Total	77	100.0	100.0	

Team members have effective meetings which are well facilitated				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	11	14.3	14.3	14.3
Disagree	34	44.2	44.2	58.4
Neutral	4	5.2	5.2	63.6
Agree	27	35.1	35.1	98.7
Strongly Agree	1	1.3	1.3	100.0
Total	77	100.0	100.0	

Turnover of key personnel is low in the project / organization				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	6	7.8	7.8	7.8
Disagree	41	53.2	53.2	61.0
Neutral	1	1.3	1.3	62.3
Agree	26	33.8	33.8	96.1
Strongly Agree	3	3.9	3.9	100.0
Total	77	100.0	100.0	

The practice of overtime payment and other benefit package is attractive				
	Frequency	%	Valid %	Cumulative %
Strongly Disagree	12	15.6	15.6	15.6
Disagree	50	64.9	64.9	80.5
Neutral	3	3.9	3.9	84.4
Agree	10	13.0	13.0	97.4
Strongly Agree	2	2.6	2.6	100.0
Total	77	100.0	100.0	