ST. MARY'S UNIVERSITY
SCHOOL OF GRADUATE STUDIES

ASSESSING SUCCESS FACTORS AND CHALLENGES OF RAILWAY MEGAPROJECTS IN ETHIOPIA

By

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ADDIS ABABA, ETHIOPIA

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ALEMU ASNAKEW TILAHUN

A THESIS SUBMITTED TO ST. MARY'S UNIVERSITY, SCHOOL OF GRADUATE STUDIES IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS IN PROJECT MANAGEMENT (MA)

Advisor: Tiruneh Legesse (Ass. Professor)

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APPROVED BY BOARD OF EXAMINERS

Dean, Graduate Studies	Signature	Date
Advisor	Signature	Date
Internal Examiner	Signature	Date
External Examiner	Signature	Date

Dedication

This work is dedicated to my Grand Father`s mother for her love, patience, wisdom and spirituality. I will always remain grateful for your kindness. May the Lord place your soul in Heaven?.

DECLARATION

I, the undersigned, declare that this MA thesis entitled: **Assessing Success Factors and Challenges of Railway Projects in Ethiopia** is my original work, prepared under the guidance of **Tiruneh Legesse (Ass. Professor**). All sources of materials used for the thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher learning institution for the purpose of earning any degree.

_____ _____

Name Signature

St. Mary's University, Addis Ababa June 23, 2017

ENDORSEMENT

This MA thesis entitled: **"Assessing Success Factors and Challenges of Railway Projects in Ethiopia"** conducted by **Alemu Asnakew** has been submitted to St. Mary's University, School of Graduate Studies for examination with my approval as a university advisor.

Name	Signature
St. Mary's University, Addis Ababa	June 23, 2017

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ACRONYMS AND ABBREVIATIONS

AACRA	Addis Ababa construction of roads Authority
AALRW	Addis Ababa light railway
AWSA	Addis Ababa water Supply Authority
CCREC	China Railway Group Limited
CEEC	China Engineering Eryuam Corporation
ERC	Ethiopian Railway Corporation
EPC	Engineering, Procurement and Construction
EPCM	Engineering Procurement and Construction Management
EEU	Ethiopian Electric Utility
GDP	Gross Domestic Product
MoFED	Ministry of Finance and Economic Development (Ethiopia)
PCPI	Project cost performance Index
PCPI	Project time performance Index
PCPI	Project quality performance Index
PSI	Project success Index

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Abstract

In this days project management knowledge and practices becomes very essential due to the fact that managing projects have been emerged complex and challenging from time to time. However, in Ethiopia, very little is studied about critical project success factors, measuring criteria, project management knowledge areas, tools and techniques. The aim of this study is to assess the critical success factors and challenges of the overall railway construction project success in Ethiopia. The study design was explanatory. Mixed approach was used and both primary and secondary data were collected using questionnaires. A sample of 79respondents was selected from a population of 264. The study findings show that project success factors such as: leadership effectiveness, project team, Contractors. Competency, cost Management, communication-management, time management, quality management, risk management, and stakeholder participation respectively are found to be critical factors to the project success. The study also concluded that the major challenging failure factors were: investment cost, skilled manpower in the sector, project integration and stakeholder management, contract administration, and land topography. Thus, it is recommended that participation of relevant stakeholders such as: farmers on the road sides, people to be displaced and others that may be affected by the project is very essential for success full completion of projects. The Ethiopian Railway Corporation should give emphasis on improving contract administration practices, integration project activities, and improving the project quality management activities. In addition to this, Success factors that have significant effect on the overall success of the railway project should be managed selectively according to their effects.

Keywords: Ethiopia, Railway, Project success, Success factors and Challenges

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CHAPTER ONE
INTRODUCTION

1.1. Background of the Study

In this days project management knowledge and practices becomes very essential due to the fact that managing projects have been emerged complex and challenging from time to time. The other fact is that many development and investments for the purpose of transformation or growth plans are intended to be passed through project activities.

According to World Bank (2008) more than 20 % of global economic activity takes place as projects, and in some emerging economies, it exceeds 30 %.For instance, in India it is 39 % and in China it is 43 %. This data shows, 22 % of the world's $55 trillion gross domestic product (GDP) goes to capital formation, which is almost entirely project-based. Global megaprojects are spending to beat $6 to 9 trillion per annum or 8% of global GDP (Accenture, 2012).Trends shows that the volume of projects grows alarmingly year by year which needs highly organized project management practices. Studies revealed that, 80% of all government policies are delivered through large-scale projects and programs they are key to innovation, change, and growth (Research Excellence framework, 2014). The other research findings have stated that even before eight years ago, global construction market was worth around US$ 3,200 billion per year (Sohal& Cavill, 2008). Now it is increasing alarmingly.

Ethiopia is one of the developing countries with having good economic annual growth. Being a developing country, there are huge development programs in Ethiopia to fulfill its demand in many aspects especially the economic and social sectors, which includes education, health, road and railway construction, hydro-electricity dam constructions, fertilizer and sugar factories project construction, welfare, and community development where the government has a high obligation. For instance, the Ethiopian government has been working hydroelectric infrastructure projects with an estimated amount of more than

US$ 11billion including those projects to be commenced in the near future (World Bank, 2008)and railway construction projects with more than US$17 billion(ERC,2017).

Ethiopia has been experienced Railway transport since the last ten decades. When the ethio-Djibouti railway has outdated, the two countries have agreed to construct new railway transport system with better technology, capacity and of facilities which is more modern than the previous one.

Megaprojects have been studied in many academic areas such as public planning, urban decision making, and economic analysis areas. They have been analyzed as complex, hard to finance projects with economic gain and social impacts. Limited research has been done in the construction industry to investigate megaprojects and to improve their performance (Brookes and Locatelli, 2015).

Critical success factors have been identified in various contexts but there is no general agreement. Most of these studies are too generic and pose a question of applicability on a specific industry such as construction (Chan et. al., 2004). The project management literature frequently refers to two streams of studies of project success. One stream is the project success factors; these are independent variables that make success more likely. The other one is the project success criteria; these are the dependent variables that measure success (Muller & Jugdev, 2012).

The characteristics of megaprojects management stated that, every construction project is unique and has its own operating environment and sets of technical requirements. As a result, the execution of a construction project is subject to numerous constraints that limit the instigation or succession of field operations, which invariably have significant negative impact on overall project performance. By definition, project constraints refer to any condition, such as temporal/spatial limitations and safety/quality concerns, which may prevent a project to achieve its goals. Successful planning, scheduling, execution and control of a construction project rely on effective identification and management of constraints through master planning and short-term look-ahead scheduling. While the master schedule provides a global view of a project and the overall execution strategy, a look-ahead schedule offers a detail account of operational constraints and a detailed plan showing work to be done within a

relatively short time skylight. Ideally, these detailed schedules should reflect actual field conditions and provide field personnel with operation instructions free of constraints and conflicts (Kernzer, 2013) which in turn privileges to the success of the project.

Numerous construction projects are still plagued by delays and cost overruns, which can frequently be traced to ineffective identification and treatment of constraints at the initiation, planning, scheduling, monitoring and control phases of the megaproject management process. First, when a constraint is not properly identified during planning, scheduling, and also at monitoring and control stage, subsequent conflicts in the field are inevitable. Today's projects are becoming more and more technically complex and logistically challenging, which exposes construction operations to even more complex constraints.

Despite their impact and significance to the overall growth and development of any national economy, limited research has been done in the construction industry to investigate megaprojects and to improve their performance (Naomi et.al., 2015). In Ethiopian case, some known projects have been either delayed, have had cost overruns, poor in quality, poor user satisfaction or did not meet the initial objectives (Tekalign,2014).

Studies show us, more than 50% of time wasted during construction is attributable to poor management practices (Koskela, 2000). Researchers at Gartner and the Giga Group concluded that project failures cost businesses more than $450 billion in 2001(Palmer, 2002). Literatures show that 65% of megaprojects end up fail, either over budgeted and/or behind schedule to be completed (Taylor, 2015). This concludes, delivery of megaprojects is an expensive, highly complex task that entails the combination of leading-edge technology and multiparty governance that demands high stakeholder commitment and multi- directional project leadership skills. According to Brooke et al (2015), Research into megaproject performance has been ongoing now for over forty years. Despite this, research into megaprojects is still not as well developed a field as other aspects of project management research. There is still a dearth of extensive empirically based investigations shared understandings of the way that megaprojects work are still to emerge.

In summary, there is a need for a better understanding of constraints in construction and a structured approach in identifying and modeling success factors (constraints) to ensure a

constraint free work plan. This research project has provided an overview of megaproject success factors focusing on planning, scheduling and control constraints by doing a survey research at Ethiopian railway megaprojects.

1.2. Statement of the Problem

Nowadays, megaprojects are becoming very important and increasingly used as the preferred delivery model for goods and services across a range of businesses and sectors, like infrastructure, water and energy, information technology, industrial processing plants, mining, supply chains, enterprise systems, strategic corporate initiatives and change programs, mergers and acquisitions, government administrative systems, banking, defense, intelligence, air and space exploration, big science, urban regeneration, and major events of across the world.

Being a developing country, there is a huge development program in Ethiopia to fulfill the demand of the society in all aspects especially the economic and social affairs which have been discussed in the background section of this study. For instance, World Bank estimates show that public infrastructure spending of Ethiopia was approximately more than 19% of its total GDP in fiscal year 2011-2012(U.S. Department of State report, 2015).

According to Tekalign (2014) 79.06 % of the construction project fails to meet its objectives in Ethiopia and if completed it is with an average cost overrun of more than 26.2%. We must understand that, Project failures have significant effect from economic as well as political points of view**.** If the project takes longer time, it requires additional resources, and budgets and this increases labor, material, machinery and equipment cost. This affects the budget of other projects and in general, it affects the economy of the country and results in dissatisfaction of the society at large. Projects are needed to be completed within the time frame, budgeted cost and required quality so that to achieve its objective and satisfy stakeholders and users as well. The study of critical success factors is a means of improving effectiveness and efficiency of projects (Chan et. el.,2004). Because of the fact that megaprojects have become increasingly common across many sectors of the capital projects industry in the country, and by nature every project is different one to the other because of various reasons, understanding them at better level has become critical.

Although, many researchers have been conducted on success factors and challenges of megaprojects in many countries across the globe, very little has been done in Ethiopia. When we see research activities carried out in Ethiopian public sector projects, most of them focus on project monitoring and evaluation practice. Therefore, this thesis research has focused to make an assessment of success factors and challenges of railway projects management process in Ethiopia. So, depending on the stated fact the researcher believed that carrying out this research in the area of railway project construction focusing on identifying critical success factors and faced challenges that cause both time and cost overrun, quality and related issue might bring a paramount effect on public project operation success.

Based on the different studies cited in the background there are persistent problems in the construction industry in Ethiopia in terms of quality issues, cost overruns and project delays. The problem in Ethiopia can be solved possibly by studying the influencing factors and challenges in Ethiopian context and implement better critical success factors management practices as done in the developed economies.

Therefore, there is a need of conducting a research to fill these gaps. Thus, the purpose of this study is to identify critical success factors contributing to the project success and challenging failure factors of the railway megaprojects in Ethiopian context through the survey study of this research and finally contribute to the project management body of knowledge in megaproject management.

1.3. Research Questions

This study attempts to answer the following questions.

1. What are the factors contributing to the success of railway construction projects?
2. What are the major challenges of the railway projects in Ethiopia?

1.4. Research Objectives

1.4.1. General Objective

To identify the critical success factors and challenges and influencing on the performance of the overall railway construction project management practices in Ethiopian context.

1.4.2. Specific Objectives

The specific objectives of this study are:

1. To assess success factors contributing to the success of railway construction projects
2. To assess the major challenges of the railway projects in Ethiopia

1.5. Significance of the Study

Given their size and scale, mega-projects are important not only to the immediate project stakeholders, but also to the societies, economies, and environments affected by them. Because mega-projects have become increasingly common across many sectors of the capital projects industry, understanding them at a better level and depth has become critical.

As it is mentioned in the statement of the problem of this study, there is no research conducted in Ethiopian railways megaprojects focusing on the success criteria and factors which is very critical for the successfulness or failure of projects. Therefore conducting a study in these issues is very essential for the purpose of finding highly influencing factors to draw appropriate scientific solutions for the improvement of mega project outcomes.

As a research, the primary merits of the study goes to the university academics. Since there are few studies in the area, it will give a comprehensive starting point for more studies in megaproject management performance monitoring and evaluation/measurement. Secondly, public (railway and others) and governmental organization participating in any types of megaprojects will get important concepts on the role of planning, scheduling and control processes for project success that will create/develop/ awareness. It will open for further research in the area.

1.6. Scope of the Study

This study mainly focuses on the Ethiopian railway megaproject construction practices such as: AALRT, AA-Djibouti, and awash-weldia railway.

The success criteria used to measure the overall success of the railway project in this study are: complete the project within time, complete the project within budget and complete the project with specified quality. To measure these success criteria, the study emphasizes on the

project success factors identified in literature for such as: Project manager's leadership effectiveness, Contractors competency, Project team effectiveness, Stakeholder's participation, Risk management, Communication management, Time management, Cost management and Quality management factors aspects. The study mainly focuses on the perception of the project employees.

1.7. Definition of Terms Used

Definitions of terms used are listed below based on the contextual definition of PMI (2013), and kerzner (2013) also other authors mentioned specifically.

Project: A temporary endeavor undertaken to create a unique product, service, or result (PMI, 2013, &kernzer, 2013).

Project management: The application of knowledge, skills, tools, and techniques to project activities to meet the project requirements (PMI, 2013 & kernzer, 2013).

Megaproject: is an extremely large-scale investment project. Megaprojects are typically defined as costing more than$1 billion and attracting a lot of public attention because of substantial impacts on communities, environment, and budgets (Brookes, et.al, 2015).

Project Success: is measured against the project's overall objectives and project management success that is measured against the iron triangle (time, cost and quality), customer satisfaction (Serrador& Turner, 2015).

Success criteria: Standards, rules, or tests on which a judgment or decision can be based, or by which a product, service, result, or process can be evaluated (Serrador& Turner, 2015).

Success factors: The set of circumstances, facts, or influences which contribute to the project outcomes (Serrador & Turner, 2015).

1.8. Research Hypothesis

Hypothesis 1: Project manager's leadership/Administrators effectiveness has significant positive effect on construction projects success.

Hypothesis 2: Contractor's competency has significant positive effect on construction projects success.

Hypothesis3: Project team effectiveness has significant positive effect on construction projects success.

Hypothesis 4: Stakeholders Participation has significant positive effect on construction projects success.

Hypothesis 5: Risk management has significant positive effect on construction projects success.

Hypothesis 6: Communication management has significant positive effect on construction projects success.

1.9. Organization of the Study

This study has consisted of five chapters. The first chapter deals with the problem and its questions to be answered, and hypothesis to be tested .The second chapter treats the related literature review. The third chapter focuses on methodology of the research and the fourth chapter deals about the data presentation, analysis and interpretation. The fifth chapter is devoted to conclusion, limitations and recommendation of the study.

CHAPTER TWO
REVIEW OF RELATED LITERATURES

2.1. THEORETICAL LITERATURE REVIEW

2.1.1. Definitions of Related Concepts

2.1.1.1. Project and Project Management

Kerzner (2013) described that to realize project management; one must start with the definition of a project. A project can be well thought-out to be any sequence or series of activities and tasks that have a specific objective to be completed within certain specifications; have specified scopes, which have defined start and end dates; have funding limits (if applicable); consume human and nonhuman resources (i.e., money, people, equipment) and are multifunctional (i.e., cut across several functional lines). Projects are unique, specific, temporary endeavors undertaken to achieve a desired outcome.

Project is a unique set of co-ordinate activities, with defined starting and finishing points undertaken by individuals or organizations to meet specific objectives with in defined schedule, cost and performance parameter. The word unique points out that every project has its own genuine nature in the sense that there may not be a pre-existing blue print for the project's execution and there may not be a need to repeat the project once completed. Its goal characteristics may be well perceive as achieving stated objectives or solve a particular problem, while its temporary nature signifies a discrete, definable commencement and conclusion. Project is series of activities and tasks that have Specific objectives, defined start and end dates, funding limits, and it also has characteristics of multifunctional i.e. cut across several functional lines (Kerzner, 2009).

Project management is the process by which projects are defined, planned, monitored, controlled and delivered such that the agreed benefits are realized. Projects bring about change and project management is recognized as the most efficient way of managing such

change. Project management, on the other hand, involves project planning, monitoring and includes such items as: Project definition of work requirements, definition of quantity and quality of work, description of resources needed, project monitoring, tracking progress, comparing actual outcome to predicted outcome, analyzing impact, making adjustments. Successful project management can then be defined as having achieved the project Objectives (within time, within cost, at the desired performance/technology level keeping the desired quality) while utilizing the assigned resources successfully and efficiently, and accepted by the customer/owners (kernzer, 2013).

According to Project Management Institute(PMI,2013), Project management is the application of knowledge, skills, tools, and techniques to a program in order to meet the program requirements and to obtain benefits and control not available by managing projects individually.

Program management is the co-ordinate management of related projects, which may include related business-as-usual activities that together achieve a beneficial change of a strategic nature for an organization.

Portfolio management refers to a collection of projects, programs, sub portfolios, and operations managed as a group to achieve strategic objectives. Programs are grouped within a portfolio and are comprised of subprograms, projects, or other work that are managed in a coordinated fashion in support of the portfolio.

Hence, a project can be stand alone or it can be a built up of a program or a portfolio management or an organizations long term strategic objectives.

2.1.1.2. The Project Management Process

According to PMI (2013), the life cycle of a project is divided into five process groups:

1. ***Initiating:*** allows to define a new project or new phase of a project in progress, to obtain authorization for its execution and if accepted, to identify stakeholders.
2. ***Planning*****:** allows developing the project scope, developing goals and defining the subsequent actions to achieve the objectives for which the project is undertaken.

3. ***Executing*:** brings together the work to be done according to the established project management plan, respecting the system and project specifications.
4. ***Monitoring & controlling:*** allows the monitoring, control and adjustments necessary for the advancement of the project and its performance. An important part of this group is to identify faulty elements that require changes to the plan and undertake the necessary changes within the executing processes.
5. ***Project Closing****:* allows for completion of all activities in an orderly way and formally close the project.

2.1.1.3. Project Management Body of knowledge areas

The total of all the project management activities consists of 42 processes, which are spread across ten knowledge areas (PMI, 2013):

1. ***Project Integration Management***: Project Integration Management includes the processes and activities needed to identify, define, combine, unify, and coordinate the various processes and project management activities within the Project Management Process Groups.
2. ***Project Scope Management***: Project Scope Management includes the processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully. It includes scope planning, scope definition, scope verification, create WBS and scope control of a project.
3. ***Project Time Management****:* Project Time Management includes the processes required to manage the timely completion of the project. It includes activity definition, activity sequencing, activity resource estimation, activity duration estimation, schedule development and schedule control of a project.
4. ***Project Cost Management****:* Project Cost Management includes the processes involved in cost planning, cost estimating, budgeting, financing, funding, managing, and controlling costs so that the project can be completed within the approved budget.
5. ***Project Quality Management****:* Project Quality Management includes the processes and activities of the performing organization that determine quality policies, objectives, and responsibilities so that the project will satisfy the needs for which it was undertaken.

6. ***Project Human Resource Management****:* Project Human Resource Management includes the processes that organize, manage, and lead the project team and all other work forces of a project. It consists of human resource planning, acquire project team, develop project team and manage project teams.
7. ***Project Communication Management****:* Project Communications Management includes 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.
8. ***Project Risk Management****:* Project Risk Management includes the processes of conducting risk management planning, identification, analysis, response planning, and monitoring and controlling of risk on a project.
9. ***Project Procurement Management****:* Project Procurement Management includes the processes necessary to purchase or acquire products, services, or results needed from outside the project team. It includes contract administration of the project.
10. ***Project Stakeholders Management****:* Project Stakeholder Management includes the processes required to identify all people or organizations impacted by the project, analyzing stakeholder expectations and impact positively or negatively on the project, and developing appropriate management strategies for effectively engaging stakeholders in project decisions and execution.

2.1.2. Project Success and Perspectives

2.1.2.1 The Project Management School of Thoughts

According to Rodney, Frank, &Christophe (2013) there are nine project management school of thoughts: Such as the optimization school, Modeling school, Governance school, Behavioral School, Success School, Decision school, Contingency School, Transaction cost/ Process school, and the Marketing School of thoughts respectively of their emerging time (i.e. from 1950s to 2000s as a school of thought or theoretical foundation of the project management as a science and an art). This study is decided to be conducted with specific to the project success school of thought followed by behavioral, optimization, and governance school of thoughts. The most important schools of thoughts are described at table 2.1, below

Table 2.1. Schools of Thoughts in Project Management

Schools of Thoughts	Common advocacy	Major objective	Contributors
Optimization School	*Considers project as analyzable task requiring methodical approaches and structured techniques, development of various "work break downs techniques".*	*Efficiency, low cost and optimal solution.*	(Morris, 1994; Packendorff, 1995; Ehgwall, 1995; Turner 1999).
Critical success factor School	*The identification of genetic factors, in multidimensional and multidimensional and multi-criteria, will greatly improve the project implementation process in practice.*	*Determination of project success/ failure through generic criteria and factors.*	(Pinto & Slevin, 1987; pinto & Prescott, 1990)
Contingency School	*Posit that the differentiation of project type, strategic problems and managerial concerns should be acknowledgement research*	*Treating each project according to their peculiarities and differences.*	(Shenhar, et al., 1996; wheel wrigh & siderholm, 1995)
Behavioral School	*Treats projects as a "temporary organization" and focus on the various behavioral aspects of projects*	*Extending the interpretation of project management within organization theory.*	(Pacjendorff, 1995; lumdin & souderholm, 1995)
Transaction cost school	*Conceptualizes projects as characterized by uncertainly, asset specificity and transaction frequency, discourages continuous relations and routine engagement in favor of the "decoupling principle:.*	*Analyzing the Existing form of projects and determining the appropriate governing mechanisms of project transactions (contract types).*	(Eccles, 1991; winch G., 1989; O'Brien et al ,1995)
Marketing School	*Devoted to the investigation into the management of the early phases of project, the identification of client needs and the formation of project organizations,*	*Investigating "strategic behaviors" of companies dealing with projects and to propose a model of supplier-based adaptation strategies in project marketing.*	(Banasard, et al., 1993; cova & holstus, 1993; Gunter and Bonaccorsi,1996)

2.1.2.2. Project Success

Project success is one of the nine project management school of thoughts. According to many literatures, it seems that the definition of project success is quite misleading. Numerous authors have researched the subject on project success but the concept of project success remained ambiguously defined. Project success is probably the most frequently discussed topic in the field of project management, yet it is the least agreed upon even though it was for more than two decades, researchers have labored to identify managerial variables critical to success. It has often proved difficult to define words such as success, because it means different things to different people (stakeholders) and is very context-dependent. Westerveld ,2003), construct a model that link all the variables of project success which he differentiate as success criteria and success factors in one consistent model which he called the Project Excellent Model.

Previous research conducted in South Africa found that success for a public construction project can be measured across six dimensions for infrastructure project success which include: economy, environment, society, resource. In Malaysia, public construction project success metrics include four perspectives, which are a financial perspective, a customer perspective, an internal perspective, and a learning and growth perspective. In Thailand, public facility and infrastructure projects are deemed successful if they achieve operational flexibility, maintainability, energy efficiency, sustainability, and the intended function to end users(in addition to satisfying stakeholders' demands). In Great Britain, successful road infrastructure projects must be achieved according to reliability, delivery on time, budget, safety, maintenance, environment, customer satisfaction and value added to national development. Furthermore, in Hong Kong, USA, Canada, Australia, Germany, and Korea, three dimensions of success measurement such as: predictability, process, and outcomes are identified in order to determine to what extent projects are delivered successfully(Toor and Ogunlana, 2009; Lin, Sun, and Kelly, 2011; Cha and Kim, 2011; Kaare and Koppel, 2012; and Ugwu and Haupt, 2007 cited by Abednego,2015) .

As previously stated, historically, project success has been defined as the completion of an activity within the constraints of time, cost and performance. Kerzner explains that today, the definition of project success has been modified to include completion with acceptance by the customer and/or user, owner within the allocated time period, within the budgeted cost, at the proper performance or specification level, with minimum or mutually agreed upon scope changes (Kerzner, 2013).

Successful project management can therefore be defined as having achieved the project objectives within these constraints. Recently, project management success has also been added that it is defined as meeting the customer's expectations. It is argued that successful Project management for construction project should align to the stakeholders' organizations goals. Chan (2009) proposed that the success of a project can be divided into four time periods. The first period is success of the project at execution. The second period is success of the project at the defect liability period. The third period is success of the project after one-to-two years. The fourth period is success of the project after three-to-five years. The authors added that success can be defined for each stage as *"The first stage is the delivery process: doing it right; the second stage is the post delivery system: getting it right; and the last stage is the post-delivery benefits: getting them right"*. Chan (2009) divided it into four aspects: accomplish the planned goals, produce benefits for the end-user, add value to the organization, and improve the infrastructure. The overall project success is the result from all four aspects mentioned.

This thesis study has focused on the specific to the project success at execution (the first period of project success).

2.1.2.3. Project Success Perspectives

Samset has explained that success can be viewed from three different perspectives; operational (the project outputs), tactical (the project goal) and strategic (the project purpose). According to him, the operational view is measured whether the project was completed on time, within costs and to the expected quality. Samset states that these are the most commonly applied measures of success, as well as the most limited perspective which only gives an indication of the delivery of the project itself (Samset, 1998, cited by Bjarnason, 2015).
Project success at operational perspective holds efficiency of the project (the cost, time and quality performance of the project/the iron triangle). Efficiency**:** is the delivery of the project in regard to time, cost and quality performance.

The tactical perspective gives a broader interpretation of the concept and focus on the extent to which the project has achieved its formal goal. This concerns whether the impact of the project is predominantly positive and whether the project is relevant in relation to people's (e.g. users and owners) needs. Project Success at tactical perspective holds three important parameters such as: Effectiveness, Impact and relevance of the project.

The strategic perspective is the broadest explanation of project success. This perspective can for example be based on measures of whether the project contributes to economic development or positive changes in society or in the country. Project success at strategic perspective consists of sustainability of a project.

This thesis study is limited on the specific of project success at operational perspective.

2.2. EMPIRICAL LITERATRE REVIEW

2.2.1. The Railway Transport Industry

2.2.1.1. Overview of the Railway

These days, railway transport becomes very popular across the globe. According to Chong (2011), developing mass transport railway network as the backbone of transport systems has been accepted as the right approach. This is because of the fact that, railway systems have the advantage of being able to move masses of people efficiently, safely and in an environmentally-friendly manner.

Railway becomes the most useful transport system in both developed and developing countries. Railways have a low impact on the environment, particularly in comparison with other transport modes and most notably, road. Overall, rail is one of the 'greenest' ways there is to provide mobility for goods and people.. For instance, the total greenhouse gas (GHG) emissions in the EU are described as: rail transport 0.9%, domestic navigation 2.2%, domestic aviation 2.5%, road transport 93.4 % and other transport has only 1.0 %(www.railwaystrategies.co.uk/).

Furthermore, in Europe as European Commission (2013) described, the rail sector plays a significant role in the economy of the European Union which made an economic benefit of the annual turnover of EUR 73 billion and employing 800,000 people. To be a sustainable system, Skilled and well-qualified train drivers are significant factor in the safety, interoperability and competiveness of railways. There are over 133,000 train drivers in the European Union at the human interface with technical developments and cross-border operations.

United States of America has invested $148 billion in 2007 to keep the national network up to acceptable service standards. Capacity improvements including railway construction are planned at several levels of analysis because the demand of rail transport has been increasing from time (Cambridge Systematic Inc, 2007).

Railway is not only widely spread in Europe and America; it has also been used widely in Asian countries like: India, china, Japan and others for long times. Now a day's, many African countries including Ethiopia has been experiencing more.

2.2.1.2. Railway in Ethiopia

Ethiopia has experienced rail transport since the last ten decades. As the Ethio-Djibouti Railway deteriorated from lack of maintenance, Ethiopia lost railroad access to the sea. The existing meter gauge railway had been originally built by the French between 1894 and 1917.

In the new era of railway transport, the construction of the Addis Ababa light railway has been completed. It was opened for transport since the last one year, which is34 km length and has become one of the attractive transport systems in the city.

Ethiopia is a mostly agricultural country with 84% of the population living in rural area. Since road transport accounts for 90-95% of inter-urban freight and passenger movements, it is considered essential to improve the road network in order to achieve the socio-economic development and food security of the country. More than 95% of Ethiopia's trade passes through Djibouti, accounting for 70% of the activity at the port of Djibouti. Because of these facts, the country has demanded railway transport system so that to be able moving these goods and commodities to and away the country.

Both Ethiopia and Djibouti have agreed to construct a railway system. Therefore with common agreement, China was financing the construction of a standard gauge railway network in East Africa, Ethiopia and Djibouti chose to abandon the meter-gauge railway and build a new standard gauge link. In 2011, the Ethiopian Railways Corporation awarded contracts to two Chinese state-owned companies for the construction of a new standard gauge railway from Addis Ababa to the Djibouti border. At Awash, there is a junction with the Awash-weldia Railway. The Awash-woldia Railway has also been contracted by Chinese contractors. This study has also included the Addis Ababa light railway.

The railway project feasibility study has covered major areas of studies, such as: financial and economic feasibility , reliability of the traffic volume for forecast, technical standards, reasonability of the design principle and constructions scheme, impact of the project construction on local environment, and ecology, project investment estimate, economical benefit analysis's and significance of the project. Risk Analysis is included in feasibility study focusing on topics are: political risks, project implementation risks, power supply risks, labor risks, exchange rate risks, operation risk and repayment risks. Scope of cost estimate does not include: cost of land requisition and demolition; purchase expense for locomotives and rolling stocks; financial expenses, all taxes and duties levied inside Ethiopia and contingencies.

The project was contracted to Chinese company. The contract type is EPC- turnkey contract agreement. The finance source is a loan from Export-Import Bank of China. The contract agreement for quality of the project was Chinese railway 2^{nd} grade standard. The railway was designed to run 120 km/hr.

2.2.2. Challenges in Construction Project Execution

Every project is different by its nature that is, its type, its size, its geographic location, uniqueness, personnel involved in the project. Hence, according to PMI (2013); project execution is inherently risky and the lack of appropriate approach to addressing these risks has led to a lot of undesirable results.

2.2.2.1. Challenges of Time and Cost Management

A common problem that affects project success in the industry is cost overrun and project delays. For example, a research by Mutijwaa and Rwelamila, (2007) showed that the South Africa Infrastructural Department is under pressure to improve performance, that is, to deliver projects on time, on budget and to higher standard of quality. They attributed the problem to lack of skilled workers and called for the need of a project manager in all these offices to coordinate the many on-going projects.

Furthermore, in Botswana, Chimwaso, (2000) investigated, the factors of cost overrun and came up with four related factors: "*fluctuation in the cost of labor and materials and contractual claims, that is, claims for extension of time with cost".* In the case of time overruns, (Zhang and Zhang, 2003) has also identified eight factors that cause delay in project executions in China: factors related to the contractor, the design team, the project, labor, client, material, equipment, and other factors.

Kazaz, et al., (2012) in Turkey has described causes of time overruns that 40% of top rated factors belong to financial factors, while 30% of them are of labor based factors, 20% are of "managerial factors and 10% are of project-based factors. Nine reasons for project delay were identified by Mitra& Tan (2012) in a specific construction project in Saudi Arabia. It is mentioned that the main causes of delay in project completion time are mainly using of inferior tools and methods as well as having inexperienced project team leaders in critical project coordination positions.

A research carried out by Fetene (2008) on the Cause and Effects of Cost overrun on public Building Construction Projects in Ethiopia aimed to dig-out information on the factors that cause cost overrun during construction and their effects on public building construction

projects in Ethiopia. The research specifically aimed to identify the main causes of cost overrun and their overall effect on public building construction, identifying the related responsible party to the cost overrun, identifying the rate of cost overrun for various types of public project and lastly examine the relationship between cost overrun and contract amount. His finding disclosed that public building construction projects suffered by cost and time overrun(i.e. actual cost overrun ranges from 8.98 % to 46.74 % and the actual time overrun ranges from 63.3 % to 151%); The causes of cost overrun were found to be inflation or increase in the cost of construction materials, poor planning and coordination, change orders due to enhancement required by clients, excess quantity during construction; The most common effects of cost overrun identified were delay, supplementary agreement, adversarial relations among stakeholders, and budget shortfall of project owners. In general the finding clearly shows that Ethiopian public project faced various problems due to several reasons.

2.2.2.2. Challenges of Human Risk Factors

Human factors are key to meet construction project goals both at design and construction level. Human factors influence cost, quality, time, environmental sustainability and client satisfaction. In Kenya, Gwaya (2015) in his study described that, the Contribution of Human resource management for overall success of the project by descriptive analysis was 84.8%. The mean value of project team of 303 observations was 4.7426 with the standard deviation of 0.46006. The multiple linear regression analysis indicated. R^2 is 0.526 which showed a moderately strong relationship between project success criteria and the human factors. Yong & Musttaffa (2012) identified 15 factors that are critical to construction project success in Malaysia that showed human related factors such as competence, commitment, communication and cooperation towards the success of a construction project.

Furthermore, according to Thevedran and Mawdesley (2003), there is a generic characteristic that human factors are the single most important element that can affect project performance. They concluded that about 80% of all project risks may be human associated, noting that even the minor effects of human factors can have a considerable contribution to or influence on the accomplishment of construction projects on a day-to-day basis. All the other factors that cause low quality cost and time overruns can be related to human risk factors. It is thus fundamental

that any approach to addressing the problems of project performance and its advancement will be related to the human elements.

2.2.2.3. Challenges of Railway Construction Projects

Railway construction costs, times and qualities are influenced by various factors that make it difficult to create an estimate that is applicable to every site. These factors can be grouped in two categories: location characteristics and service characteristics. Location characteristics, such as land use and terrain of the area, can have considerable influence on costs, time and quality. Service characteristics include the speed and the level of service, which also have a great influence on cost. Note that other influencing factors such as sensitive land are also considered to be cost factors. The influence of topography type is based on multipliers that are applied to the appropriate base cost scenario. For example, the costs in rolling hills terrain are assumed to be 1.5 times those in plains, while the costs in mountainous topography are assumed to be 1.5 times those in rolling hills terrain (Transportation Research Board, 2000).

The land use distinctiveness reflects the most likely value of land encountered to build a railway. Land use is based on the costs associated with different land use types. Tunnels are dug in various types of ground, from soft clays to hard rocks, depending on the type of soil, a method of excavation selected and so on. Another possible way of tunneling is boring, and is preferred usually when cut and-cover method is not practical. A vertical shaft is constructed and the tunnels are dug horizontally from there. This method almost avoids any disturbance to existing streets, buildings and utilities and this fact draws the most essential side of boring method to be preferred instead of cut-and-cover tunneling. However, this shows, time consuming and also problems of ground water are more likely, and tunneling through native bed rock may require blasting. One disadvantage with this, however, is that the cost of bored-tunneling is much higher than building systems cut-and-cover, depressed open, at-grade or elevated (Wikipedia, http://en.wikipedia.org/wiki/Metro, last access June 9, 2005).For example, the study conducted by Russell Reynolds Associates (2016) on rail way bridges, and tunnel construction megaprojects described that it is estimated that nine out of ten megaprojects have exceeded their budget. Rail projects exceed their budget by an average of 44.7 percent, bridges and tunnels by 35 percent, and roads by 20 percent. These same projects are usually approved with the expectation of a 20 percent return on investment. Difficulty of

bed rock, mountainous land and so forth which have an effect not only on cost overrun and delay and also has an effect on quality of the construction process.

2.2.3. Project Success Criteria and Factors Reviewed

2.2.3. 1. Project Success Measurement Criteria

Criteria are the sets of principles or standards by which success can be judged. In other words, the conditions on which decision can be made. Critical Success Factors are measured against standards that are defined as success criteria. PMI (2004)) suggested that success criteria are measures for determining to what extent the project has succeeded or failed in achieving the aims of the project. Chan et. al., (2004) suggests that for a successful framework, the relationship between critical success factors should be identified. Westerveld (2003) stated that in several studies conducted previously that project success relies on developing a comprehensive framework to link success factors and success criteria. Combining these elements not merely results in project success but leads to on-going improvement.

Table 2.2. Success Criteria Derived From Literature

Success Criteria	**Contributors**	**Success Criteria**	**Contributors**
Project efficiency	Atkinson, (1999), Shenhar & Dvir, (2007), and Shenhar et al. (2001)	Cost performance	Atkinson(199d9), Shenhar& Dvir(2007) , Westerveld, (2003), Kloppenburg and Opfer, (2002), Shenhar et al. (2001), PMI (2008), PMI (2013) and Abednego (2015)
Stakeholder satisfaction	Belassi&Tukel(1996), Hackman (1987), Lim & Mohamed (1999) and Shenhar & Dvir(2007)	Time performance	Atkinson(1999),Westerveld(2003),Shenhar &Dvir(2007), Kloppenburg & Opfer (2002), Shenhar et al., (2001), PMI ,(2008), and PMI(2013)
Relevance	Samset(1998) Lim & Mohamed(1999) and Austrian development cooperation(2009)	Quality performance	Atkinson (1999), PMI(2013), Shenhar& Dvir(2007), Westerveld(2003), Kloppenburg and Opfer(2002), Shenhar et al. (2001), PMI(2008), Globerson(1994) Ling et al. (2009), Paul et al. (1999), Roman,(1964), Sperpell (1999), and Abednego (2015)
Contractor satisfaction	Shahu et al. (2012)	Effectiveness	Samset (1998), Lim & Mohamed(1999), Austrian development cooperation(2009)
User involvement & satisfaction	Shenhar et al.(2001), Hackman(1987) and Westerveld(2003)	Impact	Samset (1998), Lim & Mohamed(1999), Austrian development cooperation(2009)
Project team Satisfaction	Shenhar et al.(2007)	Sustainability	Samset (1998), Lim & Mohamed(1999), Austrian development cooperation(2009)

The identified success criteria (dependent variable) are measured by the success factors (independent variables) set parallel to each criterion. Measurement can be conducted by collecting information and analyzed using statistical tools and techniques. For instance, in Singapore, developed a model to find the project success index which is calculated based on five project success criteria.

According to them, in their model the contribution of project time management, project cost management, quality management and the client's performance to the overall success of the project is: 20.9%, 23.3%, 19.9%, and 18.6% respectively.

Another study conducted, in Kenya, by Abednego (2015), showed that the regression coefficients of project cost management (66.1%), human resource (61.2%) and time management at 68.1% was found.

Although many success criteria are identified by many scholars, however, this researcher has decided to be specific to assessing of the Project management success factors and challenges of railway projects in Ethiopia at operational perspective.

Here is the departure of this study. The success criteria (dependent variables) to be tested are: complete the project within time (time performance), complete the project within budget (cost performance) and complete the project with specified quality (quality performance).

2.2.3.2. Success factors Reviewed from literatures

Among many critical success factors reviewed, we can use selectively depending on the size, type, nature, characteristics of projects, location and other circumstances. The railway projects in Ethiopia are megaprojects which are large, complex and the first in its type that has no adequate experience by the local leadership and work force in general. The location is also in a wide range of altitude, topography, culture and environment. In addition to this, the contractors awarded are from abroad with differing in experience. Considering this all, this researcher has selected most relevant success factors among the list of the reviewed factors. These factors can be grouped in to two such as the human factor and the project management process factors.

Table 2.3: Critical success factors identified in literature

Critical Success Factors	Counts	Critical Success Factors	Counts
Cost management	38	Realistic schedule	14
Time management	36	Project sponsor champion	12
Quality management	34	Effective monitoring/control	12
Risk management	31	Adequate budget	12
Clear realistic objectives	31	Organizational adaptation/culture/structure	11
Strong/detailed plan kept up to date	29	Good performance by suppliers	10
Good communication/feedback	27	Planned close down	10
User/client involvement	24	Training provision	9
Skilled/ qualified/sufficient staff/team	20	Political stability	7
Effective change management	19	Correct choice/of PM methodology/tools	6
Competent project manager	19	Environmental influences	6
Stakeholder-management/participation	16	Past experience (learning from)	6
Strong business case	16	Project size, level of complexity, duration	5
Sufficient/well allocated resources	15	Different viewpoints (appreciating)	4
Leadership Effectiveness	14	Risks addressed/assessed/managed	3

Source: Westerveld (2003), Fortune & White (2006), and Korbijn (2014)

Among many types of the critical success factors(independent variables) identified by different researchers, the project critical success factors considered in this study are therefore: Project manager's leadership /administrative effectiveness, Contractors competency, Project team effectiveness, Stakeholder's participation, Risk management, Communication management, Time management, Cost management and Quality management factors.

2.2.4. Critical Success Factors for This Study

2.2.4.1. Project Manager's Leadership / Administrators Effectiveness

Leadership is the capability to establish vision and direction, to influence and align others towards a common purpose and to empower and inspire people to achieve project success. It enables the project to continue in an environment of change and uncertainty. Saif et al,(2014)concluded that, leadership competency has positive impact on the project success which was previously neglected due to some unknown reasons. Leadership is a universal topic and has been an effective source for organizational success yet in project management it is evolving. As per earlier studies, they concluded that project leadership competencies are alike to competencies of leadership in general management.

Megaprojects are high-profile and high-risk projects, companies face high stakes when it comes to appointing the proper leaders for these projects. According to Thomas and Mullaly (2008), much of 20th century Project Management leadership was focused upon return on investment and iron triangle results (within time, cost budget and to acceptable quality (Toor, and Ofori(2008).

Megaprojects generally are managed with two project leaders at the level of controlling: On one side, the owner-side megaproject leader represents the joint venture, company or government body that has commissioned the project. This leader's primary focus is on ensuring the project is delivered to specification and answers to the project owner's needs. On the other side, the contractor side megaproject leader, employed by the contractor engaged to carry out the project, is responsible for the successful planning and building of the project.

Given that these extremely complex, high-risk projects are essential to modern life and will guarantee future economies and communities, what kind of leader is required at the wheel?. These days, companies seeking megaproject leaders have focused on individuals' past project experience. The most optimistic estimate suggests that a single individual will likely have managed, at most, three to four megaprojects in his or her lifetime.

As Russell Reynolds Associates (2016), stated that the association of Russell Renolds has collected a profile of 31 of the world's leading megaproject leaders, with the following

results. The majority of these leaders are male, with only five females in their sample. They tend to be more mature,81% of megaproject leaders surveyed were over the age of 50%, and 19% were over 60 years of age. Maturity can be used here as a proxy for years of experience: Current megaproject leaders have spent an average of 25 years working their way up a focused career ladder.

According to that study, Megaproject leaders' most recent preceding in megaproject leading role shows Project management(42%), Operations management(25%), Division head(7%), Engineering(4%), General management(4%), strategy(4%) and Corporate affairs(4%). To brief it more, prior to their appointment as a megaproject leader, close to half (42 percent) of both owner- side and build-side leaders were managing a preceding project. A quarter (25 percent) was project operations leaders prior to their current role. Other preceding functions include leadership of a company division (14%); a pure engineering role (7%); or even general management, strategy or corporate affairs 4% each. Hence, there are, even today, multiple avenues to becoming a megaproject leader.

According to Russell Reynolds Associates (2016), the critical factors of successful megaproject leaders are: strategic mindset, communication in all its forms, change leadership, business acumen, balanced decision making, and political intelligence.

2.2.4.2. Contractors Competency

Construction projects and their success are highly dependent on contractors (PMI, 2004). Appointment of the right contractor will not only ensure the overall quality of the project but also offer the opportunity of saving on costs. When the main contractors start their main duties, it impacts upon a project's success when the project reaches the construction or execution stage. During this lifecycle, the actual work of the project is accomplished.

Over the past few decades, numerous studies have highlighted success criteria and Critical success factors of contractors. Research results of Belout and Gauvreau (2004) indicate that contractors with adequate labor resources have a great influence on project success. The adequacy of labor resources variable was a statistically significant predictor of project success in the scheduling, budget, and contractors' influence models. This is asserted that people are

responsible for creating, managing, operating and utilizing projects and play a decisive role regarding the success or failure of a project.

Wong, (2003) showed that contractors with adequate plant resources are an important and statistically significant factor affecting project success. The scheduling model reveals that the adequacy of plant resources factor is a statistically significant predictor of project success. The study also revealed that examining company image and turnover history of a contractor appears to impact on the success of a project.

2.2.4.3. Project Team Effectiveness

Team Effectiveness is defined as the project manager or leader's perception on team members' performance in task completion, goal achievement, empowerment, information sharing and team's ability to create and sustain good working environment (Bourgault et al., 2008) .Team effectiveness refers to the extent to which a team has been successful in meeting the objectives of their project.

The quality of a project depends to a large extent on the skills and experience of project team leaders; managerial system (decision-making, choosing the correct strategy, setting-up specific objectives, selecting people, delegating responsibilities, and evaluating results); and the procedures adopted during the construction process. Azmy (2012) stated that**,** team effectiveness is important in construction project teams and project performance. The team effectiveness factors identified (team goals and objectives, team leadership, team relationship, team roles and responsibilities, team communication, and trust and values) have an impact on the performance of the construction project.

2.2.4.4. Stakeholder's Participation

Stakeholders are those with a particularly significant interest in the project's outcome, including those providing funding or right of way for the project and property owners who are affected by the project. Or it is an individual, group, or organization who may affect, be affected by, or perceive itself to be affected by a decision, activity, or outcome of a project. According to many studies, Stakeholders are unique for each project. Stakeholder participation has significant influence on project success (PMI, 2012).

According to the Ministry of Finance and Economic Development of Ethiopia (2008), Stakeholders should not be considered simply as recipients of monitoring and evaluation reports. Rather, they have the right and responsibilities to know what is happening in the project, which aspect needs corrective action, what the results are, and which lessons can be learned and shared with one another.

2.2.4.5. Project Risk Management

Risk planning, risk identification and Risk-response are a key component of risk management in railroad construction. During railroad construction risk factors exist in construction project from different aspects; for which all adopted response measures are different.

Major risks expected in railway construction projects are: geological risk, stakeholder conflict, weather, economic, political, law, and physical site, scope of work, construction contract, designing, materials, and financial and human resource risks. Risk-response is a key component of risk management in tunnel construction. The major project risk management factors such as: identifying and documenting project risks, updating the risk response plan and strategy, using risk break down structure (RBS) in the identification or planning of risk, estimating the chance of occurrence of risks, performing quantitative and qualitative risk analysis, preparing a detailed risk response plan for risks that warrant action, using risk register/log in the risk management process Performing risk audit in a project (Examining and documenting the effectiveness of the risk response strategy, and the risk management process),,developing risk response strategy, performing risk monitoring and control, and others are very critical of the project success or failures(PMI,2004, and Kernzer, 2013).

It involves choosing appropriate measures to eliminate or reduce the chances of risk happening or mitigating its impact in case of occurrences. Making these choices requires project information, technical knowledge, and contractor's and project managers' experience **(**Yan, 2014**).**

In a study finding of project success factors in Kenya, risk management descriptive analysis for overall success of the project has contributed about 85% and R^2 of .460. The mean value of project risk management was 3.9406 .

2.2.4.6. Project Communication Management

By definition, project communication management refers to the set of activities concerned with the generation, collection, presentation, distribution, and secure storage of information within a project and its environment. Project communication management is thus the backbone to effective decision making during the lifespan of a project. Project communication is the exchange of project-specific information with the emphasis on creating understanding between the sender and the receiver. Effective communication is one of the most important factors contributing to the success of a project. Communication is the fuel that keeps the project running smoothly to complete in time, with budgeted cost and with specification according to planed quality. Project communication includes general communication between team members but is more encompassing (PMI, 2004).

According to different scholars and practitioners, failure to communicate is often the greatest threat to the success of projects. This means, Communication is the glue that holds a project team together. Communication is not just talking. It is also listening. Without clear, timely, unambiguous communication, even a small team working together will have major problems. In the case of a virtual team, poor communication will render an already challenging situation nearly impossible to control. The project status needs to be tracked and monitored effectively using various tracking tools.

2.2.4.7. Project Cost Management

According to PMI (2013), Cost management is concerned with the process of planning and controlling the budget of a project or business. It includes activities such as planning, estimating, budgeting, financing, funding, managing, and controlling costs so that the project can be completed within the approved budget. Cost management covers the full life cycle of a project from the initial planning phase towards measuring the actual cost performance and project completion. To manage project costs effectively, there are three key processes we need to be able to perform: project cost estimating, project cost budgeting and project cost control.

Several cost estimating methods can be applied to predict how much it will cost to perform the project activities. The choice for the estimation method depends on the level of

information available. Analogous estimating using the actual cost of previous, similar projects can serve as a basis for estimating the current project. Another option is to use parametric models in which the project characteristics are mathematically represented. Cost control is concerned with measuring variances from the cost baseline and taking effective corrective action to achieve minimum costs (Kerzner, 2012).

Cost and activity control will help to manage the project budget. According to PMI (2013), Control is comparing actual performance with planned performance, analyzing variances, assessing trends to effect process improvements, evaluating possible alternatives, and recommending appropriate corrective action as needed.

Controlling is a three-step process of measuring progress toward an objective, evaluating what remains to be done, and taking the necessary corrective action to achieve or exceed the objectives. Project controls are aimed at increasing the performance of the project cost management.

According to the study of Abednego (2015), the Contribution of cost management for overall success of the project by descriptive analysis was 84%. The mean value of project cost was 4.6436 . The multiple linear regression analysis indicated that it has R^2 of .598 which showed a moderately strong relationship between project success criteria and the cost factors.

2.2.4.8. Project Time Management

Project time management is the efficient use of time by means of good organization, efficient productivity, and proper planning. Project managers, who are tasked with overseeing projects from start to finish, utilize these time management skills to complete their work in the most efficient, cost-effective ways possible. It is necessary because a team needs to be organized to meet deadlines and to streamline collaboration. The knowledge area of time management typically refers to the skills, tools, and techniques used to manage time when accomplishing specific tasks, projects and goals (Kerzner, 2013). Scheduling and sequencing of activities will usually use to manage the time to be used in the appropriate utilization of the project schedule time.

Scheduling is the process used to determine the overall project duration and when activities and events are planned to happen. This includes identification of activities and their logical dependencies, and estimation of activity durations, taking into account requirements and availability of resources. There are different types and formats of schedules. Examples of schedule formats are milestone charts, bar charts and project schedule network diagrams. These formats are briefly described as follows (PMI, 2013).

Previous study revealed that the Contribution of time management for overall success of the project by descriptive analysis was 92% with the mean value of project time was 4.6446 (Abednego, 2015).

2.2.4.9. Project Quality Management

Project quality management is the discipline that is applied to ensure that both the outputs of the project and the processes by which the outputs are delivered meet the required needs of stakeholders. Quality is broadly defined as fitness for purpose or more narrowly as the degree of conformance of the outputs and process. According to Iyer (2006), study findings, the critical success factors obtained was: project manager's competence; top management's support; monitoring and feedback by project stakeholders; and administrators' competence. The factors that harmfully affected the quality performances of projects were: conflict among project stakeholders/participants; aggressive socio-economic environment; harsh climatic condition; Project Manager's ignorance and be deficient in of knowledge; defective project conceptualization; and aggressive competition during tendering.

As Abednego, (2015) the influence of quality management for overall success of the project by descriptive analysis was 85% and the mean value of project quality was 4.7426 .

2.2.5. Summary of Empirical literature Review

In the literature review, project cost overrun and delay becomes significant challenges of the project management process. The human factors are the most influencing factors of project failure and /or delay, the next influencing factors are project management process factors. Project success is defined by different Stakeholders differently based on their perspectives. This shows it differs from project to project. Therefore, studying the success factors of these particular railway projects is relevant and significantly important.

Although, there are many success measuring criteria and critical success factors set by different scholars, all of them cannot be equally important for all types of projects as every project is unique in different aspects. Researchers have to select their relevant type of success factors specific type, size or nature of projects.

Hence, the critical success factors are selected for this study, among many of them, and grouped in to two major categories depending on their generic characteristics. The major groups are:

1. The four human related critical success factors such as: Project manager's leadership/administrative effectiveness, Contractors competency, Project team effectiveness, and Stakeholders participation
2. The five project management process critical success factors such as: Risk management, Communication management, Time management, Cost management and Quality management.

In this study, each critical factor has been used as independent variable where each criterion is placed as dependent variable in the multiple linear regression analysis.

In addition to this, each critical success factor is divided into its subdivision factors and will be evaluated by descriptive analysis (percentage, mean and standard deviations) using those factors listed under each critical factor. This has been designed by quantitative structured questionnaires.

2.3. Conceptual Framework

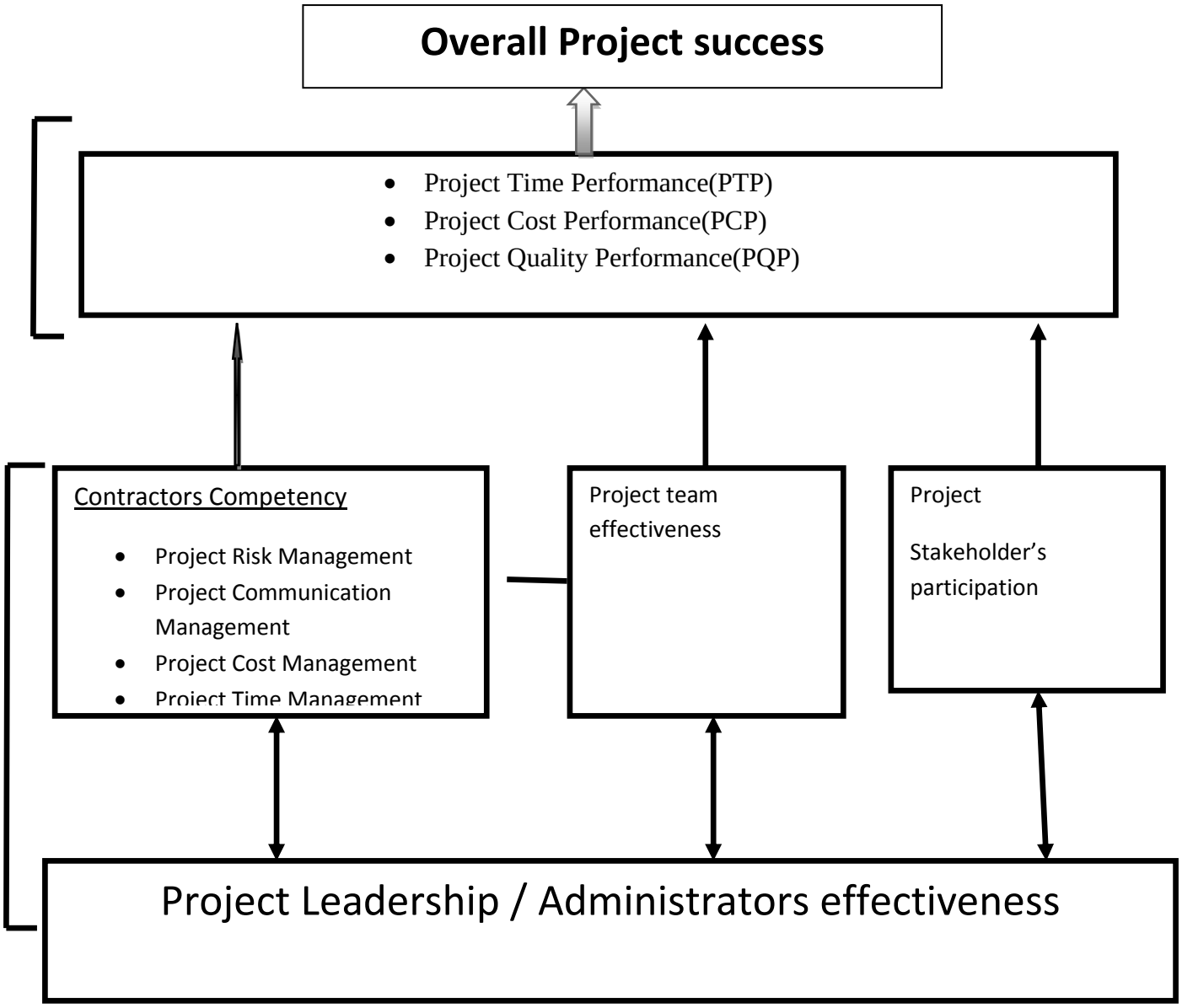
As it is described in the above section 2.2.5, the major critical success factors which are to be used in this study are selected and grouped into two categories such as: the human related critical factors and the project management process group critical factors .The measuring criteria selected from literature review to conduct this thesis research for the measurement of the overall success of the railway project in Ethiopia are project cost performance, project time performance and project quality performance.

Therefore, the conceptual frame work of this research is presented in figure 2.4below.

The **arrow shows** the direction of management activity flows, influences and command of chains, controls, responsibility flows, and activity directions and so on for the success of the

project. In principle a project management office are led by project managers or administrators. This means, the project plan is prepared and directed by project managers. The project managers perform leadership activates, direct project activates, provide support to the project team and receive report from the team and so on. The project team also make monitoring and evaluation activities such as: the risk management activities, time managements, quality issues and communication activates and others as well. Besides, project managers communicate not only with the team but also with the concerned stakeholders and contractors. On the other side, the project team and stakeholders usually communicate with the project managers and with contractors. The contractor is also expected to communicate and provide regular reports to the project managers or the project team members. The contractor obligated to perform project activates towards the completion of the project with successful achievement. There are interconnection between different participants and the project success factors are lead or administered with those networks.

Figure 2.4.The Conceptual Framework of the Project success



CHAPTER THREE
RESEARCH DESIGN AND METHODOLOGY

For this thesis research methodology, the research methods, approaches, designs, sampling techniques and sample size, data collection methods, and data analysis methods are described hereunder in detail one by one.

3.1. Research Design and Approach

According to Yin (2009), any researcher can use diverse strategies in his/her research or more than one design at a time that means different research designs may be employed both at a time, one or two at a time for a single research program.

Therefore, this thesis research employed two types of designs such as descriptive and mainly explanatory methods. Descriptive design was used to describe the analysis of the collected data while explanatory design was concerned to test both some objectives and the research hypothesis, since one of the aims of this research is finding relationships between various success factors and in their influence on project success.

Creswell and Borrego described three research approaches: such as qualitative, quantitative and mixed methods (Creswell, 2013). Based on the character of the research questions, here, in this study, mixed approach is used with a larger extent of positivists (quantitative). Within this general positivist framework, elements of the phenomenological (qualitative) approach also have been incorporated to provide alternative insight and to identify major challenges of the project management process.

3.2. Research Methods

For this thesis research, survey method has been chosen as the appropriate method to collect data in concerning project success factors concentrated on the scheduling, monitoring and controlling process of the railway megaproject. Furthermore, the survey method can cover interview, questionnaire method and document review of the railway project management

process and triangulate it. Survey method provides with standardized answers allow easy comparison and generalization; and also researcher's control of the process and gives opportunity to increase the speed of data Collection (Creswell, 2013).

3.3. Sample and Sampling Techniques

3.3.1. Sampling Population

The population of this study is working forces of the Ethiopian railway corporation which covers managers and all workers of the railway projects. The sampling frame of this study was all project staffs who has first degree and above and have worked directly in the project.

3.3.2. Sampling Techniques

The proposed sampling technique for this population is purposive sampling where the respondents were selected based on the criteria (Black, 2010; Saunders& Thornhill, 2012).

3.3.3. Sample Size

There are suggestions (Burns, 2000; May, 2001; Bryman, 2004) that sample size is not necessarily the major consideration in designing the research method, as long as it fulfilled the basic requirements. According to Bryman, (2004), the decision about sample size is not a straight forward once as it depends on numbers of considerations: so there is no definitive answer. Voorhis and Morgan (2001) propose rules of thumb for sample size of multiple regressions is 50 to 300 samples which suggested that different statistical procedures require different numbers of sample size. The pragmatic issues were based on Bryman, (2004) considerations that in most cases, determining sample size is related to time and cost resources.

According to Roscoe (1975) proposes the sample size in multi-variety research (including multiple regression analysis, the sample size should be several times (preferably 10 times or more) as large as the number of variables in the study.

When the population is less than 1000, we can take a sample of 30% of the total population. If the population is greater than 1000, a sample size of 10-20% can be a representative of the population (Gay and Airasian, 2003).

The total population of this study were 264 project team members who have at least first degree and have been working in the construction of the railway projects.

Therefore, Sample size of respondents of this thesis research is total sampling population*30% = 264*0.3= 79 respondents are participated. This means, for the quantitative data collection of the study, a sample size of 79 members were selected from a population of 264.The number of variables planned to be used in the regression analysis are six. So, 6*10= 60, this is less than 79.Based on the above guidelines, the sample size planned to be used in this research is believed to be sufficient to be treated as parametric. Secondly, for the qualitative data collection of the study, five key participants were invited for interview purpose.

3.4. Data Sources and Tools/Instruments of Data Collection

This study has employed both primary and secondary data. Primary data represents to data obtained first hand by the researcher on the variable of interest for the specific purpose of study, while secondary data is those collected from sources already existing in the concerned organizations or by stakeholders of the project to be studied. Data was collected using three methods such as by structured questionnaire, interview of informative groups and secondary data by reviewing of major project documents.

3.5. Procedures of Data Collection

For quantitative data collection, having decided on the dependent variables, Likert rating scale was adapted to support producing the appropriate ratings. Except for demography questions, all variables (dependent and independent) identified were incorporated in the questionnaire properly for measurement purpose with a 5-point Likert scale rating of 1-5 points. The questionnaire were distributed to employees who have been directly working in the project activities to fill it independently and returned for analysis.

For the interview purpose a group was organized holding key persons who have been working in all project life cycles of the railway construction project.

3.6. Methods of Data Analysis

The data analysis procedures adopted were: statistical analysis of descriptive frequencies, means and multiple linear regressions to test the association of success factors, and the effect of success factors on the overall success of the railway projects . Analysis was done using SPSS for Windows, Version 20). Qualitative data was analyses using content analysis based on the research questions.

3.7. Reliability and Validity tests

Reliability is concerned with the question of whether or not a result is stable (Bryman and Bell, 2007). The idea of reliability is important for measuring. The research method carefully explained throughout this research. The sample selection based upon non-probability. The people are selected because of their positions of responsibility in this area. The respondents are free to answer the questionnaire without stress, which would have negative effects upon the reliability of this study. This study is possible to reproduce with consistent results. Validity is concerned with "the integrity of the conclusions that are generated from a piece of research" (Bryman and Bell, 2007). The process of survey, the questionnaire sent to the respondents is understandable and acceptable. In addition, the empirical data analyzed with SPSS for windows, which is possibly the most widely used computer software for the analysis of quantitative data.

Furthermore, when conclusions are to be drawn about a population on the basis of regression analysis carried out on a sample of that population, there are several assumptions that must be taking into consideration and satisfied to allow for the statistical validity of the findings, which are as follows in table 3.1.below:

Table 3.1. Rule of Thumbs for Statistical Tests

Item no.	Statistical tests	Rule of thumbs
1	Linear relationship test	Q-Q plot and Scatter plot must show Linearity of independent and dependent variable relationships
2	Reliability test	**Cronbach's alpha** > 0.6
3	Test of Model fitness (R^2)	Between 0 and ±0.20 - Very weak , Between ±0.20 and ±0.40 – Weak, Between ±0.40 & ±0.60 – moderate, Between ±0.60 and ±0.80 - Strong and Between ±0.80 and ±1.00 – Very strong
4	Multicollinearity test	$r < 0.90$, tolerance > 0.10 and VIF < 2.5
5	Skewness test	$-1 < r < +1$
6	Durbin-Watson statistic test	0 to 4

Based on this, the multiple regression tests relevant statistical analysis have been done such as: reliability tests, linearity test, normality test, Goodness of fit test ($\mathbf{R^2}$), F-test, t-tests, correlation analysis and other relevant reliability statistical tests were conducted as mentioned in chapter four tables4.1 below.

3.8. Ethical Considerations

Obeying ethical rules is vital in conducting research. The researcher received a letter of introduction form the St. Mary's university. Letter of permission enabled the researcher to carry out the research and approach the informants. Participant of the study was informed about the objectives of the study emphasizing that the data were used only for the intended academic purpose only. Careful attention was given, regarding respecting the rights, needs and values of the study subjects, and maintaining confidentiality of the data and acknowledging sources of information.

CHAPTER FOUR
RESULTS AND DISCUSSION

In this section, the researchers collected data were discussed, analysed and presented. To collect important information the investigator were distributed 79 questionnaires for selected respondents from this 76 were returned and analysed with a response rate of 96%.

4.1. Descriptive Statistics of Dependent and Independent Variables

To include all the data values, the most frequently used measure of central tendency is the mean or average, which includes all data values in its calculation. Because the mean is the building block for many of the statistical tests used to explore relationships.

As indicated in table 4.1.below, the mean value of Project team effectiveness, Project manager's leadership / Administrators effectiveness, Contractors competency and Project cost management were 4.0395, 3.9737, 3.9605 and 3.9079 respectively having rated better followed by Project time management, and Communication management which have a mean of 3.7763, and 3.7237 respectively. While Project quality management, Project Risk management and Stakeholders participation have the smallest mean of 3.5395,3.5000, and 3.4605 respectively.

This result shown, most of the factors have mean value of greater than 3.5 which is nearly 4. It is evident that, respondents have agreed most of the project success factors were well practiced in the project management process. In addition, we can also evaluate that all the success factors (independent variables) have strong effect on the dependent variables (railway construction project success).

In addition to the mean value, frequency distribution of the identified project success factors were evaluated and presented in Likert scale format in table 4.1 below.

Table 4 .1. Descriptive Statistics of Dependent and Independent Variables

No.	Variables	N	Strongly Disagree N (%)	Disagree N (%)	Neutral N (%)	Agree N (%)	Strongly Agree N (%)	Mean
1	Project manager's Leadership/ Administrative Effectiveness	76	-	**2(3)**	**9(12)**	**54(71)**	**11(15)**	3.9737
2	Project Contractors Competency	76	.	-	**13(17)**	**51(67)**	**12(16)**	3.9605
3	Project Team Effectiveness	76	-	**2(3)**	**7(9)**	**53(70)**	**14(18)**	4.0395
4	Stakeholder Participation and Management	76	-	**4(5)**	**21(27)**	**47(62)**	**4(5)**	3.4605
5	Project Risk Management	76	-	**4(5)**	**17(22)**	**49(65)**	**6(8)**	3.5000
6	Project Communication Management	76	-	-	**13(17)**	**52(68)**	**11(15)**	3.7237
7	Project Cost Management	76	-	-	**13(17)**	**52(68)**	**11(15)**	3.9079
8	Project Time Management	76	-	-	**15(20)**	**48(63)**	**10(13)**	3.7763
9	Project Quality Management	76	-	**2(3)**	**19(25)**	**44(58)**	**11(15)**	3.5395
	Valid N (listwise)	76						

Source: Own Survey, (2017)

As item no.1 table 4.1 above showed, out of seventy six respondents that have responded the questionnaires, when agree and strongly agree are summed up, 86 %(66) of them have agreed that project managers/administrators have effective leadership ability. Where,3 %(2) respondents did not agree. However, 12% (9) of respondents for this factor were neutral. The other success factor evaluated was project contractor's competency. For this factor, 83 % (63)of respondents have agreed there was relatively effective contractor for the success of the project.

In this study, out of seventy-six respondents, in table 4.1 above, 88% (67) of them have decided the railway construction project teams were effective to complete the project successfully where only 3% (2) of them were disagreed and 9% (7) of respondents have not decided (neutral). This result has demonstrated that the project team was the most important success factor of the project completion within time, budget and specification.

The result from table 4.1., item no. 4 has also revealed that the participation of stakeholders was agreed by 67% (51) of the total respondents. However, in this success factor 27% (21) were neutral and 5 % (4) were disagreed. We can conclude that stakeholder participation was the least contributing factor which was not clearly decided by the mentioned respondents.

The frequency distribution from table 4.1 demonstrated that non- human success factors such as: risk management 73 % (55), communication management 83 % (63) cost management 83% (63), time management 79% (58) and quality management 73 % (55) of the respondents respectively have agreed that these success factors were also important in the project management process.

According to the assessment findings result revealed in table 4.1 above, the contribution of success factors for the overall success of the railway construction project can be ranked as follows: Project Team Effectiveness, Project manager's Leadership/ Administrative Effectiveness, Project Contractors Competency, Project Cost Management, Project Time Management, Project Communication Management, Project Quality Management, Project Risk Management and Stakeholder Participation respectively are important success factors for the success of railway construction project in Ethiopia.

4.2. Multiple Regression Analysis

Table 4.2. Relevant Statistical tests

Item. No.	Statistical tests	Test results	Decision
1	Linear relationship test	Both the Q-Q plot and scatter plot line of all the variables are linear	All independent variables have linear relationship with dependent variables
2	Reliability test	Cronbach's alpha is 0.92	It is More reliable
3	Test of Model fitness (R^2)	R^2 is between 0.58 to 0.622	Multiple regression model is fit for this study
4	Multicollinearity test	r is <0.50,Tolerance= 0.768 to 0.872 and VIF = 1.147 to 1.301	No problem of Multicollinearity
5	Skewness test	-0.716 to - 0.001	Both variables are within the acceptable range for normality, Observation distribution is asymmetric
6	Durbin-Watson statistic test	0 to 2.455	There is independent of residuals

Source: own Survey, (2017)

Based on the result of statistical tests, in table 4.2 above, the result of the test showed that, collected data were consistent, reliable and the regression model used was validated, and fit to this study.

4.2.1. Analysis of the dependent variable Regression Equation

Table .4.3. Model Summary of Time, Cost and Quality Performance Regressions

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.780[a]	.608	.574	.29569	2.323
2	.789[a]	.622	.589	.24714	1.854
3	.763[a]	.582	.545	.32794	2.455

a. **Predictors:** (Constant), Communication management, Project team effectiveness, Project Risk management, Contractors competency, Stakeholders participation, Project manager's leadership / Administrators effectiveness

b. **Dependent Variable 1:** Completing the project within time
c. **Dependent Variable 2 :** Completing the project within budget
d. **Dependent Variable 3**: Completing the project with specification(specified quality)

Source: Own survey, (2017)

The regression of project time performance (model 1) on the explanatory variables gives an R^2 value of 0.608, as shown on table 4.3 above, Where $0<R^2< 1$**.** Here, 60.8% of the variability in the time performance of a railway project has been explained strongly by the six explanatory variables in combined and 39.2 % variability is explained by other external variables which are not considered in this study.

As we can see in the Model Summary generated from cost performance(model 2)regression (Table.4.3) above,R^2= 0.622 which indicates that 62.2% of the variance in the project success criteria which is called complete the project within budget (cost) can be explained by this regression model. On the other side, the rest 37.8 % variability is affected by other external factors which are not included in this test of relationship.

The regression (Model 3) Summary (table 4.3) offers R^2= 0.582 which indicates that 58.2% of the variance in the project success criteria which is called complete the project with specified quality can be explained by these six project management success factors where the rest 41.8% is affected by other external factors. So, it has to be done alongside other indicators.

The ANOVA generated from dependent variables demonstrated that, there is significant relationship between dependent and independent variables (table 4.4. below).

In table 4.4, below at model 1, F-test examines the significance of R^2 (in this case, 60.8% goodness fit). The result of table 4.4 in the above, revealed that completing the project within time and the success factors with combined has significant relationship at (F=17.87, P<0.001).This means the six project critical success factors has a combined significant effect on the project time performance (PTP) of the railway construction project.

To verify the influence of six project management factors to the project cost performance, a Multiple Linear Regression was conducted. The result of the test (Table 4-4, below at model 2) demonstrated that those six factors has significantly influenced the success criteria of the project (F=18.947, P<0.001).This means, the six project critical success factors has significant combined effect on the project cost performance (PCP) of the railway construction project.

Table. 4.5. ANOVA of dependent variable Regression

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.375	6	1.563	17.871	.001[b]
	Residual	6.033	69	.087		
	Total	15.408	75			
2	Regression	6.944	6	1.157	18.947	.001[b]
	Residual	4.214	69	.061		
	Total	11.158	75			
3	Regression	10.316	6	1.719	15.987	.001[b]
	Residual	7.421	69	.108		
	Total	17.737	75			

a. **Dependent Variable (model 1)** : Completing the project within time **,**
Dependent Variable (model 2) : Completing the project within budget.
Dependent Variable(model 3) : Completing the project with specification(specified quality)

b. **Predictors**: (Constant), Communication management, Project team effectiveness, Project Risk management, Contractors competency, Stakeholders participation, Project manager's leadership / Administrators effectiveness.

The result of table 4.5 at model 3, in the above showed, completing the project with specification and the success factors with combined has significant relationship at ($F=15.987$, $P<0.001$). This means, the six critical success factors in combination has significant effect on the project quality performance Index (PQPI) of the railway construction project.

4.2.2. Analysis of the Dependent and Independent variables Regression Equation

Table 4.6. Regression Coefficients of Dependent and Independent Variables

variables	Model 1				Model 2				Model 3			
	B	**Std. error**	**t**	**Sig**	**B**	**Std. error**	**t**	**Sig**	**B**	**Std. error**	**t**	**Sig**
Constant	.454	.369	1.230	.223	.779	.308	2.526	.014	-.043	.409	-.105	.917
PLE	.283	.064	4.431	.001*****	.233	.053	4.372	.001*	.154	.071	2.180	.033*****
CC	.075	.063	1.179	.242^	.138	.053	2.610	.011*	.112	.070	1.600	.114^
PTE	.070	.060	1.176	.243^	.103	.050	2.071	.042*	.323	.066	4.901	.000*****
SM	.119	.056	2.109	.039*****	.081	.047	1.726	.089^	.130	.063	2.070	.042*****
PRM	.127	.056	2.256	.027*****	.092	.047	1.957	.054*	.238	.062	3.820	.001*****
PCM	.203	.055	3.668	.001*****	.150	.046	3.238	.002*	.018	.061	.299	.766^

Model 1 = Dependent Variable 1: Completing the project within time (Project time Performance= PTP)

Model 2 =Dependent Variable 2: Completing the project within budget(Project cost Performance =PCP)

Model 3 =Dependent Variable 3 : Completing the project with specification(Project quality Performance PQP)

***** Significant at p<**0.05**
^ Not significant at **p<0.05**

Source: Own Survey, (2017)

The result of t- test presented in Table 4-6 at model 1, above illustrated, except contractor's competency and project team effectiveness; each other success factors has significant relationship with time Performance of the railway project.

The result of the test presented in Table 4-6 above at model 2, suggested that, except Stakeholders participation, each of other factors has significant relationship with Cost Performance of the railway project.

The result of the multiple linear regression coefficient of t-tests presented in Table 4-6 at model 3 above, demonstrated, except contractor's competency and communication management factors each of other success factors has significant positive effect on quality Performance (project success criteria) of the railway project.

4.2.3. Hypothesis Testing

A linear regression test was conducted to verify the association between those six project management factors and the railway construction project success.

As it is discussed in chapter two of this thesis research, the railway project success at operational perspective is the aggregate outcome of the performance of the three success criteria such as: complete the project within time (time performance), complete the project within planned budget (cost performance) and complete the project with specified specification (quality performance).

4.2.3.1. The Effect of success factors on time performance

The result of the multiple regression test presented in Table 4.5 above, model 1 suggested that, there was a significant relationship ($F=17.87$, $p<0.05$) between the railway project success criteria such as completing the project within time and the six success factors in combined. In addition to this, the combined association was relatively strong ($R^2=.608$), which means that 60.8 % of the total variation in time performance was affectedbythe six success factors.

From the regression result in the above table 4.6, it can be concluded that project managers leadership/administrative effectiveness ($\beta=0.283$, $t=4.431$, $p<0.05$), stakeholders participation

(β=0.119, t=2.109, p<0.05), project risk management (β=0.127, t=2.256, p<0.05) and communication management (β=0.203, t=3.668, p<0.05) each have significant positive effect on projecttime performance. However, contractors competency (β=0.075, t=1.179, p<0.05), and project team effectiveness (β=0.070, t=1.176, p<0.05) has not significant positive effect.

4.2.3.2. The Effect of success factors on cost performance

The result of the test presented in Table 4.5 model 2 shows, there was a significant relationship (F=18.947, p<0.001) between the project success criteria such as completing the project within budget and the six success factors. In addition to this table 4.5 demonstrated the combined association was relatively strong (R^2=0.622), which means cost performance was affected positively by the six success factors.

From the regression coefficient result above at 4.6, we can understand that project managers leadership/administrative-effectiveness(β=0.233,t=4.372,p<0.05),contractors-competency(β=0.138, t=2.610, p<0.05), project team effectiveness (β=0.103, t=2.071, p<0.05),project risk management(β=0.092, t=1.957, p<0.05), and project communication management (β=0.150, t=3.238, p<0.05) each has significant positive effect on project cost performance. But stakeholders participation (β=0.081, t=1.726, p<0.05) has not significant positive effect on project cost performance.

4.2.3.3. The Effect of success factors on quality performance

The result of the test presented in Table 4.5,model 3 suggested that, there was a significant relationship (F=15.987, p <0.05) between the project success criteria such as completing the project with specification and the six success factors, which means that 58.2% of the total variation in project quality performance was positively affected by the six success factors.

From the βeta coefficients generated from regression of quality performance in table 4.6 above, it can be concluded that project managers leadership/administrative effectiveness (β=0.154, t=2.180, p<0.05) project team effectiveness (β=0.323,t=4.901, p<0.05),stakeholders participation (β=0.130, t=2.070, p<0.05)and project risk management(β=0.238, t=3.820, p<0.05) each has significant positive effect on quality performance. But contractors

competency (β=0.112, t=0.1.600, p<0.05) and communication management (β=0.018, t=0.299, p<0.05) each has not significant positive effect.

4.2.3.4. Factors Affecting Railway Project success

The railway project success is the aggregate output of the three success measuring criteria discussed in the above from sub title 4.2.3.1 to 4.2.3.3. That means, we can say, success factor of any of the above criteria is a sub set of the success factors of the railway project success. The grand mean of the three success criteria scores are regressed as follows in table 4.7 below.

Table 4.7. Coefficients of the Overall Railway Project Success Regression

variables	Model 4			
	B	**Std. error**	**t**	**Sig**
Constant	0.137	0.362	1.217	0.084
PLE	0.146	0.062	3.661	0.001**
CC	0.062	0.062	1.796	0.088*
PTE	0.131	0.058	2.716	0.049**
SM	0.083	0.055	1.968	0.072*
PRM	0.122	0.055	2.677	0.045**
PCM	0.074	0.054	2.401	0.002**

Model 4= the overall success of the railway project

*** = Significant at p<0.01
** = Significant at p<0.05
* = Significant at p<0.1

From the regression coefficient result above at 4.7, we can understand that project managers leadership/administrative-effectiveness (β=0.147,t=3.661,P<0.01), project team effectiveness (β=0.131, t=2.716, p<0.05),project risk management(β=0.122, t=2.677, p<0.05), and project communication management (β=0.074, t=2.401, p<0.01) each has significant positive effect on project success. But, contractors competency and stakeholders participation) each has no significant positive effect on project cost performance at p<0.05.

Therefore, we can conclude that the decision would be the null hypothesis is accepted for the six-tests of the hypothesis of this thesis research at P<0.1 level.

4. 3. Major challenges facing to Ethiopian railway projects

The qualitative collected data by interview method is analyzed based on the research question and presented focusing on the core points. The following are found to be critical failure factors for the Railway Projects in Ethiopia.

1. **High Investment Costs:** Right-of-Way: compensation payments for land acquisition, Construction costs: site preparation, earth works, infrastructure, supervision of work and contingencies and Rolling stock. For instance, in Ethiopian topography a 1 km railway construction may cost an estimated amount of 7 million dollar.
2. **Lack of skilled manpower in the sector:** Because it is not yet fully formed Manufacturing Industry for the Sector, the most challenging factors weremonitoring and controlling of railway projects on site, Operation and Maintenance of Railway Infrastructure, contract administration, etc…need experienced manpower.Respondents said **"***manpower allocation for the project was not enough some times during peak times especially during monitoring and evaluation times***".**
3. **Problems related to project Integrationmanagement:**there were problems of **Integration** with Utilities (Right-of-Way problems). That was Right of way issues along the Roots of the railway were challenging. For instance, Coordination with AACRA, AWSA, big factories, flower farms, EEU, Ethiotelecom, and other Addis Ababa city and regional authorities was difficult during the railway project construction.
4. **Poor participation of relevant stakeholders:** the public (Principally farmers and related people) alongside of the roots did not sufficiently participate.
5. **Project scope management problems:**they said ***"****During planning stage of the railway projects, a very detailed plan for the communication of stakeholders and risk management was not done sufficiently and this became a headache during the implementation phase***".** This means, the project planning phases must have considered stakeholders to participate at relevant process groups or stages.
6. **Lack of proper decision-**: There were constraintsof continuous decision and feedback to the contractors to do the project according to contract, quality and time.

7. **Contract administration constraints**: the project used selected contract delivery method (EPC**).**According to respondents,**"***The communication with the contractors was not open as client contractors**".** *The local/ the corporation'smonitoring and supervision team hadnot full power in controlling the work/process as per the plan to be with best quality.* Some Respondents wrote on the questionnaire**"***Due to Conflictof interests**,** there were multiple interests of the stakeholders for example to gain unnecessary economic advantage at the expense of the corporation costs**"**.*There were alsoConstraints of technology transfer. **"***There was contractor's unwillingness to transfer knowledge to Ethiopian engineering professionals**".***
8. **Geological and weather challenges:** difficulty of earth work particularly at Beseka Lake, unexpected flood and destruction of culverts, etc. in the down steams of the roots were Geological challenges of the railway construction.

4.4. Summary of Findings

According to Saif.,et al., (2014*),* leadership competency has positive impact on the project success. The finding of this study revealed, that leadership/administrative effectiveness has significant positive effect on railway project success. This result is in line with the literature reviewed in chapter two at 2.2.4.1 above.

Regarding the project leadership practices, the interview participants said *"in this railway project, we have seen Strong political will and commitment from the government". There was a project steering committee that was headed by core higher officials and members of it were ministers, and more concerned sector authorities. In addition to this, the ERC board was a responsible body to administer the overall project leadership to move towards success".*

"Both the steering committee and the board were evaluating the performance of the project activities every fifteen days and gave strong directions to the project leadership and also to the core stakeholders (like ERC, Ethiotelecom, EEU, transport minister, regional governments, Ethiopian revenue authority, and others)".

These shows, there were strong project administrative activities which made the project to be successful. We can say, the project managers had strong top management support. The top

management of the corporation was cascading their vision and mission both physically and spiritually many more times to their subordinates.

Both the quantitative and qualitative analysis revealed that project leadership played significant role on the overall project success. In the descriptive frequency and mean distribution leadership and team effectiveness were the most important success factor for project success. In addition to this, as the regression analysis demonstrated, a 1% change on the value of project management leadership will change the project success by 22.3%. This shows the finding of this study has agreed with the previously studied results by other researchers such as Russell Reynolds Associates, (2016); Toor, and Ofori, (2008). And also a 1% change on the value of team effectiveness will change the project success by 16.5 %. This study has been concluded in line with the study of Azmy (2012) and Bourgault et al., (2008) who stated that**,** team effectiveness is important in construction project teams and project performance. Risk and communication management are the next significantly influencing factor on the success of the railway construction project in Ethiopia. A 1% change on the values of risk and communication management will change the overall success of the railway project by 15% and12.3% respectively. These results have agreed with other researchers ((PMI, 2004; and Kernzer, 2013).

Stakeholder participation and Contractors competency were also important success factors which accounts 1% change on the value of each factor will change the project success by11.1 % and 10.8 % respectively, which is supported by the study of PMI (2004); Belout and Gauvreau, (2004); and Wong et al., (2003) stated that contractors with adequate plant resources are an important and statistically significant factor affecting project success.

To summarize, collected data about project success factors identified from literature have been analyzed and accordingly interpreted. It is concluded that project leadership effectiveness, team effectiveness, contractor's competency, risk management, cost management, time management, communication management and stakeholder participation respectively with their order become critical success factors of the railway construction project success. Each of these factors has significant positive effect and has linear relationship with the overall project success. Cost performance is the most significantly contributing criteria of project success followed by time and quality performance. The overall findings

revealed that project leadership/administrators and project team commitment was strong and has good political intelligence.

On the other hand, the findings showed that there is weakness of stakeholder participation and project integration management activities such as coordination of relevant government institutions in the area of right- of way issues, land compensation and participation of stakeholders particularly, participation of farmers' on the roots of the railway was poor. There were also problems in the area of contract administration and scope management such as: technology transfer issues, quality control issues, monitoring and evaluation, documentation and lesson development activities were not effectively managed. According to Davies,(2002) Megaproject success is strongly linked with Stakeholder Management Success.However; in this project, Stakeholder participation seems to be weakly practiced in the project management process. The result of both the quantitative and qualitative analysis demonstrated that the practice of this factor was less than all of the other factors. This result is not also agreed with the guidelines of Ministry of Finance and Economic Development of Ethiopia (2008; and PMI, 2012).

As the interview data shown, clear project charter and other relevant subsidiary plans have not been well prepared such as: project communication plan, project risk management plan, project integration management plan, project procurement plan, and stakeholder management plan that would assist the project management process more effective. Because of the fact that, the project has used an ECP/ Turnkey contract type of project procurement, it leaves most of the documentation tasks to the contractor and receives progress report.

CHAPTER FIVE
CONCLUSION AND RECOMMENDATIONS

In this chapter, a conclusion of the research findings that has been discussed and analyzed indetail in chapter four is drawn shortly. Furthermore, possible recommendations based on the findings have been provided and also future research gaps are indicated hereunder.

5.1. Conclusions

The study concluded that project success factors such as: Project managers leadership/ administrative effectiveness, project team effectiveness, contractor's competency, project Cost management, project communication management, project time management, project quality management, project risk management, andproject stakeholders participation respectively are found to be critical success factors contributing to the railway construction project success.That means all the variables tested are critical factors which strongly influence the success of the railway construction projects in Ethiopia.However, stakeholder participation factor was weakly managed.

In addition, each of these success factors has significant positive effect and has linear relationship with each of the corresponding success measuring criteria and also with the overall railway construction project success.

The regression findings concluded that contribution level of success criteria to the overall project success showed that completing the project within budget (Cost performance) is the most significantly contributing criteria of project success followed by complete the project within time(time performance) and complete the project with specified quality(quality performance)to influence the success of railway construction projects.

The study findings has also concluded that Major challenges of the railway construction in Ethiopia are: investment costs, skilled manpower, project integration management, stakeholder management, scope management, contract administration, and land topography which have been influencing negatively.

5.2. Recommendations

Based on the above finding and conclusion the researcher forwarded the following recommendations.

- Stakeholder management should be given prime attention in order to strengthen the project sustainability and impacts on the country's economy.The Ethiopian railway corporation (ERC) has to participate relevant stakeholders such as: farmers on the road sides, people to be displaced and others that may be affected by the project. ERC should give emphasis on improving contract administration by developing skilled manpower and project lesson development activities. Success factors that have significant effect on the overall success of the project should be managed selectively according to their effects.
- Problems in the area of project integration management particularly coordination of core stakeholder sectors must be solved to not will happen in other railways projects intended to be construct in phase II in the coming five years. Respect the voice of stakeholders.
- Contract administration constraints such as implementing strong monitoring and control practices, technology transfer and keeping quality according to agreements must be solved in other similar projects by taking lesson from these projects.
- Projects management subsidiary plans such as project scopemanagement plan, cost, time, quality, risk; HRM, stakeholder participation, communication and contract administration plans need to be prepared and implement to solve integration and coordination problems and also must be managed properly for the success of the project.
- **Recommendation to Further studies:**
    - This study was limited to project success at operational perspectives (construction aspects) only. Therefore, further studies arerecommended to study the railway project success at tactical perspectives(such as: project Effectiveness, overall Impacts and relevance of the project) and also at strategic perspectives focusing on Sustainability of railwayprojects at broader and complex level to test whether the project contributes to economic development or positive changes in society or to the country.

5.3. Limitations of the study

This study was conducted with some sort of limitations. One of the limitations of the study was unavailability of research literature on the railway projects management in Ethiopia.

The researcher was faced many problems which, in fact, may affect the quality of the study. Even though, mixed approach is used in this study and can reduce the weakness effects of the Quantitative approach, the following limitations were expected**:** unwillingness of the respondent to fill the questionnaire, delay in returning back the questionnaire, unavailability of well-organized secondary data that could be easily accessed for the purpose, shortage of time and budget to undertake the study. To minimize the effects of these problems, the researcher has used maximum effort through spending more time and giving more attention.

REFERENCES

Abednego O.G. (2015)..Development of A Project Management Evaluation Model for the Construction Industry in Kenya. Unpublished PhD dissertation, Jomo Kenyatta University of Agriculture and Technology, Kenya.

Berenson, M. L., Levine, M. L., Krehbiel, T. C., & Stephan, D. (2002).Statistics for managers. Upper Saddle River, NJ: Prentice Hall.

Belout, A., Gauvreau, C., (2004). Factors influencing project success: the impact of human resource management. International Journal of Project Management, 1–11.

Bryman, A. (2004). Social Research Methods.2nd ed..Oxford: Oxford University Press.

Bryman, A. & Bell, E. (2003).Business Research Methods. Oxford: Oxford University Press.

Berenson, M., Levine, D. and Krehbiel, T. 8th Edition (2002).Basic Business Statistics: Concepts and applications. New Jersey: Prentice Hall

Borrego, M., Douglas, E.,&Amelink, C.(2009). Quantitative, Qualitative, and Mixed Research Methods in Engineering Education. Journal of Engineering Education,

Bourgault, M., Drouin, N., & Hamel, E. (2008). Decision making within distributed project teams: An exploration of formalization and autonomy as determinants of success. PMI Project Management Journal, *39,* Supplement, S97-S110.

Burns, R. B. (2000). Introduction to Research Methods, 4th ed. London: Sage Publications.

Cambridge Systematic, Inc. (2007).National Rail Freight Infrastructure Capacity and Investment Study. Washington DC: Association of American Railroads, 2007.

Chan A., Scott D. and Chan A. (2004).'Factors affecting the success of a construction project' Journal of Construction Engineering and Management vol. 130.

Chew Tai, C. (2011).Sustainable Railway Development through Careful Planning, Design and Implementation, honk Kong.

Cheong Yong, Y., & Emma Mustaffa, N. (2012).Analysis of factors critical to construction project success in Malaysia. Engineering, Construction and Architectural Management, 19(5), 543-556.

Chimwaso, D. K. (2000).An Evaluation of Cost Performance of Public Project. Case of Botswana.In2nd Construction Industry Development in the New Millennium. Gaborone.

Creswell, J. W. (2013). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. United States of America: SAGE Publications.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003).Applied multiple regression/correlation analysis for the behavioral sciences, *3rd Ed*. Mahwah, NJ: Lawrence Erlbaum Associates

Cook-Davies, T. (2002).*The* real success factors on projects. International.Journal of Project Management, Vol. 20, pp.185-190.

David, T. (2015).Thinking Business Advice and insight for the everyday business person.

Elías, B. (2015).Critical Success Factors for Planning, Scheduling and Control in Design and Construction: unpublished Master thesis, Reykjavík University, Norway.

European Commission. (2013a): The Fourth Railway Package – Completing the single European railway area to foster competitiveness, and growth, COM (2013) 25 final, Brussels.

Eweje, J., Turner, J. R., & Müller, J. R. (2012**).**Maximizing strategic value from megaprojects: The influence of information-feed on decision-making by the project manager. International Journal of Project Management, *30*(6), 639–651.

Fetene Nega (2008).Causes and Effects of Cost Overrun on Public Building Construction in Ethiopia. Addis Ababa, Ethiopia.

Fortune, J., & White, D.(2006).Framing of project critical success factors by a systems model. International Journal of Project Management, 53-65.

Gay R.andAirasian P.(2003).Educational Research Competencies for Analysis and Application(7^{th}ed).New York：Merrill Prentice Hall.

Gert, K.(2014).Success criteria and critical success factors for contractors of urgent and unexpected projects**:** A multiple case study within the maintenance & repair sector Master thesis. Erasmus University, Netherlands.

Naomi, B, and Giorgio, L. (2015).A Megaproject Research Framework. University of Leed, Published by the University of Leeds, April 2015 ISBN 978-0-9576805-7-9

Nurhidayah, A.(2012).The role of team effectiveness in construction project teams and project performanc**e:** PhD Dissertation**,** Iowa State University, Iowa.

Makulwasawatudom, A., Emsley, M., & Sinthawanarong, K. (2003).Critical Factors Influencing Construction Productivity in Thailand.InSecond International Conference on Construction in the 21st Century (CITC-II) .Sustainability and Innovation in Management and Technology, 10-12 December, Hong Kong.

May, T. (2001).Social Research: Issues, Methods and Process,3rd ed. Buckingham: Open University Press.

Mitra, S., & Wee Kwan Tan, A. (2012). Lessons learned from large construction project in Saudi Arabia. Benchmarking: An International Journal, 19(3), 308-324.

Ministry of Finance and Economic Development of Ethiopia.(2008).Guidelines for monitoring and evaluation of public sector projects. Addis Ababa, Ethiopia.

Mutijwaa, P., &Rwelamila, D. (2007). No Title Project Management Competence in Public Sector Infrastructure Organization. Construction Management and Economics.

Hair, J., Money, A., Samuel, P and Page, M. (2007).Research methods for businessChichester, England: John Willey & Sons, Ltd

Kazaz, A., Ulubeyli, S. and Tuncbilekli, N.A. (2012).Causes of delays in construction projects in Turkey.Journal of Civil Engineering and Management, 18(3): 426–435.

Kerzner, H.(2009). Project Management: A systems Approach to Planning, Scheduling, and Controlling. (10thedn). Hoboken, NJ: John Wiley.

Kerzner, H. (2013). Project management: A systems approach to planning, scheduling and controlling. New York: Wiley & Blackwell.

K. N. JHA &IYER,K. C. (2006).Critical Factors Affecting Quality Performance in Construction Projects: Total Quality Management, Vol. 17, No. 9, 1155–1170,routledge Taylor Francis group, New Delhi, India.

Jugdev, K., & Müller, R. (2005).A Retrospective Look at Our Evolving Understanding of Project Success.Project Management Journal 36 (4).

Project Management Institute (PMI,2004). *A* guide to the project management body of knowledge, *3rd ed.* Newton Square, USA: Project Management Institute.

PMI(2013). A guide to the Project Management Body of Knowledge.5th Edition.PMBOK Guide.

Ploywarin S. & Song Y.(2014). Analysis of Risk-Response based on Railroad Construction Project Author's Details: International Journal of Management Sciences and Business Research, ISSN (2226-8235) Vol-3, Issue 12.

Research Excellence framework. (2O14**).**Improving Megaproject Performance through Better Decision Makin**g:** Impact case study; University of Oxford, UK.

RMT Course Handbook.(2008). Urban Management Master Program II.Ethiopian Civil Service College. Addis Ababa, Ethiopia.

Russell Reynolds Associates. (2016).Megaproject leaders: Shifting the focus from Technical to people leaders at www.russellreynolds.com.

Saunders, M., Lewis, P. and Thornhill, A. 4th Edition (2007) .Research Methods for business students. Harlow, England: Prentice Hall.

Serrador, P. & Turner R.(2015).The Relationship between Project Success and Project Efficiency. Project Management Journal.Vol.46, no. 1.

Saifur, R. K., Choi, S. L. and Syed Muhammad J. I. (2014**).**Leadership Competency: A Tool for Project Success.MalaysiaIslamic University of Bahawalpur: Middle-East Journal of Scientific Research 19 (10): 1280-1283.

Shenhar, A. J., &Dvir, D. (2007).Reinventing project management: The diamond approach to successful growth and innovation. Boston, unpublished MA thesis: Harvard Business School Press.

Sherif, M. A. (2002).A framework for improving pre-project planning.Unpublished PhD Thesis.Southborough University, Southborough.

Sohail, M., &Cavill, S. (2008).Accountability to prevent corruption in construction projects. Journal of Construction Engineering and Management, 134(9), 729-738.

Tabish, S., &Jha, K. (2011).Important factors for success of public construction projects.In 2nd International Conference on Construction and Project Management IPEDR. Singapore: IACSIT Press.

U.S. Department of State report.(2015. May).Ethiopian investment climate statement. Washington DC.

Tekalign Lemma.(2014).The role of project planning on project performance in Ethiopia: Unpublished MA Thesis, Addis Ababa University. Addis Ababa, Ethiopia.

Ticehurst, G.W. and Veal, A.J. (1999) Business research methods: a managerial approach, Australia: Longman

Thevedran, V., & Mawdesley, M. J. (2003, December).Human Risk Factors in Construction. In Second International Conference on Construction in the 21st Century (CITC-II) Sustainability and Innovation in Management and Technology, 10-12, Hong Kong.

Thomas, J., Mullaly, M., (2008). Researching the Value of Project Management. Project Management Institute, Newtown Square, PA.

Tuckman, B. W., & Harper, B. E. (2012).Conducting Educational Research. United Kingdom: Rowman& Littlefield Publishers.

Turner, J. R. (2009**).** The handbook of project-based management: Leading strategic change in organizations (3rd Ed.). London, UK: McGraw-Hill

Turner, R., Anbari, F., &Bredillet,C. (2013). Perspective son research in project management: the nine schools. Journal of Global Business Perspectives,

Toor, S.-u.-R., Ofori, G.(2008). Leadership for future construction industry agenda for authentic leadership. International Journal of Project Management26 (6), 620–630

Yin, R. K. (2009).Case Study Research: Design and Methods (4th Ed). United States of America: SAGE Publications.

VanVoorhis, C. W. & Morgan, B. L. (2001). Statistical rules of thumb: what we don‘t want to Forget about sample sizes. Psi Chi Journal of Undergraduate Research.

Westerveld, E. (2003**).** The project excellence model: Lining success criteria and critical success factors. International Journal of Project Management, *21*(6), 411–418.

Wideman, R. M. (2002). Wideman comparative glossary of common project management terms v3.1.Retrieved from http://www.maxwideman.com/pmglossary/index.htm.

World Bank (2008).Little Data Book. Washington, DC: International Bank for Reconstruction and Development/the World Bank, Development Data Group.

Wong, C.H., Nicholas, J., Holt, G.D.(2003). Using multivariate techniques for developing contractor classification models. Engineering Construction and Architectural Management 10 (2), 99–116.

Zwikael, O., &Ahn, M. (2011). The effectiveness of risk management: An analysis of project risk management planning across industries and countries. Journal of Risk Analysis,*31*(1), 25-37.

Zhang, Y., & Zhang, L. (2003). Study on Reasons for Delays in Civil Engineering Project in China. In Conference Proceeding, Sustainability and Innovation in Management and Technology, 10¬12 2003.

APPENDIX A: RESEARCH QUESTIONNAIRE

Dear Participants,

My research title is**: Assessing Success Factors and Challenges of Railway projects in Ethiopia.**

With sincerity I would like to extend my deep appreciation to your company and thestaff for the willingness and cooperation in undertaking this valuable research. I askyour kindly cooperation in answering the questions as truthfully as possible and your response will be highly confidential.

This survey will only be used for a student research purposes only.This study examines different project success factors associated with project management success criteria such as: project cost performance, project time performance and project quality performance (only at operational perspective).Your participation in this survey is completely voluntary.

Yours Sincerely
Thank you very much for your kind cooperation.

December, 2016

Contact address: Mobile: 09-28-409978 email: ethioalex68@gmail.com

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Section I: Please specify the choices that belong to you bellow. Please tick (X) in the box provided.

1- **Please specify your gender:** ☐ Male ☐ Female

2. Please specify your age category: ☐ 18-30 ☐ 31-40 ☐ 41-50 ☐ above 50

3. Please specify the level of your education: ☐ First Degree ☐ Master's Degree ☐ PhD

4. Please specify your educational Profession

☐ Engineering ☐ Project management ☐ Architecture ☐ Construction management

☐ Economics ☐ Management ☐ Sociology ☐ Specify if any other_____

5. Service Life Time (Experience) in the project management work

☐Under3 year ☐4-10 year's ☐11-20year's ☐21- 30 years ☐ above 30

6. Marital status: ☐Single ☐ Married ☐Divorce

Section II. Based on your overall involvement and experience in Ethiopian railway construction project in general, please evaluate the real status of the following project success factors specific to this project using the 5-point Likert rating scale. Please tick (**X**) in the box provided. **Where,**

1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree,5= strongly agree

Code	Descriptions	Scales				
		5	4	3	2	1
1	**Project manager's Leadership / Administrative Effectiveness**					
1.1	Ability to make effective leadership and decision making					
1.2	Commitment to project goals and objectives					
1.3	Have strategic mindset					
1.4	Have Effective conflict resolution					
1.5	Having relevant past experience					
1.6	Management of changes was effective					
1.7	Contract management was appropriate					
1.8	Situational management was appropriate					
1.9	Have communication skills in all its forms					
1.10	Personnel-Recruitment and selection is properly performed					
1.12	Has Project team Motivation and team building skill					
1.13	The project leadership has Political intelligence					
2	**Contractors Competency**					
2.1	Project construction has been provided adequate plant resources					
2.2	The contractor has effective Project leadership ability					
2.3	The project completion has met cost, time and quality plans					
2.4	Professional and skilled labors were hired for the project adequately.					

2.5	Good service of the contractor was demonstrated during the project.					
2.6	Contractor demonstrated good technical ability on the project					
2.7	Contractor Selection for this project was done through proper procedure					
2.8	Carried out all works using appropriate activity scheduling models.					
3	**Project Team Effectiveness**					
3.1	We have trust and values within the project team					
3.2	The project team has understood the goals and objectives of the project					
3.3	Our project team members have understood and willing to carry out their roles and responsibilities effectively					
3.4	Project team leaders have relevant skills and experiences the project activities					
3.5	Interactive communication is present within the project team.					
3.6	The teams have been successful in meeting the objectives of their project.					
3.7	The project management team has a master construction schedulea look ahead schedule and weekly work plan to control work activities.					
4	**Stakeholder Participation and Management**					
4.1	There were active participation of stakeholders in quality related decisions					
4.2	There were regular meetings between authorities, contractors, and other relevant stakeholders in solving the problems.					
4.3	In this railway project, the importance of managing both internal and external stakeholders has been emphasized in all the project lifecycle process.					
4.4	All stakeholders have been given the opportunity to air their views (voices**)** on the project's goal, impact and any other relevant project decision processes.					
4.5	Stakeholders that can be affected by the project have been properly managed					
5	**Project Risk Management**					
5.1	Project risks are Identified and response plan was prepared properly					
5.2	There was Continuously updating the risk response plan and strategy					
5.3	Risk break down structure (RBS) was used in the identification & planning cycle					
5.4	Estimating the chance of occurrence of risks (for example as low, medium, High)					
5.5	Performing Quantitative risk analysis [e.g.: simulation, decision tree analysis...					

5.6	Performing risk audit in a project (Examining and documenting the effectiveness of the risk response strategy, and the risk management process)					
5.7	Developing risk response strategy (e.g.: avoid, transfer, mitigate, accept...)					
5.8	Performing risk monitoring and control (identifying & documenting new risks, closing those outdated and tracking those already identified risks) to avoid it.					
5.9	Geological risks were well estimated at the planning time					
6	**Project Communication Management**					
6.1	Standardized formats and templates have been used for all formal project communications regarding with the interest of the stakeholders					
6.2	There is a free and open flow of work information to me from other level of our project and from me to others.					
6.3	Performance feedback has been regularly provided to all stakeholders based on their role and responsibility in both methods					
6.4	Good decisions are always made within the team regarding project matters					
6.5	Awareness creation and progress report presentations were provided on the specific date, time, location, by specific presenter(s)					
6..6	There was clear, timely, and unambiguous communication between all parties in the project					
7	**Project Cost Management**					
7.1	The project planning team has applied a realistic cost estimates					
7.2	Changes in specifications and designs are adequately taken into account					
7.3	Quantity and price changes have valued at cost estimation session					
7.4	During planning phases, expropriation costs and safety and environmental demands were properly estimated (not underestimated)					
7.5	Enough time has been given for proper cost estimation.					
7.6	Taking control action to correct unfavorable trend or to take advantage of unusually favorable trend.					
7.7	In our work , What-if scenario analysis is used to review various scenarios to bring the schedule into alignment with the plan					

7.8	Earned value management (EVM) was properly used as a cost control tool					
8	**Project Time Management**					
8.1	Enough time has been given for proper activity time estimation.					
8.2	We have been controlling the project by determining through formal and informal reports the degree to which progress toward objectives.					
8.3	Detailed schedules are prepared for almost every activity					
8.4	Performance review have been done to: measure, compare, and analyze schedule performance such as actual start and finish dates, percent complete, and remaining duration for work in progress					
8.5	In this rail way project planning and controlling process, a milestone chart/labor chart and Gantt chart were used properly as scheduling tool					
8.6	Adjusting leads and lags and schedule compression techniques is used to find ways to bring project activities that are behind into alignment with grand plan					
8.7	Every activity duration is estimated properly					
8.8	Work breakdown structure(WBS) was worked and scheduled properly					
8.9	The Critical Path Method (CPM) and Program Evaluation and Review techniques (PERT) were used properly as activity compression, scheduling and networking tool.					
9	**Project Quality Management**					
9.1	There was executive commitment to project quality performance on controlling to be worked based on specification.					
9.2	Determining cause of and possible ways to act on significant deviations from planned performance.					
9.3	Government has established a mandatory external quality assurance of this railway projects development.					
9.4	The railway corporation has contracted appropriately external project reviewers/auditors to work on uncertainties likely to affect the project.					
9.5	The railway construction project activities are performed according to the specification designed in the contract plan (based on the project charter).					

Part IV. Pleaserate the **project success criteria**below per their level (degree) of performance to the overall success of the railway project you are involved or belonging to you. Please tick (**X**) in the box provided. **Where,**

1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree,5= strongly agree

Code	Lists of Suggested Success Criteria	5	4	3	2	1
1	Completing the project within time					
2	Completing the project within budget					
3	Completing the project with specification(specified quality)					

Part Two: Interview Questions

1. Do all the projects have subsidiary plans of the project management separately? .

- Those of the project management body of knowledge area plans (for the management of scope, cost, time, quality, risk, HRM, stakeholder participation, communication and contract administration…) .

2. How do you evaluate the planning, scheduling and controlling process of the railway projects?.

3. How was the project management or administration process taking place?.

- How the commitment of the project overall leadership activities can described?

4. How do you see the stakeholder participation in the projects?

5. What were the challenges significantly influences the implementation of the project?

- How did they influence the project?
- Didn`t they included in the risk management plan)

6. Do you think all documentations related to this project were properly managed?

7.Whatwas the project approved budget, paid cost, scheduled date and completed dates?

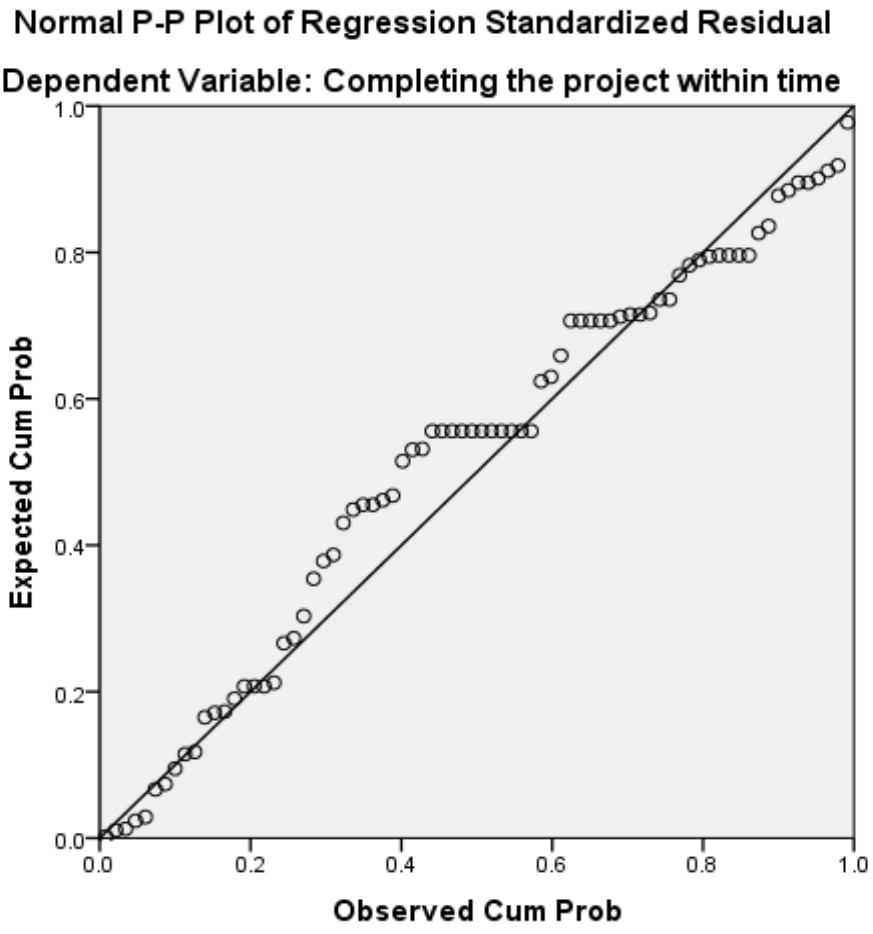
APPENDIX B: DIFFERENT RELIABILITY TESTS AND SOME ANALYSIS RESULTS

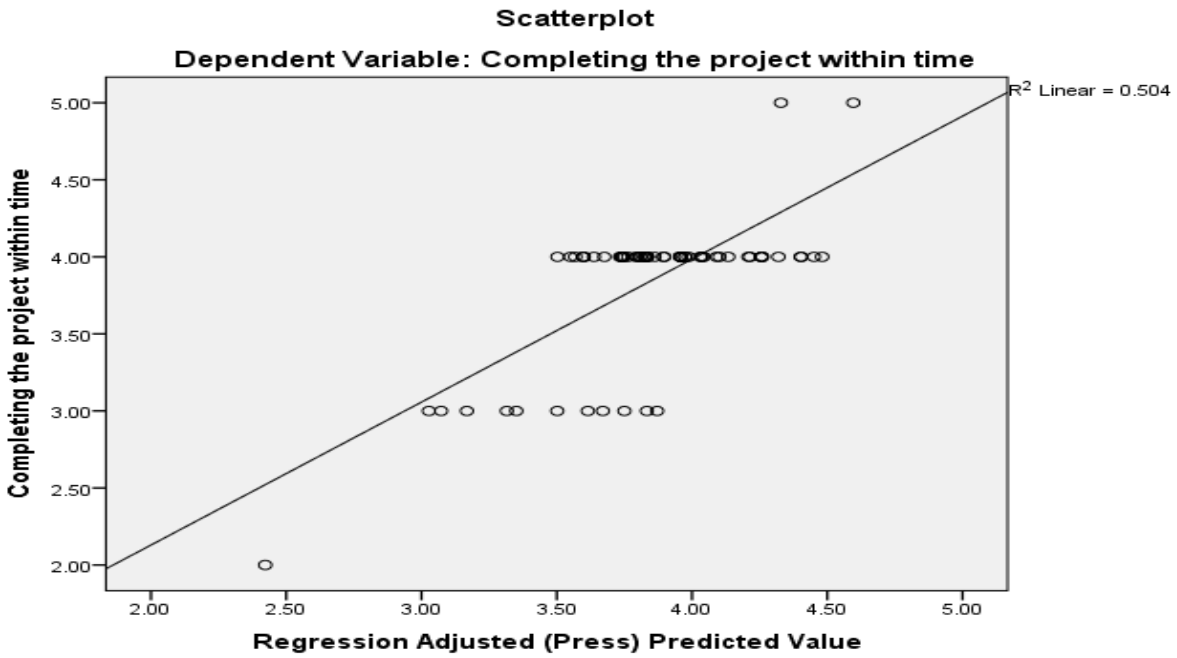
Cronbanch alpha tests

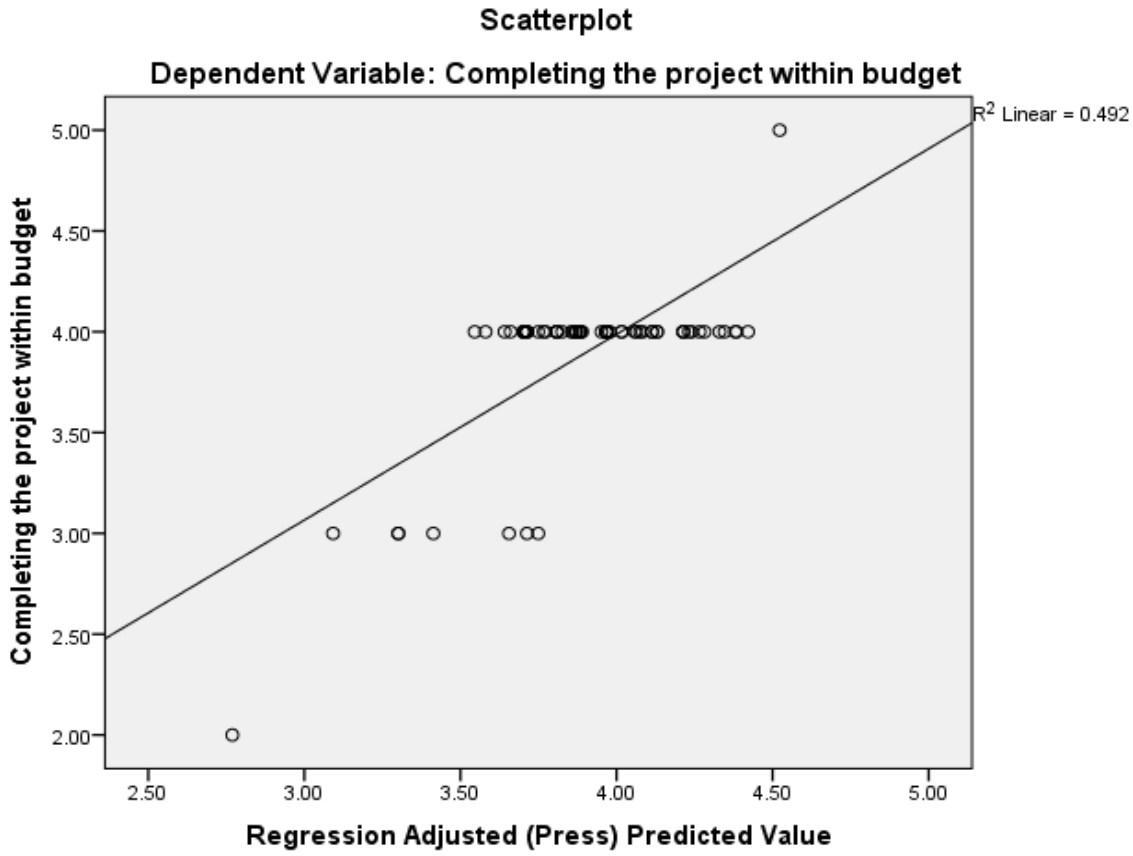
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.920	.930	82

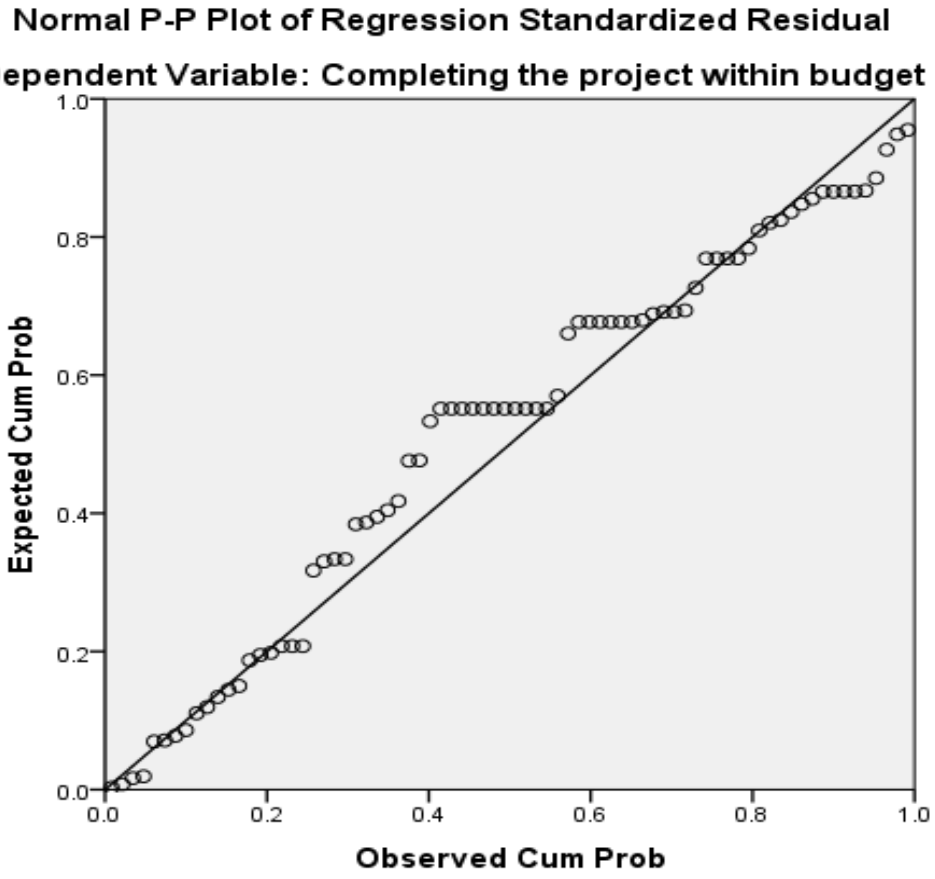
Results of linearity tests

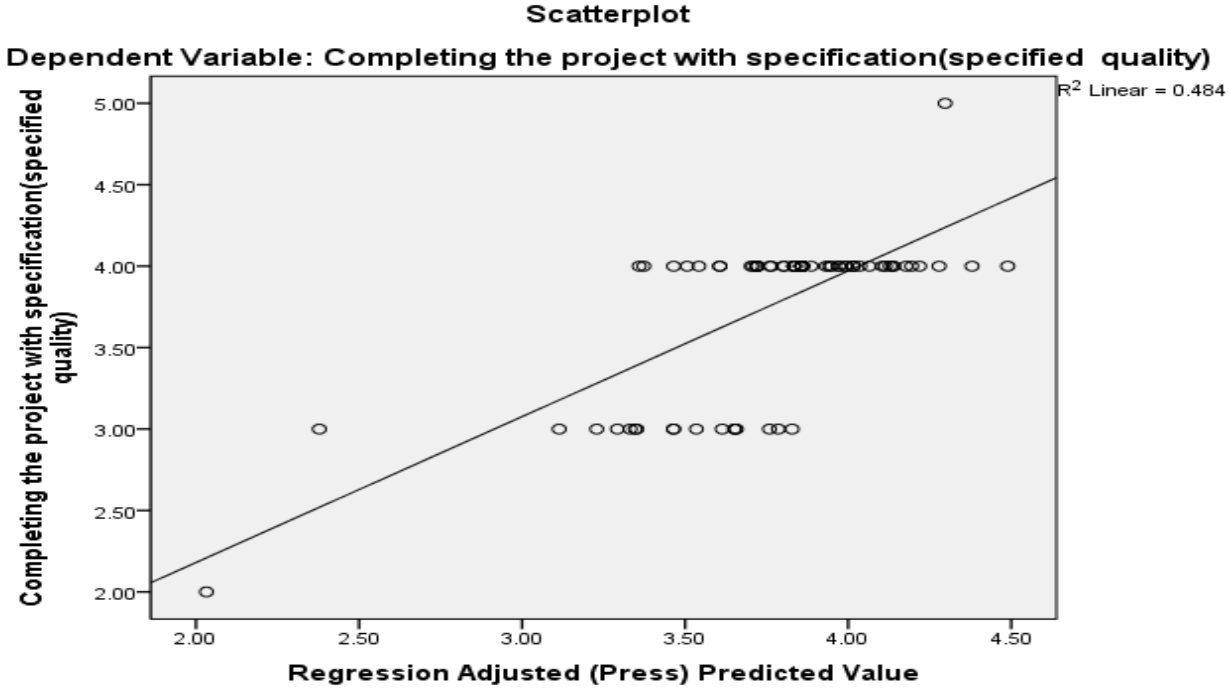
MA THESISSPSS DATA linear relationship test 2017

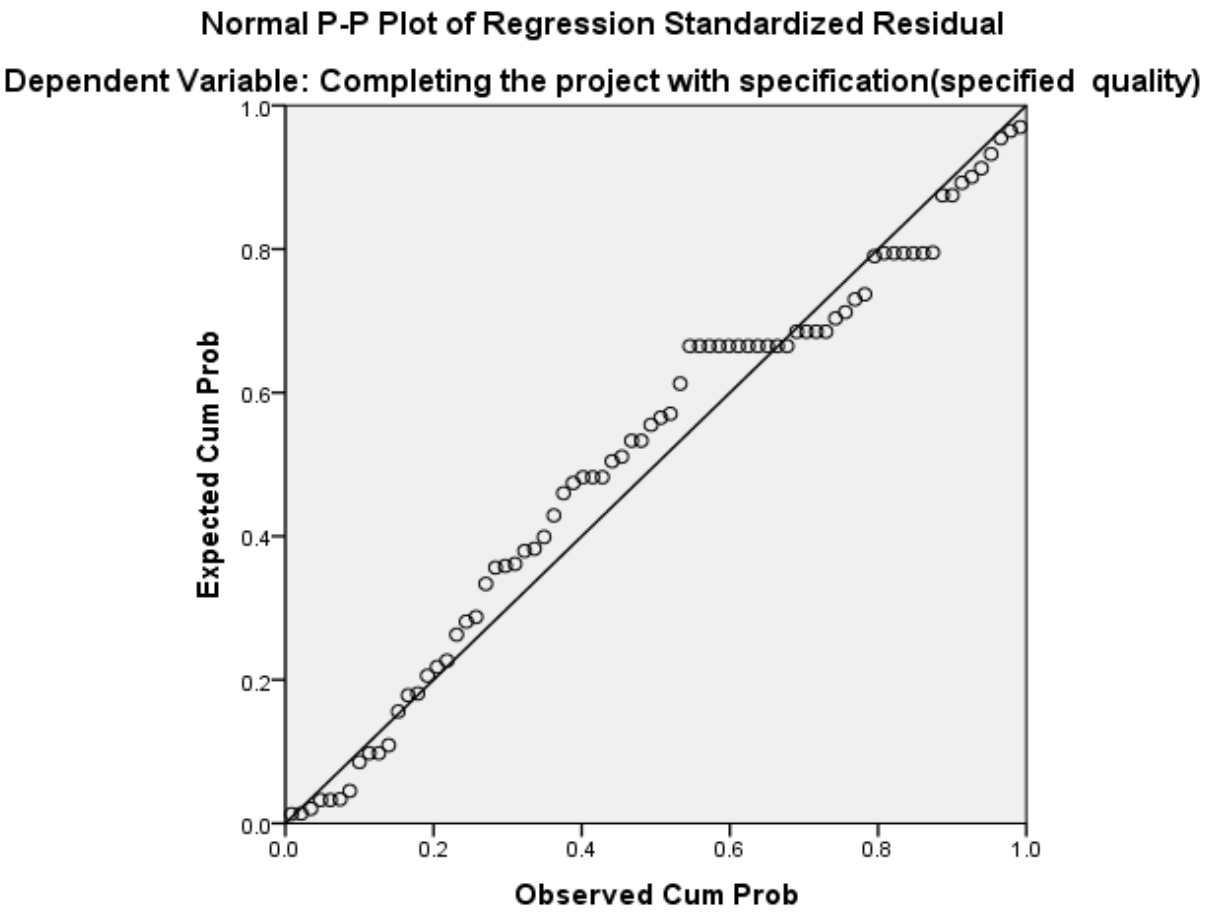



Scatterplot
Dependent Variable: Completing the project within time
R² Linear = 0.504
Completing the project within time
Regression Adjusted (Press) Predicted Value
5.00
4.50
4.00
3.50
3.00
2.50
2.00
2.00
2.50
3.00
3.50
4.00
4.50
5.00


Scatterplot
Dependent Variable: Completing the project within budget
R² Linear = 0.492
Completing the project within budget
Regression Adjusted (Press) Predicted Value
5.00
4.50
4.00
3.50
3.00
2.50
2.00
2.50
3.00
3.50
4.00
4.50
5.00


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: Completing the project within budget
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0


Scatterplot
Dependent Variable: Completing the project with specification(specified quality)
R² Linear = 0.484
Completing the project with specification(specified quality)
Regression Adjusted (Press) Predicted Value
2.00
2.50
3.00
3.50
4.00
4.50
5.00



Correlation Analysis

Project Critical Success Factors		1	2	3	4	5	6
Project manager's leadership /Admin/Effectiveness(1)	Pearson Correlation	1	.143	.249*	.327**	.192*	.429**
	(1-tailed)		.109	.015	.002	.048	.000
Contractors competency(2)	Pearson Correlation	.143	1	.291**	.181	.114	.168
	Sig. (1-tailed)	.109		.005	.059	.163	.073
Project team effectiveness(3)	Pearson Correlation	.249*	.291**	1	.182	.016	.214*
	Sig. (1-tailed)	.015	.005		.057	.446	.032
Stakeholders participation(4)	Pearson Correlation	.327**	.181	.182	1	.339**	.284**
	Sig. (1-tailed)	.002	.059	.057		.001	.006
Project Risk management(5)	Pearson Correlation	.192*	.114	.016	.339**	1	.328**
	Sig. (1-tailed)	.048	.163	.446	.001		.002
Communication management(6)	Pearson Correlation	.429**	.168	.214*	.284**	.328**	1
	Sig. (1-tailed)	.000	.073	.032	.006	.002	

*Correlation is significant at the 0.05 level (1-tailed).

**Correlation is significant at the 0.01 level (1-tailed).

Coefficients[a] Generated from Time performance Regression

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.454	.369		1.230	.223		
	Project manager's leadership effectiveness(PLE)	.283	.064	.381	4.431	.001*	.768	1.301
	Contractors competency(CC)	.075	.063	.095	1.179	.242^	.872	1.147
	Project team effectiveness(PTE)	.070	.060	.096	1.176	.243^	.855	1.170
	Stakeholders participation(SP)	.119	.056	.174	2.109	.039*	.836	1.196
	Project Risk management(PRM)	.127	.056	.189	2.256	.027*	.812	1.232
	Communication management(CM)	.203	.055	.305	3.668	.001*	.822	1.216

a. Dependent Variable: **Completing the project within time (PTP)**

***** Significant at P<**0.05**

^ Not significant at **P<0.05**

Coefficients[a] Generated from Cost Performance Regression

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.779	.308		2.526	.014		
	Project manager's leadership effectiveness(PLE)	.233	.053	.369	4.372	.001*	.768	1.301
	Contractors competency(CC)	.138	.053	.207	2.610	.011*	.872	1.147
	Project team effectiveness(PTE)	.103	.050	.166	2.071	.042*	.855	1.170
	Stakeholders participation(SP)	.081	.047	.140	1.726	.089^	.836	1.196
	Project Risk management(PRM)	.092	.047	.161	1.957	.054*	.812	1.232
	Communication management(CM)	.150	.046	.264	3.238	.002*	.822	1.216

a. Dependent Variable: Completing the project within budget(PCP)

***** Significant at P<**0.05**

^ Not significant at **P<0.05**

Coefficients[a] Generated From Quality Performance Regression

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-.043	.409		-.105	.917		
	Project manager's leadership effectiveness(PLE)	.154	.071	.194	2.180	.033*	.768	1.301
	Contractors competency(CC)	.112	.070	.133	1.600	.114^	.872	1.147
	Project team Effectiveness(PTE)	.323	.066	.413	4.901	.000*	.855	1.170
	Stakeholders participation(SP)	.130	.063	.176	2.070	.042*	.836	1.196
	Project Risk management(PRM)	.238	.062	.330	3.820	.001*	.812	1.232
	Communication management(CM)	.018	.061	.026	.299	.766^	.822	1.216

a. **Dependent Variable:**Completing the project with specification(specified quality)(PQP)

***** Significant at p=**<0.05**

^ Not significant at **p=<0.05**

Demographic Characteristics

Item No.	Demographic Characteristics	Variables	No. of Respondents	Percentage (%)
1	**Gender**	Male	57	75
		Female	19	25
2	**Age category**	18-30	26	34
		31-40	47	62
		41-50	3	4
3	**Education**	First Degree	40	53
		Master's	36	47
4	**Profession**	Engineering	44	58
		Construction management	1	1
		Economics/Management	10	13
		Sociology	21	28
5	**Experience**	Under 3 year	10	13
		4- 10 years	52	68
		11-20 years	14	18
6	**Marital status**	Single	47	62
		Married	29	38

Source: Own Survey, (2017)