



ST. MARY'S UNIVERSITY
SCHOOL OF GRADUATE STUDIES
MASTER OF ARTS IN PROJECT MANAGEMENT

ASSESSMENT OF PROJECT MANAGEMENT
SUCCESS DETERMINANTS IN THE
CONSTRUCTION INDUSTRY
IN ADDIS ABEBA

By: BENIAM TEKLE
ID.No.: SGS/0104/2009B

JANUARY, 2019
ADDIS ABABA, ETHIOPIA

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ADVISOR: TEMESGEN BELAYNEH (PHD)

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**ASSESSMENT OF PROJECT MANAGEMENT SUCCESS
DETERMINANTS IN THE CONSTRUCTION
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By: BENIAM TEKLE

APPROVED BY BOARD OF EXAMINERS

Dean, Graduate

Studies Signature

Advisor

Signature

External Examiner

Signature

Internal Examiner

Signature

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List of Abbreviations and Acronyms

PMBOK.....Project Management Body of Knowledge

PMBOK- PMI.....Project Management Body of Knowledge - Project Management
Institute

MUDC.....Ministry of Urban Development and Construction

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Abstract

This study was conducted with an objective of identifying, quantifying, and ranking of construction projects management success determinants. The focus of the study was on the medium level contractors i.e. grade-6, 7 and 8, including both general and building contractor categories. There are 4330 medium level contractors in the study area that provided total population. Therefore taking this population the calculated sample size was 366. The study selected four success criteria that are time, cost, quality, and stakeholder satisfaction. And a total of 66 success factors compiled in six groups (Management, Procurement, Client, Contractor, Project Manager, and Environment Related Success Factors) from literatures. The data collection was conducted using questionnaire having 5 level Likert scale and distributed to 370 respondents (including contractors, consultants & owners) out of which 275 responses were received. The data were analyzed using computer software. The analysis was divided into general characteristics (grade and experience of contractors) and relative importance index analysis. Relative index analysis was selected to rank the factors according to their relative importance. For each success factors group a cumulative mean was calculated to identify the significance level of the success factor group according to the Likert scale. Then by computing the relative importance on the elements of the success factors the ranking of each element was done to identify which of the factors are ranked the highest three in their respective group. Finally the ranking of all the 66 success factors in the six groups was computed together to identify the major 10 significant success factors. The results showed that 50% of the ranked ten major success factors come from the Project Management Related group, 30% are from the Contractor Related group, Environmental and Management Related factors provide 10% each.

Key words: *Project Management, Project Management Success, Determinants in Construction Project Management, Critical Success Factors, Success Criteria, Time, Cost, Quality.*

CHAPTER ONE

INTRODUCTION

1.1. Background

Ethiopia is the 2nd populous country in Africa, which lead a none-oil driven economy. Following the long term development strategy, the country aims to achieve sustainable human development with all requirements for a middle income country by the year 2025. This includes establishment of a solid, diversified, robust and competitive economy that can effectively handle the challenges of development, and adapt to the changing market and technological conditions in the regional and global economy. Development of infrastructure is among the priorities considered as an important ingredient towards attainment of faster economic growth, MUDC (2012), ITE (2018).

In this endeavor construction industry is identified as a major economic sector that enables most of the other sectors because it transforms various resources into constructed physical, economic and social infrastructure that are necessary for socio-economic development. The activities and processes include the technique by which the physical operations are planned, designed, procured, constructed or produced, altered, repaired, maintained, and demolished.

As it is the case with almost all of the developing countries the construction sector in Ethiopia is challenged by many factors from achieving results successfully. Researches show that the main reasons for the construction projects failure in developing countries include lack of advance planning, a holistic approach, lack of comprehensive engineering & management, inconsistency in monitoring & follow-up, etc. Tadesse et al (2016). According to MUDC (2012) the state of the local construction industry performance constraints include inadequate capacity of local contractors and consultants, inadequate public sector delivery capacity, corruption, erratic work opportunities, use of outdated technologies and practices, lack of effective supporting policies and poor state of the economy. A study on project management maturity assessment of contractors in Ethiopia, Abadir (2011), also found out that the project maturity level is low, with informal practice of basic processes dominantly exercised.

Even though the prevailing conditions seem not to be in favor of the sector, the construction industry maintains to be the main economic driving force in Ethiopia, MUDC (2012). The sector's contribution to the GDP at constant basic price has increased from 4.3% in 1993 E.C to 5.8% by 2002 E.C. and the sector is showing an annual growth of 37%, ITE (2018).

1.2.Statement of the problem

Considering the general view, construction industry is characterized as dynamic in nature, this could be a result of the ever increasing uncertainties in technology, budgets, and development processes. On the other hand construction projects being a combination of many interactions of both planned and unplanned activities, they operate under uncertainties like changes of participants, change in work style, insecure availability of resources, uncertain environmental factors, etc. In all of these uncertainties there are factors that will have dominance to change success of the project more critically than the rest.

This is evident in the plenty of lists of success factors in project management literatures. Even though there are lots of factors to consider, the general agreement is that the list of factors will be highly dependent on the perspective of the observer, in addition to this they are also influenced by sectorial, cultural, and geographical differences, Montequin et al (2016). A complementary study by Jorge & Mário (2016) showed that the success criteria are part of a multi-dimensional variables that include factors involving not only the project results, but also customer's satisfaction and ultimately the owner organization.

In a study by Els et al (2012) confirmed that there is no conclusive evidence or consensus on the factors for project success through the numerous studies that have been carried out till then. The researchers further provided evidence by referring Clarke (1999) that managing equally all success factors at the same time would be impractical and unachievable. Going further, backing Pareto's principle the study pointed out that giving attention to and concentrating on the critical few would most likely ensure project success. Categorizing these factors and criteria in to groups was suggested to be a good practice for ease of understanding and acceptance. Accordingly the study categorized the success factors in to four main categories that are human management, process, organization, and contractual and technical categories.

In agreement with this in a relatively recent study conducted in Ethiopia by Mamaru et al (2017) indicated that it was a widely accepted concept that project managers need focused effort to gain an expanded comprehension of the potential effects of major success factors which in turn could assist their work on current and future project managements. They defined the major success factors as any of the aspects of a business that are identified as vital for successful targets to be reached and maintained. The success factors are presented to be identified from areas like production processes, employee and organization skills, functions, techniques, and technologies. A total of 73 factors were identified a survey on 120 subjects conducted, then the results were listed in a rank of major success factors in building construction projects management.

On the aspects of construction firms working in Addis Abeba, the Federal Ministry of Construction Bureau identified broad distinction of construction firm's categories that can be summarized as building and general contractors. It further divided the contractors on the bases of firm's capacity from grade 1 the highest to grade10 the least level or grade of contractors. According to the Ministry there were 7654 licensed contractors in the budget year 2016/17GC. From this, the majority that was around 4330 were of contractors in grade 6, 7 and 8 which in this study are referred as medium level contractors for ease of communication.

Although this group of contractors provide the majority, that is around 57% of all contractors working in the study area, there is shortage of studies that consider the project management success determinants for this group over the general working conditions. Many of studies available come in the form of sector specific like housing, real estate, etc or studies on higher grade contractors of grade 1 and 2 firms, or core project management knowledge area specific like time, cost, etc., Addis (2014) a study on construction risk management; Melat (2017) a study on Real Estate Development Construction Projects; Abdissa (2003) study on Claims in Ethiopian Construction Industry; Tadesse et al (2016); Werku & Kumar (2016); Sadik (2017); Yebichaye (2016), Abadir (2011) a study on project management maturity in the construction industry.

The aim of this study was therefore to gain an understanding and establish quantities for the success determinants in the construction project's management with a focus on the medium level contractors in the study area.

1.3. Research question

The objective of any project undertaking will be to achieve a set of desired results with in predefined constraints. The constraints come in all forms of inputs and conditions including resources like time, cost, scope, quality, human resource, processes, procedures, environment, etc. therefore the basic question for this study were:

- What are the significant success factors in construction project's management for medium level contractors in Addis Abeba?
- Can these success factors be quantified, ranked and interpreted to improve the project management practice?

1.4. Objective of the Study

1.4.1. General objective

The general objective of the study was to investigate and identify the significant success determinants on building construction projects in Addis Abeba. With regard to the major groups of success factors that are: Management Related Success Factors, Purchasing Related Success Factors, Client Related Success Factors, Contractor Related Success Factors, Project Manager Related Success Factors, and Environment Related Success Factors.

1.4.2. Specific objectives

This study was conducted with the intent of meeting the following specific objectives for medium level contractors in their construction management practices:

- To identify the critical success factors for the medium level contractors,
- To quantify the success factors for the medium level contractors, and
- To rank the success factors for the medium level contractors.

1.5. Significance of the study

The construction industry remains to be the major economic driving force in the country, MUDC (2012). As is discussed in the previous pages, the industry holds performance constraints pertaining to inadequate capacity of local contractors and consultants, inadequate public sector delivery capacity, corruption, erratic work opportunities, use of outdated technologies and practices, lack of effective supporting policies and poor state of the economy. There is also a low level of project management maturity as is found in the assessment of contractors by Abadir (2011). The level of construction projects status indicate that there are a number of factors relevant for projects success that did not get proper attention. This study was significant in that it focuses on identifying and quantifying the significance of these factors, and in turn help the progress of achieving construction projects objectives.

1.6. Scope and limitation of the study

This study was conducted in Addis Abeba, with a focus on projects undertaken by the middle level contractors that are grade 6, 7, and 8. This group of contractors were selected because they provide the largest construction group of the study area.

There was a shortage of time to conduct unstructured interview with selected consultants, construction professionals, and owners. Instead the questionnaire was designed to include these respondent's views and their responses are included in the assessment.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1.Theoretical Literature

2.1.1. Projects, Project Management, & Construction Projects

Project in simple terms is a collection of activities that are interrelated with a specific overall purpose. It is an organized endeavor to accomplish a specified non-routine and low volume task. Although projects are not repetitive they take significant amount of time to complete and are large scale and complex enough to be recognized as separate undertaking, Mishra and Taran (2005).

Project management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements, PMBOK (2013).

In the construction sector, projects are undertaken to transform various resources into constructed physical, economic and social infrastructure necessary for socio-economic development. It embraces the process by which the said physical infrastructure are planned, designed, procured, and constructed or altered, repaired, maintained, and demolished, Ethiopia Ministry of Urban Development and Construction (2012).

2.1.2. Project success

In general success can be defined as an attainment of intention, as in the achievement of something planned or attempted, Microsoft Encarta (2009). In business context success comes down to two broad management skills, often termed as ‘doing the right thing’ (choosing the right projects) and ‘doing things right’ (good project management), Elaine (2009).

Literatures agree that one of the most common challenges in project management is determining whether or not a project is successful, Mishra and Taran (2005), PMBOK (2013). More recently, practitioners and scholars have determined that project success should also be measured with consideration toward achievement of the project objectives. In the history of

project success research, scholars have identified categories for project success determinants as factors and criteria Baccarini (1999). In the same study the success criteria were explained as those that are used to measure success and the factors are those that facilitated the achievement of success.

Similar to the meaning of success of projects, success factors and criteria are not universal for all projects since different projects and different people prioritize different sets of success determinants, Morteza & Kamyar (2011).

There are long lists of project success determinants in project management literatures, Montequin et al (2016), Els et al (2012). The general agreement here was that the determinants were highly dependent on the perspective of the observer, in addition to being influenced by the social, cultural, and geographical differences of individual projects, Montequin et al (2016). Els et al (2012), Clarke (1999) also found that managing equally all these determinants at the same time were impractical and unachievable. Therefore it was advised that giving attention to and concentrating on a selected few would ensure success. The option advised was to classify the list of determinants in to groups and analyzing each group in detail, Schultz et al (1987), Clarke (1999, Westerveld (2003), Nguyen et al (2004), and Bryde and Brown (2004).

2.1.3. Success Criteria in Project and Project Management

As discussed above there were several criteria that have been studied in order to state the issue of project success. Project success criteria were the dependent variable which measures success, Srimathi et al (2017). According to Cooke (2002), Lim & Mohamed (1999) success criteria were taken as benchmark to measure or judge success. Traditionally project success criteria focused on cost, time and quality, the study by Atkinson (1999) showed that these criteria are no longer sufficient to measure the success of projects. In the same manner, several researchers agree that success cannot be achieved only through these three criteria because of project success complexity Kylindri et al (2012). According to Nicholas (1989) the best overall criterion for project success was when all major stakeholders' objectives were achieved including the user, project manager and the development group all think their expectations were met or exceeded.

Along the same line, current project management guides place an emphasis on the delivery of projects within the constraint of time, cost and scope also referred to as the iron triangle, PMBOK (2013). More specifically, the project management objectives referred as the iron triangle were more easily measurable in the quantitative scale this was the point at which project management ends. Comparatively the rest project objectives were tend to be qualitative and not easily measured in any objective manner, or may be longer-term and more complex to measure quantitatively in a reasonable period. This led to the idea that the project management criteria being a subset of all project criteria.

Prefer et al (2018) included in their overview a summary list of success criteria for projects and project management as below:

1. Cost, Time, Performance, Satisfaction, Use, Effectiveness, Pinto and Slevin (1988).
2. Technical performance, Efficiency of project execution, Managerial and organizational implications, Personal growth, Project termination, Technical innovativeness, Manufacturability and business performance, Freeman and Beale (1992).
3. Time Performance, Cost Performance, Quality Performance, Health, Safety and Environment, Client Satisfaction, Khosravi and Afshari (2011).
4. Cost, Time, Meeting the technical specification, Customers' satisfaction, Stakeholders, satisfaction, Bryde and Robinson (2005).
5. Cost, Time, Quality, Scope, Customer Satisfaction, Safety, Team Satisfaction, Shareholder Satisfaction, Bahia and Farias (2010).
6. Cost, Quality, Time, Customer Satisfaction, Technical Specifications, and Functional Requirements, Revenue and Profits, Competitive Advantage, Market Share, Reputation Tmeemy et al (2010).
7. Cost, Time, Technical Requirements, Customer Satisfaction, Objectives Achievement, Gomesa and Romao (2016).
8. Client's satisfaction, Project completed on time, Project completed to specified quality standard, Absence of disputes, safety, Completion within budget, Mukhtar and Amirudin (2016).

9. Quality, Time, Cost, Health, Safety and Environment, Scope, Customer' Satisfaction, Efficiency of use resource, Effectiveness Productivity, Profitability, Shareholder satisfaction, Experience gain from the project, Achievement of project's objectives, Sustainability, Reliability, Omer and Haleema (2017).

A brief generalization provides that the criteria cost, time, quality and stakeholders' satisfaction were found as appropriate theories and were selected to construct this study up on.

2.2. Empirical Literature

Below two studies are presented to guide the flow of the reminder of this study. The first study, Els et al (2012) established its purpose as to move beyond the generally accepted generic knowledge areas and processes in order to evaluate and rank the critical success criteria (the 'what' to be achieved) and the success factors (the 'how' to achieve) in built environment project management. The study then provided a summary of researches on factors of project success relating their historical development. In doing so it gave justification on the advantages of identifying groups of success factors rather than analyzing them individually. Four main groups of success factors were identified based on literature review of principles of management namely, human management, process, organization and an additional category of contractual and technical based on the implementation of a construction project.

The first factor group, 'Human management' contained four factor elements, namely, team and leadership, project manager, communication and stakeholder management. The second factor group 'Process' comprised planning, scheduling, monitoring and control, quality management, and risk management. The third factor group 'Organization' included organization structure, financial resources, policy & strategy, learning organization, and external environment. The fourth factor group 'Contract and Technical' covered procurement and contract, contractor, technical and innovation. The identified list of various dimensions of project success, comprising the success factor groups and success factor elements, are listed as in the table below (Table 2.1).

Table.2.1. Success factors groups and elements of success factors,

SUCCESS FACTOR GROUPS	SUCCESS FACTOR ELEMENTS
Human management	<ol style="list-style-type: none">1. Team & Leadership2. Project Manager3. Communication4. Stakeholder management
Process	<ol style="list-style-type: none">1. Planning2. Scheduling3. Monitoring and Control4. Quality Management5. Risk Management
Organization	<ol style="list-style-type: none">1. Organization structure2. Financial Resources3. Policy & Strategy4. Learning from experience5. External Environment
Contract and Technical	<ol style="list-style-type: none">1. Procurement and Contract2. Contractor3. Technical4. Innovation

Source: Els et al (2012)

The idea of project success was showed as a concept embracing two dimensions of ‘What to achieve’ and ‘How to achieve’. Consequently, the study provided a definition for project success as achieving the success criteria of stakeholders’ appreciation, completion on time, within cost and quality through the success factors of human management, process, contractual and technical and organization. This was shown diagrammatically as in figure below (Figure 2.1).

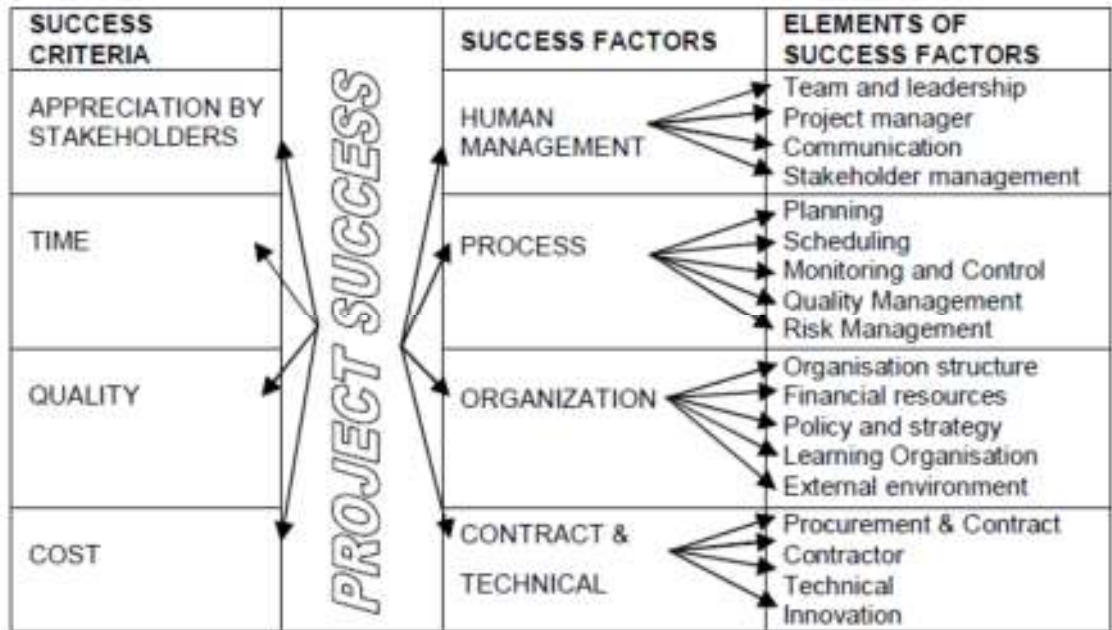


Figure 2.1. Project success, source: Els, M et al (2012)

The data collection was conducted using questionnaire and the responses were analyzed for all dimensions. First for the four success criteria, then for the four success factors, and finally for the eighteen elements of success factors. The results found and the conclusions drawn were done accordingly.

The second study was Mamaru et al (2017) which had an objective to investigate the major success factors on building construction projects management system of Addis Ababa. The research started by identifying the presence of major success factors which were critical to a project success in the uncertain conditions of building project processes. These major success factors emanated from the sets of circumstances, facts, or influences that contribute to the project success. The study provided six groups of factors as sources of major success factors that are listed as below.

1. Management Related Success Factors
2. Purchasing Related Success Factors
3. Client Related Success Factors

4. Contractor Related Success Factors
5. Project Manager Related Success Factors
6. Environment Related Success Factors

In providing detail analysis of the success factors, in the literature review, the study first identified the presence of generic success criteria and factors as those that are found and can influence most types of construction projects; and these include time, cost, and quality. Then the success criteria according to owner, designers, and contractors were provided. After stating this the study used literatures and questionnaires to identify the list of success factors in the table below (Table 2.2).

Table 2.2. Success factors identified through literature review and questionnaires

SUCCESS FACTOR GROUPS	SUCCESS FACTOR ELEMENTS
Management related factors	<ol style="list-style-type: none"> 1. Decision making effectiveness 2. Project monitoring 3. Planning effort 4. Control of sub-contractors' work 5. Training the HR in the skill demanded by project 6. Coordination effectiveness 7. Control mechanism 8. Risk identification and allocation 9. Prior project management experience 10. Constructability program 11. Developing appropriate organization structure 12. Formal dispute resolution process 13. Communication system 14. Implementing an effective safety program 15. Feedback capabilities 16. Implementing effective quality assurance program 17. Troubleshooting

SUCCESS FACTOR GROUPS	SUCCESS FACTOR ELEMENTS
	18. Motivation/ Incentives
Procurement related factors	<ol style="list-style-type: none"> 1. Project delivery system (e.g. design-bid-build, design build) 2. Project bidding method (e.g. price based competitive bidding, negotiated bidding, best value bidding) 3. Project contract mechanism (e.g. lump sum, unit price, cost plus, etc.)
Client related factors	<ol style="list-style-type: none"> 1. Timely decision by owner/ owner's representative 2. Owner's clear and precise definition of project scope & objectives 3. Client's confidence in construction team 4. Client's emphasis on low construction cost 5. Client's emphasis of quick construction 6. Nature of client (privately funded vs. publicly funded) 7. Size of client's organization 8. Client's ability to make decision 9. Client's knowledge of construction project organization 10. Owner's construction sophistication 11. Owner's risk attitude (willingness to take risk) 12. Client's emphasis on high quality of construction 13. Client's project management 14. Influence of client/ client's representative 15. Client's ability to define roles 16. Client's experience 17. Client's ability to brief
Contractor related factors	<ol style="list-style-type: none"> 1. Contractor's cash flow 2. Site management 3. Contractor experience 4. Supervision 5. Effectiveness of cost control system 6. Extent (Involvement) of Subcontracting

SUCCESS FACTOR GROUPS	SUCCESS FACTOR ELEMENTS
	7. Speed of information flow
Project manager related factors	<ol style="list-style-type: none"> 1. Leadership skills of project manager 2. Project manager's commitment to meet quality, cost & time 3. Project manager's early & continued involvement in project 4. Coordinating ability and rapport of project manager with contractors/ subcontractors 5. subcontractors 6. Project Manager's authority to take financial decision, selecting key team members, etc. 7. Organizing skills of project manager 8. Project Manager's authority to take day-to-day decisions 9. Project Manager's experience 10. Project Manager's competence 11. Coordinating ability and rapport of project manager with owner/ owner representatives 12. Construction control meetings 13. Technical capability of project manager 14. Project manager's ability to delegate authority 15. Project manager's adaptability to changes in project plan 16. Motivating skills of project manager
Environmental related factors	<ol style="list-style-type: none"> 1. Adequacy of funding 2. Technology availability 3. Economic environment 4. Commitment of all parties to the project 5. Physical work environment 6. Social environment 7. Human Skill availability 8. Weather condition (rainy, hot, cold...) 9. Industrial relations environment 10. Administrative approvals environment

SUCCESS FACTOR GROUPS	SUCCESS FACTOR ELEMENTS
	11. Political environment 12. fraudulent practices, corruption, favoritism, lack of ethics,

Source: Mamaru et al (2017)

The data collection method used were questionnaire, desk review, and interview. 120 questionnaires were distributed to contractors, clients, consultants and others companies. From 120 questionnaires, 81 questionnaires were returned back and used for analysis. Data were analyzed using computer software, SPSS version 20 and Excel. The results were provided for the top ten major success factors according to their rank order based on relative importance index.

In both researches the common objective was to investigate the project success determinants; in doing so to identify, rank, and evaluate them. In the 1st study, Els et al (2012), the relation among success factors and criteria were identified through the idea of project success as a concept embracing the two dimensions of ‘What to achieve’ and ‘How to achieve’. The study then provided a definition for project success as achieving the identified success criteria that are: stakeholders’ appreciation, completion on time, within cost and quality through the success factors of human management, process, contractual & technical, and organization.

The 2nd study, Mamaru et al (2017), presented a resent investigation with an elaborate and comprehensive list of success factors that emanate from six success factor groups. The relevant success criteria and comprehensive list of success factors were identified from literature reviews and questionnaires after which a survey were conducted and results provided with regard to the success factors.

Therefore by taking the common success criteria from the theoretical literature (time, cost, quality, and stakeholder satisfaction), the integrative concept of the 1st study, Els et al (2012) and the comprehensiveness of the 2nd study, Mamaru et al (2017) the below model is developed to guide the progress of this study.

Table 2.3. Developed Project success model

Success Criteria	Success Factor Groups	Success Factor Elements
Time	Management related factors	<ol style="list-style-type: none"> 1. Decision making effectiveness 2. Project monitoring 3. Planning effort 4. Control of sub-contractors' work 5. Training the HR in the skill demanded by project 6. Coordination effectiveness 7. Control mechanism 8. Risk identification and allocation 9. Prior project management experience 10. Developing appropriate organization structure 11. Formal dispute resolution process 12. Communication system 13. Implementing an effective safety program 14. Feedback capabilities 15. Implementing effective quality assurance program 16. Motivation/ Incentives
	Procurement related factors	<ol style="list-style-type: none"> 1. Project delivery system (e.g. design-bid-build, design build) 2. Project bidding method (e.g. price based competitive bidding, negotiated bidding, best value bidding) 3. Project contract mechanism (e.g. lump sum, unit price, cost plus, etc.)
	Client related factors	<ol style="list-style-type: none"> 1. Timely decision by owner/owner's representative 2. Owner's clear and precise definition of project scope & objectives 3. Client's confidence in construction team 4. Client's emphasis on low construction cost 5. Client's emphasis of quick construction 6. Nature of client (privately funded vs. publicly funded) 7. Size of client's organization 8. Client's ability to make decision 9. Client's knowledge of construction project organization 10. Owner's construction sophistication 11. Owner's risk attitude (willingness to take risk) 12. Client's emphasis on high quality of construction 13. Client's project management 14. Influence of client/ client's representative 15. Client's ability to define roles
Cost		

Success Criteria	Success Factor Groups	Success Factor Elements
Quality	Contractor related factors	<ol style="list-style-type: none"> 1. Contractor's cash flow 2. Site management 3. Contractor experience 4. Supervision 5. Effectiveness of cost control system 6. Extent (Involvement) of Subcontracting 7. Speed of information flow
Stakeholders' satisfaction	Project manager related factors	<ol style="list-style-type: none"> 1. Leadership skills of project manager 2. Project manager's commitment to meet quality, cost & time 3. Project manager's early & continued involvement in project 4. Coordinating ability and rapport of project manager with contractors/ subcontractors 5. Project Manager's authority to take financial decision, selecting key team members, etc. 6. Organizing skills of project manager 7. Project Manager's authority to take day-to-day decisions 8. Project Manager's experience 9. Project Manager's competence 10. Coordinating ability and rapport of project manager with owner/ owner representatives 11. Construction control meetings 12. Technical capability of project manager 13. Project manager's ability to delegate authority 14. Project manager's adaptability to changes in project plan 15. Motivating skills of project manager
	Environmental related factors	<ol style="list-style-type: none"> 1. Technology availability 2. Economic environment 3. Commitment of all parties to the project 4. Physical work environment 5. Social environment 6. Human Skill availability 7. Weather condition (rainy, hot, cold...) 8. Administrative approvals environment 9. Political environment 10. fraudulent practices, corruption, favoritism, lack of ethics,

Source: Mamaru et al (2017)

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1. Research Design

In any form of research, it is a common requirement to either count things and/or talk to people. Broadly research methods can be classified using this distinction as:

Quantitative - as the name suggests, it is concerned with trying to quantify things i.e. these methods look to quantify data and generalize results from a sample of the population of interest. Questions such as ‘how long’, ‘how many’ or ‘the degree to which’ may be asked. Usually a large number of cases representing the population of interest and randomly selected respondents are involved, Stuart & Nicola, (CLES).

Qualitative – concerned with a quality of information, qualitative methods attempt to gain an understanding of the underlying reasons and motivations for actions and establish how people interpret their experiences and the world around them, Stuart & Nicola, (CLES).

As discussed in the introduction part above the aim of this study was to gain an understanding and establish quantities for the success determinants in the construction projects with a focus on the medium level contractors in the study area.

Therefore based on the type of data gathered and size of the potential candidates included in the survey both quantitative and qualitative research approaches were used with descriptive research design on a cross-sectional basis over the medium level contractors in Addis Abeba. A sample size of respondents were identified using calculation as presented in the next section. The method of contact selected were through governmental institutions where the respondents come to receive and or offer services. After receipt of consent data collection was conducted using questionnaire.

3.2. Population and sampling technique

The total number of contractors in Addis Abeba was found to be about 7634 that includes grade 1 to 10 level contractors of both general and building contractor categories. Out of these the medium level contractors (i.e. grade 6, 7 & 8 contractors) number about 4330 which in this case was the total population.

According to Susan et al (2015), to calculate the sample size based on the sample required to estimate a proportion, the below formula was used:

$$n_r = \frac{4pq}{d^2}$$

Where: n_r = required sample size,

p = proportion of the population having the characteristic,

$q = 1-p$ and

d = the degree of precision.

Since there was no prior research to use for the proportion of the population (p), as advised in Susan et al (2015) p was taken as 0.5 which assumes maximum heterogeneity (i.e. a 50/50 split) and therefore q was calculated as $q = 1-0.5 = 0.5$. The degree of precision (d) which is the acceptable margin of error as this was a preliminary study margin of error was set to $\pm 5\%$ that is $d = 0.05$. The resulting sample size was:

$$n = \frac{4pq}{d^2} = \frac{4 \times 0.5 \times 0.5}{0.05^2} = \frac{1}{0.0025} = 400$$

400 was therefore the sample size which was around 9% of population size. As is indicated Susan et al (2015) when the sample are found relatively large (e.g. over 5%) proportion of the population, a finite population correction factor can be applied, to reduce the sample size. The formula for this is:

$$n_a = \frac{n_r}{1 + \frac{(n_r - 1)}{N}}$$

Where: n_a = the adjusted sample size,

n_r = the original required sample size, and
 N = population size.

Therefore taking the population size 4330 the resulting adjusted sample size was found to be 366.

As stated in the previous parts the list of contractors who had renewed their licenses for the budget year 2016/17 GC. were found from Federal Ministry of Construction. As the scope of this study was on the medium level contractors the list was analyzed for same, there were incompleteness and inaccuracies in the recorded addresses. This had paused a challenge that the elements in the sample could not be individually identified. The non-random sampling method as indicated in Ranjit (2011 p: 187-189) the accidental sampling procedure was utilized. The sampling was conducted in various locations until the desired sample size was reached. The locations included Sub-city Administration Offices of Construction Administration departments, Construction Permit & Control departments, and under Customs and Revenue Authority, small tax payer's offices; under Housing Development Project, Sub-City Construction Project Offices; under Federal Ministry of Construction, contractors' and professionals' registration office, and through individual contractor friends & acquaintances of friends.

3.3.Data collection method

In this study primary data was collected using questionnaires designed and implemented to collect all the necessary primary data. The questionnaire for this study is developed based on Mamaru et al (2017) with selected sixty six success factors grouped in six categories.

The data were collected from medium level contractors, consultants, and owners. The data collection tool used was a questionnaire having five Likert scales (1 = not significant, 2 = slightly significant, 3 = moderately significant, 4 = very significant, and 5 = extremely significant).

The items in the questionnaire were validated and tested for reliability and used after it was assured to meet the requirements.

3.3.1 Validity and Reliability

Validity is the extent to which the items or questions incorporated in the questionnaire measures what it is supposed to measure and performs as it is designed to perform. The item in this study's questionnaire are argued to be valid because they were designed according to Mamaru et al (2017) sixty six success factors grouped in six categories for construction projects.

Reliability test measures whether or not the instrument consistently measure what it is intended to measure. According to Joseph & Rosemary (2003), and George & Mallery (2003), a Cronbach's alpha value higher than 0.7 is considered to be reliable. The reliability gets stronger as it goes higher than 0.7 and poorer as it gets lower than 0.7.

In this study a pre-test of the response validity & reliability was conducted on 18 respondents and the internal validity test was conducted using computer software, SPSS version 25 application. The below table (Table 3.1) shows result of the validity test as values of Chronbach's Alpha for the six groups of factors individually and for the whole questionnaire. The result showed the Chronbach's Alpha values range from 0.721 to 0.921 for the individual group of factors and a value of 0.952 for the whole questionnaire which were all in the acceptable range, George and Mallery (2003). The questionnaire was thus found reliable and proceeded for distribution.

Table 3.1 Chronbach's Alpha test result

I.No	Factor groups	Chronbach's Alpha value
1	Management related factors	0.921
2	Owner related factor	0.721
3	Procurement related factors	0.769
4	Contractor related factors	0.846
5	Project management related factor	0.903
6	Environment related factors	0.732
	Overall	0.952

Source: respondents

3.4.Method of Data Analysis

The feedback from the respondents was analyzed using computer software i.e. SPSS version 25 application. Based on the content of the questionnaires, the analysis was divided into general characteristics (grade and experience of contractors) and relative importance index analysis.

Relative index analysis was selected in this study to rank the factors according to their relative importance. The following formula was used to determine the relative index

$$RI = \frac{\sum W}{A \times N}$$

Where: 'w' is the weighting as assigned by each respondent on a scale of one to five with one implying the least significant and five the highest significant. 'A' is the highest weight and 'N' is the total number of the sample.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1. Characteristics of the Respondents

The research questionnaire was distributed to 370 respondents. The distribution was conducted through various locations where the respondents are presumed to be found providing and/or seeking services.

Based on the content of the questionnaires, the analysis was divided into general characteristics (grade and experience of contractors) and relative importance index analysis. From the total 370 distributed questionnaires 278 responses were received and 3 were rejected as the responses were not complete or properly responded. The below table (Table 4.1) provides the respondents classified in type, i.e. in contractors in grades, consultants, and owners. There were 248 total number of all grades of contractors which is about 67%, 18 were consultants which is 4.9% and 9 were owners that is 2.4% which provide a total of 74.32% of the total 370 questionnaires distributed.

Table 4.1: Respondents by type

Category of respondents	Frequency	Percent
Contractor grade -6	86	31.3%
Contractor grade -7	102	37.1%
Contractor grade -8	60	21.8%
Consultant	18	6.5%
Owner	9	3.3%
Total	275	100%

Source: respondents

Regarding the experience as shown in the table below (Table 4.2) 58.47% of the contractors from all grades were found to have 0 to 5 years of experience, 39.52% have 6 to 10 years of experience, and 2% have above 10 years of experience.

Table4.2: Work experience of contractors

Years of experience	Frequency	Percent
0 to 5 year	145	58.47%
6 to 10 year	98	39.52%
above 10 years	5	2.02%
Total	248	100.00%

Source: respondents

4.2. Success Factors Investigation and Analysis

Relative index analysis was selected in this study to rank the factors according to their relative importance. Each individual factor's relative index, as perceived by the respondents was used to assess the general and the overall ranking in order to give comprehensive picture of major success factors of building construction as regarded from the medium level contractors in the study area.

The cumulative mean for success factors under each of the six factor groups was computed to identify the significance level of the group as perceived by the respondents. Then computing the relative importance the ranking of the success factors in each group was done to identify which of the factors are ranked the highest three in the respective group and discussions on each group of factors are provided. Below the results of the findings along with their discussions for each factor group and the overall ranking are presented.

4.2.1. Management Related Success Factors

The table (Table 4.4) below show that the respondents provide a grade of very significant to the factors in the group named management related factors that is cumulative mean of 3.99 (≈ 4). Going through the individual factors 'Communication system', 'Control mechanism', and 'Control of sub-contractors' work' are ranked first, second and third.

Therefore in the management activity installing a suitable communication system, establishing effective and efficient control mechanism, and proper controlling of subcontractors' are found as most ranking factors in order to complete the project successfully.

Table 4.4. Management related success factors relative index

Individual Success Factors	Mean	Std. Deviation	Highest Weight	Relative Importance
Communication system	4.34	0.879	5	0.868
Control mechanism	4.26	0.767	5	0.852
Control of sub-contractors' work	4.17	0.905	5	0.833
Coordination effectiveness	4.15	0.934	5	0.830
Decision making effectiveness	4.14	0.907	5	0.828
Developing appropriate organization structure	4.09	0.800	5	0.819
Feedback capabilities	4.06	0.815	5	0.812
Formal dispute resolution process	3.97	0.928	5	0.794
Implementing an effective safety program	3.96	0.877	5	0.792
Implementing effective quality assurance program	3.91	0.869	5	0.782
Motivation/ Incentives	3.85	0.888	5	0.771
Planning effort	3.85	0.944	5	0.771
Prior project management experience	3.84	0.951	5	0.767
Project monitoring	3.81	0.880	5	0.762
Risk identification and allocation	3.75	0.896	5	0.749
Training the HR in the skill demanded by project	3.70	0.951	5	0.740
Cumulative mean	3.99			

Source: Respondents

4.2.2. Owner Related Success Factors

The owner of the project is one among the different parties that participate in the in building construction projects. Usually this party is the source of the budget for a project. As thus, it has an important role in determining the success of projects. The table below (Table 4.5) summarizes the response results of the factors that are identified as Owners related factors. The cumulative average of the responses was 3.69 which is above moderately significant level according to the five scale

Likert scale. The relative importance index of the factor ‘Owner’s clear and precise definition of project scope & objectives’ was found to be 0.853 which is the first ranking for owner related factors, followed by ‘Timely decision by owner/ owner’s representative’ with relative importance of 0.794, and third was ‘Client’s emphasis on high quality of construction’ with 0.788 relative importance.

Table 4.5. Owner related success factors relative index

Individual Success Factors	Mean	Std. Deviation	Highest Weight	Relative Importance
Owner’s clear and precise definition of project scope & objectives	4.27	0.939	5	0.853
Timely decision by owner/ owner’s representative	3.97	0.939	5	0.794
Client’s emphasis on high quality of construction	3.94	0.924	5	0.788
Client’s confidence in construction team	3.92	0.876	5	0.784
Client’s ability to make decision	3.91	0.981	5	0.783
Client’s emphasis of quick construction	3.87	0.925	5	0.775
Client’s emphasis on low construction cost	3.69	1.012	5	0.738
Influence of client/ client’s representative	3.65	0.982	5	0.731
Owner’s risk attitude	3.64	1.039	5	0.727
Nature of client (privately funded vs. publicly funded)	3.50	1.160	5	0.700
Client’s project management experience	3.49	1.242	5	0.697
Client’s knowledge of construction project organization	3.46	1.178	5	0.692
Size of client’s organization	3.35	1.184	5	0.669
Owner’s construction sophistication	3.33	1.288	5	0.666
Client’s ability to define roles	3.32	1.159	5	0.664
Cumulative mean	3.69			

Source: Respondents

4.2.3. Procurement related factors

The scope of procurement in this study can be defined as the framework within which the construction project is brought about, acquired or obtained. Three factors are identified in this group that are: Project delivery system (selection of the organization for the design and construction of the project); Project bidding method (procedures adopted for the selection of the main contractor and project team) and project contracting mechanism through which an agreement is performed.

Table 4.6. Procurement related success factors relative index

Individual Success Factors	Mean	Std. Deviation	Highest Weight	Relative Importance
Project delivery system (e.g. design-bid-build, design build)	3.83	0.886	5	0.766
Project contract mechanism (e.g. lump sum, unit price, cost plus, etc.)	3.78	0.962	5	0.756
Project bidding method (e.g. price based competitive bidding, negotiated bidding, best value bidding)	3.72	1.029	5	0.743
Cumulative mean	3.77			

Source: Respondents

As was found from the results the cumulative average for this group (3.77) was above moderately significant and closer to very significant levels according to the five scale Likert scale. Referring to the importance index of the factors the first ranking was ‘Project delivery system (e.g. design-bid-build, design build)’ with 0.776, followed by ‘Project contract mechanism (e.g. lump sum, unit price, cost plus, etc.)’ with 0.756 and last ‘Project bidding method (e.g. price based competitive bidding, negotiated bidding, best value bidding)’ with importance index of 0.743.

4.2.4. Contractor Related Success Factors

The contractors and subcontractors are among the main stakeholders in any construction industry who are responsible to do the activities of the actual construction works. These parties start their main duties when the project reaches the construction stage. The variables included under the contractors' related factors were: contractor experience, site management, supervision and involvement of subcontracting, contractor's cash flow, effectiveness of cost control system, and speed of information flow.

The overall rating for this group was a cumulative average of 4.15 which is in small magnitude higher than the very significant level (4) according to the five level Likert scale. The first ranking from among the factors was 'Contractor's supervision' with importance index of 0.893, followed by 'Contractor's site management' with importance index of 0.884, and third 'Contractor's experience' with 0.855 relative importance index the table below (Table 4.7) provides the details of the results found.

Table 4.7. Contractor related success factors relative index

Individual Success Factors	Mean	Std. Deviation	Highest Weight	Relative Importance
Contractor's supervision	4.47	0.760	5	0.893
Contractor's site management	4.42	0.762	5	0.884
Contractor's experience	4.28	0.926	5	0.855
Contractor's cash flow	4.14	0.857	5	0.828
Effectiveness of cost control system	4.11	0.785	5	0.822
Speed of information flow	3.96	0.823	5	0.793
Extent (Involvement) of Subcontracting	3.70	0.947	5	0.740
Cumulative mean	4.15			

Source: Respondents

4.2.5. Project Manager Related Success Factors

The project manager is another major stakeholder in all types of projects and in particular in construction project, and thus the competence of the project manager is a major factor affecting project planning, scheduling, and communications activities of the project operations. The factors under this group include the skills and characteristics of project managers, their commitment, competence, experience, and authority.

The overall rating for this group was a cumulative average of 4.15 which is in small magnitude higher than the very significant level (4) according to the five level Likert scale. The first ranking from among the factors was ‘Project manager’s commitment to meet quality, cost, & time’ with importance index of 0.887, followed by ‘Project Manager’s authority to take day-to-day decisions’ with importance index of 0.873, and third ‘Leadership skills of project manager’ with 0.868 relative importance index the table below provides the details of the results found.

Table 4.8. Project Management related success factors relative index

Individual Success Factors	Mean	Std. Deviation	Highest Weight	Relative Importance
Project manager’s commitment to meet quality, cost, & time	4.43	0.796	5	0.887
Project Manager’s authority to take day-to-day decisions	4.37	0.854	5	0.873
Leadership skills of project manager	4.34	0.801	5	0.868
Project Manager’s authority to take financial decision, selecting key team members, etc.	4.32	0.895	5	0.863
Project Manager’s experience	4.27	0.928	5	0.854
Motivating skills of project manager	4.26	0.957	5	0.852
Project Manager’s competence	4.22	0.826	5	0.844
Organizing skills of project manager	4.15	0.842	5	0.829

Individual Success Factors	Mean	Std. Deviation	Highest Weight	Relative Importance
Coordinating ability and relationship of project manager with contractors/subcontractors	4.14	0.891	5	0.828
Technical capability of project manager	4.04	0.919	5	0.807
Coordinating ability and relationship of project manager with owner/owner's representatives	4.01	0.828	5	0.803
Project manager's adaptability to changes in project plan	4.01	0.947	5	0.803
Project manager's early & continued involvement in project	3.99	0.837	5	0.799
Project manager's ability to delegate authority	3.83	0.921	5	0.767
Construction control meetings	3.82	0.884	5	0.764
Cumulative mean	4.15			

Source: Respondents

4.2.6. Environment Related Success Factors

In this study environmental factors relates to external influences on the construction projects' process, and these include the social, political, technical, etc. systems in the surrounding environment of the projects. The attributes used to measure this factor include economic environment, social environment, political environment, physical environment, technology availability, human skill availability, weather conditions, and level of fraudulent practices.

The overall rating for this group was a cumulative average of 3.80 which is in small magnitude less than the very significant level (4) according to the five level Likert scale. The first ranking from among the factors was found to be 'Commitment of all parties to the project' with importance index of 0.855, followed by 'Human Skill availability' with importance index of 0.804, and third

‘Fraudulent practices, corruption, favoritism, lack of ethics,’ with 0.788 relative importance index the table below provides the details of the results found.

Table 4.9. Environment related success factors relative index

Individual Success Factors	Mean	Std. Deviation	Highest Weight	Relative Importance
Commitment of all parties to the project	4.27	0.897	5	0.855
Human Skill availability	4.02	0.810	5	0.804
Fraudulent practices, corruption, favoritism, lack of ethics,	3.94	1.323	5	0.788
Physical work environment	3.80	0.917	5	0.759
Weather condition (rainy, hot, cold...)	3.76	0.864	5	0.751
Social environment	3.75	0.874	5	0.751
Technology availability	3.73	1.015	5	0.746
Economic environment	3.67	0.964	5	0.734
Political environment	3.60	1.084	5	0.719
Administrative approvals environment	3.50	1.062	5	0.700
Cumulative mean	3.80			

Source: Respondents

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND ECOMMENDATIONS

5.1. Summary of major findings

After reviewing a number of literatures including Frefer et al (2018), Srimathi et al (2017), Kyindri et al (2012), Cooke (2002), Lim & Mohamed (1999), Atkinson (1999), and Nicholas (1989) four success criteria (cost, time, quality and stakeholders' satisfaction) were identified as measures for success of construction projects management.

And from two selected studies, Els M (2012) and Mamaru et al (2017), the model for the study with a total of 66 success factors compiled in six groups (Management Related, Procurement Related, Client Related, Contractor Related, Project Manager Related, Environment Related Success Factors) were identified as factors that facilitate the success of construction projects management for medium level contractors.

Primary data on these success factors were collected from medium level contractors, consultants, and owners. The data collection tool used was a questionnaire having five Likert scales (1 = not significant, 2 = slightly significant, 3 = moderately significant, 4 = very significant, and 5 = extremely significant). After validity and reliability tests were conducted on small number of respondents the questionnaire were distributed to 370 respondents. 275 responses were received which was analyzed using SPSS version 25 software. Based on the content of the questionnaires, the analysis was divided into general characteristics (grade and experience of contractors) and relative importance index analysis which was used to rank the factors according to their relative importance.

For each success factors group a cumulative mean was calculated to identify the significance level of the success factor group according to the Likert scale. Then by computing the relative importance on the elements of the success factors the ranking of each element was done to identify which of the factors are ranked the highest three in the respective group and discussions on each group of factors are provided. Finally the ranking of all the 66 success factors in the six groups was computed together to identify the major significant 10 success factors. The finding for the overall and each success factor group are presented below.

1. Management Related Success Factors, this group had cumulative mean of 3.99 (≈ 4) which was found to be very significant according to the Likert scale. The factors ‘Communication system’, ‘Control mechanism’, and ‘Control of sub-contractors’ work’ are ranked first, second and third with 0.868, 0.852, and 0.833 relative importance indexes respectively. Therefore in the management activity installing a suitable communication system, establishing effective and efficient control mechanism, and proper controlling of subcontractors’ work were found to be very important for a project to complete successfully.
2. Owner Related Success Factors, had a cumulative average of 3.69 which is above moderately significant and closer to very significant according to the five scale Likert scale. The relative importance index of the factor ‘Owner’s clear and precise definition of project scope & objectives’ was found to be 0.853 which is the first ranking, followed by ‘Timely decision by owner/ owner’s representative’ with relative importance of 0.794, and third was ‘Client’s emphasis on high quality of construction’ with 0.788 relative importance.
3. Procurement Related Success Factors, as is found from the results the cumulative average for this group was 3.77 which is above moderately significant and closer to very significant levels according to the five scale Likert scale. Referring to the importance index of the factors the first ranking was ‘Project delivery system (e.g. design-bid-build, design build)’ with 0.776, followed by ‘Project contract mechanism (e.g. lump sum, unit price, cost plus, etc.)’ with 0.756 and last ‘Project bidding method (e.g. price based competitive bidding, negotiated bidding, best value bidding)’ with importance index of 0.743.
4. Contractor Related Success Factors, the overall rating for this group was a cumulative average of 4.15 which is in small magnitude higher than the very significant level according to the five level Likert scale. The first ranking from among the factors under this group was found to be ‘Contractor’s supervision’ with importance index of 0.893, followed by ‘Contractor’s site management’ with importance index of 0.884, and third ‘Contractor’s experience’ with 0.855 relative importance index the table below provides the details of the results found.
5. Project Manager Related Success Factors, the overall rating for this group was a cumulative average of 4.15 which is in small magnitude higher than the very significant level according to the five level Likert scale. The first ranking from among the factors under this group was ‘Project manager’s commitment to meet quality, cost, & time’ with importance index of 0.887, followed by ‘Project Manager’s authority to take day-to-day decisions’ with

importance index of 0.873, and third ‘Leadership skills of project manager’ with 0.868 relative importance.

6. Environment Related Success Factors, the overall rating for this group was a cumulative average of 3.80 which is in small magnitude less than the very significant level according to the five level Likert scale. The first ranking from among the factors was found to be ‘Commitment of all parties to the project’ with importance index of 0.855, followed by ‘Human Skill availability’ with importance index of 0.804, and third ‘Fraudulent practices, corruption, favoritism, lack of ethics,’ with 0.788 relative importance index.
7. The major ten success factors were drawn by ranking the 66 success factor elements of the six groups together, the below table provides a summary of the findings.

Table 5.1. Top ten success factors relative index

Success Factors Group	Elements of success factors	M	SD	RII	Rank
Contractor related	Contractor’s supervision	4.47	0.760	0.893	1 st
Project management related	Project manager’s commitment to meet quality, cost, & time	4.43	0.796	0.887	2 nd
Contractor related	Contractor’s site management	4.42	0.762	0.884	3 rd
Project management related	Project Manager’s authority to take day-to-day decisions	4.37	0.854	0.873	4 th
Project management related	Leadership skills of project manager	4.34	0.801	0.868	5 th
Management related	Project monitoring	4.34	0.879	0.868	6 th
Project management related	Project Manager’s authority to take financial decision, selecting key team members, etc.	4.32	0.895	0.863	7 th
Contractor related	Contractor’s experience	4.28	0.926	0.855	8 th
Environment related	Commitment of all parties to the project	4.27	0.897	0.855	9 th

Success Factors Group	Elements of success factors	M	SD	RII	Rank
Project management related	Project Manager's experience	4.27	0.928	0.854	10 th

Source: Respondents

Where: M stands for Mean, SD stands for Standard Deviation, & RII Relative Importance Index

Accordingly 50% of the ranked ten major success factors come from the Project Management Related group, 30% are from the Contractor Related group, Environmental and Management Related factors provide 10% each.

5.2. Conclusion

A number of literatures from perspective of projects & projects management success, and determinants for projects management & construction projects management success were reviewed Frefer et al (2018), Srimathi et al (2017), Kylindri et al (2012), Cooke (2002), Lim & Mohamed (1999), Atkinson (1999), and Nicholas (1989). These were used to select the determinants identified as four success criteria (cost, time, quality and stakeholders' satisfaction). Two literatures one from projects management and the other from construction projects management perspectives, Els et al (2012), and Mamaru et al (2017) respectively, were selected to develop the model for the research and identify sixty six success factors that facilitate the achievement of the success.

Primary data on these success factors were collected from medium level contractors, consultants and owners. The data collection tool used was a questionnaire having five Likert scales. After validity and reliability tests were conducted on small number of respondents the questionnaire were distributed to 370 respondents. 275 responses were received which was analyzed using computer software. Based on the content of the questionnaires, the analysis was divided into general characteristics (grade of contractors, experience, etc) and relative importance index analysis which was used to rank the factors according to their relative importance.

For each success factors group a cumulative mean was calculated to identify the significance level of the success factor group according to the Likert scale. Then by computing the relative importance on the elements of the success factors the ranking of each element was done to identify which of the factors are ranked the highest three in their respective group.

Finally the ranking of all the 66 success factors in the six groups was computed together to identify the major significant 10 success factors. Accordingly 50% of the ranked ten major success factors come from the Project Management Related group, 30% are from the Contractor Related group, Environmental and Management Related factors provide 10% each.

5.3. Recommendations

On the bases of the findings of the study:

- Findings on the ten major success factors suggest that the project manager related factors were found dominating (i.e. five out of the top ten) the construction projects management success, therefore it is recommended that parties involved in construction projects need to give due attention to project management skills and competencies so that the desired success will have better achievement chances.

Recommendation for future studies:

- This study was conducted on medium level contractors (Grade 6, 7, & 8) in Addis Abeba; complimentary studies that may come with narrower geographic area and different grades of contractors can further elaborate the findings.
- The study mainly focuses on measuring the significance level of the success factors, studies with respect to identifying and measuring the relationship between factors and criteria will provide complete knowledge.
- Last this study was mainly conducted with primary data, studies that involve data from secondary source may have more comprehensive result.

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APPENDICES

APPENDIX: A

QUESTIONNAIRE

Thank you for agreeing to complete this questionnaire.

1. General information about the study

Research Title:

**ASSESSMENT OF PROJECT MANAGEMENT SUCCESS DETERMINANTS
IN THE CONSTRUCTION
INDUSTRY IN ADDIS ABEBA.**

Research Background:

This questionnaire is prepared for a Master's thesis in Saint Mary's University, Project Management Department, focusing on assessment of success determinants in construction projects.

Research Objective:

The research proposal focuses on identifying, measuring and ranking of success factors in the construction projects in Addis Abeba, with a focus to the medium level contractors i.e, Grade 6, 7, and 8 of both Building and General contractors category.

Research Team:

Student researcher name _____

All information provided will be treated anonymously. And research team assures you that all information will be kept confidential.

2. General information about the person filling the form

Construction firm: please check the grade of your firm.

Grade-6

Grade-7

Grade-8

Other: Consultant

Owner

Years of experience: 0 to 5

6 to 10

above 10

3. Factors Affecting Construction Project Management Success

In the next pages there are list of success factors compiled in six groups (*Management Related, Client Related, Procurement Related, Contractor Related, Project Manager Related, and Environment Related Success Factors*), these factors are believed to affect construction project's success. Each factor is associated with boxes for choice of numbers indicating the significance level of the factor (i.e. 1 = not significant, 2 = slightly significant, 3 = moderately significant, 4 = very significant, and 5 = extremely significant). Please think through each factor and indicate your observation of its significance level by checking in the box provided.

1 = not significant, 2 = slightly significant, 3 = moderately significant, 4 = very significant, and 5 = extremely significant.

Success factors		Level of significance				
		1	2	3	4	5
Management related factors	Decision making effectiveness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Project monitoring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Planning effort	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Control of sub-contractors' work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Training the HR in the skill demanded by project	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Coordination effectiveness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Control mechanism	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Risk identification and allocation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Prior project management experience	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Developing appropriate organization structure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Formal dispute resolution process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Communication system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Implementing an effective safety program	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Feedback capabilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Implementing effective quality assurance program	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Motivation/ Incentives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Procurement related factors	Project delivery system (e.g. design-bid-build, design build)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Project bidding method (e.g. price based competitive bidding, negotiated bidding, best value bidding)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Project contract mechanism (e.g. lump sum, unit price, cost plus, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1 = not significant, 2 = slightly significant, 3 = moderately significant, 4 = very significant, and 5 = extremely significant.

Success factors		Level of significance				
		1	2	3	4	5
Client (and /or Owner) related factors	Timely decision by owner/ owner’s representative	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Owner’s clear and precise definition of project scope & objectives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Client’s confidence in construction team	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Client’s emphasis on low construction cost	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Client’s emphasis of quick construction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Nature of client (privately funded vs. publicly funded)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Size of client’s organization	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Client’s ability to make decision	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Client’s knowledge of construction project organization	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Owner’s construction sophistication	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Owner’s risk attitude (willingness to take risk)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Client’s emphasis on high quality of construction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Client’s project management experience	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Influence of client/ client’s representative	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Client’s ability to define roles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Contractor related factors	Contractor’s cash flow	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Contractor’s site management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Contractor’s experience	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Contractor’s supervision	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Effectiveness of cost control system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Extent (Involvement) of Subcontracting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Speed of information flow	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1 = not significant, 2 = slightly significant, 3 = moderately significant, 4 = very significant, and 5 = extremely significant.

Success factors		Level of significance				
		1	2	3	4	5
Project manager related factors	Leadership skills of project manager	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Project manager's commitment to meet quality, cost, & time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Project manager's early & continued involvement in project	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Coordinating ability and relationship of project manager with contractors/subcontractors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Project Manager's authority to take financial decision, selecting key team members, etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Organizing skills of project manager	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Project Manager's authority to take day-to-day decisions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Project Manager's experience	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Project Manager's competence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Coordinating ability and relationship of project manager with owner/owner's representatives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Construction control meetings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Technical capability of project manager	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Project manager's ability to delegate authority	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Project manager's adaptability to changes in project plan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Motivating skills of project manager	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Environmental related factors	Technology availability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Economic environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Commitment of all parties to the project	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Physical work environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Social environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Human Skill availability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Weather condition (rainy, hot, cold...)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Administrative approvals environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Political environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Fraudulent practices, corruption, favoritism, lack of ethics,	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Thank You!

APPENDIX: B

Reliability Case Processing Summary

		N	%
Cases	Valid	18	100.0
	Excluded ^a	0	.0
	Total	18	100.0

a. Listwise deletion based on all variables in the procedure.

1. Scale: Management related factors f test

Reliability Statistics

Cronbach's Alpha	N of Items
.921	16

2. Scale: Owner related factor f test

Reliability Statistics

Cronbach's Alpha	N of Items
.721	11

3. Scale: Procurement related factors f test

Reliability Statistics

Cronbach's Alpha	N of Items
.769	3

4. Scale: Contractor related factors f test

Reliability Statistics

Cronbach's Alpha	N of Items
.846	7

5. Scale: project management related factor f test

Reliability Statistics

Cronbach's Alpha	N of Items
.903	15

6. Scale: Environment related factors f test

Reliability Statistics

Cronbach's Alpha	N of Items
.732	10

7. Scale: All factors f test

Reliability Statistics

Cronbach's Alpha	N of Items
.952	66

APPENDIX: C

Ranking of the sixty six factors

Descriptive Statistics

Success factors	N	M	Std. Devi.	H. Wt	RII	Rank
Contractor's supervision	275	4.47	0.760	5	0.893	1 st
Project manager's commitment to meet quality, cost, & time	275	4.43	0.796	5	0.887	2 nd
Contractor's site management	275	4.42	0.762	5	0.884	3 rd
Project Manager's authority to take day-to-day decisions	275	4.37	0.854	5	0.873	4 th
Leadership skills of project manager	275	4.34	0.801	5	0.868	5 th
Project monitoring	275	4.34	0.879	5	0.868	6 th
Project Manager's authority to take financial decision, selecting key team members, etc.	275	4.32	0.895	5	0.863	7 th
Contractor's experience	275	4.28	0.926	5	0.855	8 th
Commitment of all parties to the project	275	4.27	0.897	5	0.855	9 th
Project Manager's experience	275	4.27	0.928	5	0.854	10 th
Owner's clear and precise definition of project scope & objectives	275	4.27	0.939	5	0.853	11 th
Motivating skills of project manager	275	4.26	0.957	5	0.852	12 th
Coordination effectiveness	275	4.26	0.767	5	0.852	13 th
Project Manager's competence	275	4.22	0.826	5	0.844	14 th
Decision making effectiveness	275	4.17	0.905	5	0.833	15 th
Implementing effective quality assurance program	275	4.15	0.934	5	0.830	16 th
Organizing skills of project manager	275	4.15	0.842	5	0.829	17 th
Planning effort	275	4.14	0.907	5	0.828	18 th
Contractor's cash flow	275	4.14	0.857	5	0.828	19 th
Coordinating ability and relationship of project manager with contractors/subcontractors	275	4.14	0.891	5	0.828	20 th
Effectiveness of cost control system	275	4.11	0.785	5	0.822	21 st
Control mechanism	275	4.09	0.800	5	0.819	22 nd
Prior project management experience	275	4.06	0.815	5	0.812	23 rd
Technical capability of project manager	275	4.04	0.919	5	0.807	24 th
Human Skill availability	275	4.02	0.810	5	0.804	25 th
Coordinating ability and relationship of project manager with owner/owner's representatives	275	4.01	0.828	5	0.803	26 th
Project manager's adaptability to changes in project plan	275	4.01	0.947	5	0.803	27 th

Success factors	N	M	Std. Devi.	H. Wt	RII	Rank
Project manager's early & continued involvement in project	275	3.99	0.837	5	0.799	28 th
Risk identification and allocation	275	3.97	0.928	5	0.794	29 th
Timely decision by owner/ owner's representative	275	3.97	0.939	5	0.794	30 th
Speed of information flow	275	3.96	0.823	5	0.793	31 st
Motivation/ Incentives	275	3.96	0.877	5	0.792	32 nd
Fraudulent practices, corruption, favoritism, lack of ethics,	275	3.94	1.323	5	0.788	33 rd
Client's emphasis on high quality of construction	275	3.94	0.924	5	0.788	34 th
Client's confidence in construction team	275	3.92	0.876	5	0.784	35 th
Client's ability to make decision	275	3.91	0.981	5	0.783	36 th
Developing appropriate organization structure	275	3.91	0.869	5	0.782	37 th
Client's emphasis of quick construction	275	3.87	0.925	5	0.775	38 th
Communication system	275	3.85	0.888	5	0.771	39 th
Training the HR in the skill demanded by project	275	3.85	0.944	5	0.771	40 th
Control of sub-contractors' work	275	3.84	0.951	5	0.767	41 st
Project manager's ability to delegate authority	275	3.83	0.921	5	0.767	42 nd
Project delivery system (e.g. design-bid-build, design build)	275	3.83	0.886	5	0.766	43 rd
Construction control meetings	275	3.82	0.884	5	0.764	44 th
Formal dispute resolution process	275	3.81	0.880	5	0.762	45 th
Physical work environment	275	3.80	0.917	5	0.759	46 th
Project contract mechanism (e.g. lump sum, unit price, cost plus, etc.)	275	3.78	0.962	5	0.756	47 th
Weather condition (rainy, hot, cold...)	275	3.76	0.864	5	0.751	48 th
Social environment	275	3.75	0.874	5	0.751	49 th
Feedback capabilities	275	3.75	0.896	5	0.749	50 th
Technology availability	275	3.73	1.015	5	0.746	51 st
Project bidding method (e.g. price based competitive bidding, negotiated bidding, best value bidding)	275	3.72	1.029	5	0.743	52 nd
Implementing an effective safety program	275	3.70	0.951	5	0.740	53 rd
Extent (Involvement) of Subcontracting	275	3.70	0.947	5	0.740	54 th
Client's emphasis on low construction cost	275	3.69	1.012	5	0.738	55 th
Economic environment	275	3.67	0.964	5	0.734	56 th
Influence of client/ client's representative	275	3.65	0.982	5	0.731	57 th
Owner's risk attitude (willingness to take risk)	275	3.64	1.039	5	0.727	58 th
Political environment	275	3.60	1.084	5	0.719	59 th

Success factors	N	M	Std. Devi.	H. Wt	RII	Rank
Nature of client (privately funded vs. publicly funded)	275	3.50	1.160	5	0.700	60 th
Administrative approvals environment	275	3.50	1.062	5	0.700	61 st
Client's project management experience	275	3.49	1.242	5	0.697	62 nd
Client's knowledge of construction project organization	275	3.46	1.178	5	0.692	63 rd
Size of client's organization	275	3.35	1.184	5	0.669	64 th
Owner's construction sophistication	275	3.33	1.288	5	0.666	65 th
Client's ability to define roles	275	3.32	1.159	5	0.664	66 th
Valid N (list wise)	275					

APPENDIX: D

DECLARATION

I Beniam Tekle declare that this thesis conducted under the title ‘Assessment of Project Management Success Determinants in the Construction Industry in Addis Abeba’ is my original work, prepared under the guidance of Temesgen Belayneh (PHD). All the sources of materials used for thesis have been duly acknowledged. I further confirm that the study has not been submitted in part or in full to any other higher learning institutions for the purpose of earning any degree.

Beniam Tekle

St. Marry’s University, Addis Ababa

January, 2019

APPENDIX: E

Endorsement

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

Temesgen Belayneh (PhD)

St. Marry's University, Addis Ababa

January, 2019