ADDIS ABABA UNIVERSITY

IMPACT OF TRIPARTIE PROJECT MANAGEMENT COMPETENCY IN PROJECT SUCCESS: (A CASE STUDY ON LEGEDADI PHASE II WATER SUPPLY PROJECT)

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COLLEGE OF BUSINESS AND ECONOMICS
SCHOOL OF COMMERCE
GRADUATE PROGRAM IN PROJECT MANAGEMENT

February, 2024
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Advisor: Dr. Worku M

A Project Submitted to College of Business and Economics School of Commerce Graduate Program in Project Management in Partial Fulfillment of the Requirements for the Degree of Master of Art in Project Management

February, 2024
Addis Ababa, Ethiopia

DECLARATION

I declare that this project work entitled, **Impact of Tripartite Project Management Competency in Project Success: A case study on Legedadi Phase-II Water Supply Project** is my original work. This project work has not been presented for any other university and is not concurrently submitted in candidature of any other degree, and that all sources of material used for the thesis have been duly acknowledged.

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STATEMENT OF CERTIFICATION

This is to certify that BESUFEKAD MULUSHEWA has carried out this research project on the topic entitled "**Impact of Tripartite Project Management Competency in Project Success: A case study on Legedadi Phase II Water Supply Project** "under my supervision. This work is original in nature and it is sufficient for submission for the partial fulfilment for the award of Degree of Masters of Art in Project Management.

Name-Worku M ..... (PHD)

Signature_____

Date_____

Addis Ababa, Ethiopia

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APPROVED BY BOARD OF EXAMINERS:

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ADVISOR	SIGNATURE	DATE
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INTERNALEXAMINER	SIGNATURE	DATE
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EXTERNALEXAMINER	SIGNATURE	DATE

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ABSTRACT

The aim of this study is to assess the relationship between tripartite project management competencies and project success through evaluating the competence of each personnel involved. Understanding of the impact of competent personnel deployment, helps organizations to be more cautious in assigning staffs for simple, critical, complicated and risky jobs. The research made a cross-sectional study on a case of Legedadi Phase-II water supply project. Qualitative research method used to collect questionnaires from each parties so as to analyze project management competency of 50 senior staffs who had directly involved on the project. Perceived project success of the case project is defined to correlate the relation between tripartite competence and project success level. There is a positive and significant relationship between tripartite project management competency and projects success. The study found out that in construction projects that involve client, consultant and contractor, a project success cannot be guaranteed only from one party expert level project management competency but a cumulative effort of parties is the case. The study conclusion is that a combined project management competency of tripartite guarantees success of construction projects. Finally Project Oriented Organization need to enhance giving training to refresh and equip their project managers with regard to project management body of knowledge. More over POO need to have an interface management that creates a conducive environment in the project environment to lead a successful project.

CHAPTER ONE

INTRODUCTION

Project management competency is a broad topic that covers work experience, personality and project management knowledge area. Tripartite project management competency is a cumulative project management competency that is applied to manage a project implementation. Understanding impact of tripartite project management competency help organizations to get prepared in successfully completing a project that involves more than one party in making decisions. This chapter reveals background of the study, background of the project, statement of the problem, the research question, objective of the study, significance of the study, scope of the study and definition of key words.

1.1. Background of the Study

Organizational capabilities is Organization's ability to perform a coordinated set of task using organizations resource for a unique end result, Helfat et al. (2003: 999). Competence is the degree to which a firm meet objectives' and have shown that it is positively associated with the level of knowledge and skill of the responsible managerial group, McGrath et al. (1995: 251). Core- Competency is a competency at core (corporate Center) can be mentioned as a core competence which helps in the competitiveness of an organization, (Wernerfelt, 1984; Hamel and Prahalad, 1990; 1994). Project management can be considered as core competence of organization for one thing it creates competitive advantage for the organization (Roland Gareis, Martina Huemann, 2000).

Project success is dependent on the project management competence of an organization which are skill and knowledge of managing group assigned on projects. The three contracts on the project under study have single client and single consultant whereas three different contractors for each contracts. Considering that both contractors are working under same project environment it was expected that all projects should have had similar project success, however the results are different. Having similar commencement date and contract signing date, a very widely different completion date was obtained. This study tries to find out what exactly made such a difference by evaluating the competencies of management group involved in each contracts to verify cumulative effect on the project. Evaluating the competence helps in understanding the impact of personnel allocation and make informed decision with respect to staff delegation to such critical, complicated and risky jobs.

The parties involved at each contract namely client, consultant and contractor are evaluated to assess cumulative project management of the contract to analyze and identify the impact of tripartite project management competency on the project success of each contract. Using a questionnaire of 10 members from each parties those are involved directly on the project a competency of 50 senior managers who have directly involved on the project gathered for qualitative research. This way the impact of the parties involved on the project success is identified so as to create a criteria in assigning workers to projects.

1.2. Background of the Project

Background of the Legedadi Phase-II is a Water Supply Project that was planned to alleviate the sever water supply shortage of the city of Addis Ababa. Because of the fact that it became difficult to predict daily water demand of dwellers of the city. The urgency for the project was so high that too much focus was given from City's Mayor's Office and Addis Ababa Water and Sewerage Authority. The project is

divided in to Four Lots and the contract is awarded for three Contractors. Scope of Lot-1 contract is all civil works including pipe supply and laying of 100KM collector pipe length with pipe diameter from DN350 up to DN 800, two concrete reservoirs, ancillary buildings for 16 submersible pump stations, and 30km access road. The scope of Lot-2 and Lot-3 contracts is all civil works including pipe supply and laying of 120KM length transmission and distribution line with pipe diameter from DN250 up to DN 1000, nine concrete reservoirs, ancillary buildings for nine reservoir sites, and 20 KM access road. The scope of Lot-4 contract is supply and installation of all electromechanical equipment necessary to collect, transfer, treat and distribute water extracted from the well field. It includes 16 booster pumps in two booster stations, 16 submersible pump stations, 11 reservoir valve room electromechanical equipment and SCADA software.

1.3. Statement of the Problem

Projects consume budgets, times and other resources allocated for it until it is closed; because of its nature damages suffered by projects are forgotten after its completion, as long as it give service for its intended purpose. Most projects in our country, as part of the globe, face project delay, extra budget consumption and finally closing contracts to demobilize project resources. Various factors could be considered for project failure, however to prevent such failures focus shall be given to areas where project managers control; such as team building and running team.

Traditionally projects are misconceived in such a way that only contractors are said to be failed a construction project when it fails, whereas three parties are agreed to take responsibility in implementing a project. To study influence of combined project management competency shall fill the conceptual gap in the construction industry of our country. Similarly empirical studies justified that project management

competencies have direct impact on project success. Most empirical studies evaluated the link between project success and competencies, once again there is little empirical studies made regarding relationship between tripartite project management competencies and project success. Therefore this study fills a gap that observed on empirical studies of the subject.

Legedadi Phase-II Water Supply Project is owned by Addis Ababa City Water Supply Authority. The project involves three contracts with three different contractors having single client and single consultant, however all contract come up with three different results working under same project environment. Hence by evaluating project management competency of each parties involved in each contract its impact identified and shown that there is a positive and significant relationship between project management competence and project success.

Projects suffer from late decision making, lack of commitment, lack of belongingness, externalizing of problems and shortcoming in interface management. As its temporary nature project ending is inevitable, weather successfully close out or by termination due to failure. After projects are closed only some parties suffer from the delay including contractor, end users and government. There is limited research made in this respect that needed a combined effort of academician and practitioners. Though there were various research papers found regarding competency and project success, it was difficult to find researches regarding combined project management competency of tripartite.

Project success is dependent on team members and team ability to work severally and teaming well together reinforced by planning, resources allocations and leadership style deployed (D. Koutsikouri, 1 A. R .J. Dainty, S. A. Austin 2006). Project success depends on people view of the project therefore it should be termed as ‘perceived project success’ (Baker, Murphy & Fisher, 1988). Project success could not be

defined as a unique collections of critical success factors that should be fulfilled. Yet based on its definition and property projects are characterized by the time consumption, budget allocations, quality of product, sophistication (scope) and satisfaction of clients. Subsequently for the case of this study project success is related with completion of project in time, within budget allocated and as per specified quality.

The capability of each member of a team shall be evaluated to correlate it with an actual success observed on the project specified. As most projects owned by the government of Ethiopia experience much time extensions, budget overruns and sometime functionality issues, the finding of what made the difference in these contracts can help change construction industry culture to successfully completion. Therefore the aim of this study is to analyze impact of cumulative project management competencies in project success to find out a solution for extra time elapse, budget overruns and functionality failure of projects.

1.4. Research Question

The general research question this study aims to answer is why projects of same nature under same working condition come up with different results.

The study addresses the following question to understand occurrences on the project.

1. What is the competence level of personnel involved and its effect on respective team?
2. What is the competence levels of each party under tripartite on the project?
3. What is Perceived Projects Success of the project under study?
4. What is the effect of cumulative competency of tripartite on project success?

1.5. Objective of the Study

1.5.1.General Objective

The general objective of the study is to explain the effect of project management competency of personnel severally and collectively on success of a project so as to devise strategies for project success. Moreover setting a selection criterion for personnel deployed on a project on the basis of project scope such as sophistication, urgency and resource allocation to cope up for the required position.

1.5.2.Specific Objective

The specific objective of the study is

- To assess project management competence of personnel deployed on the project.
- Assess the effect of team management competence on project success.
- Explain the correlation between cumulative project management competence and project successful.

1.6. Significance of the Study

Project management is considered as core-competence of an organization that bring about a secret recipe over an end product. Managing project in a competitive way and devising strategy for sustaining, dynamic and efficient project management is a core for existence of project oriented organization. Projects in Ethiopia are consuming too much budget from the already scarce country’s budget. Evaluating the weak

link in the project managing group gives way to identify the exact location of fault and work on it for future management of projects. Considering a mass competence cannot give clear picture where problems lie. Hence it is possible to identify where exactly the problem lies through evaluating project management competence of parties with respect to knowledge area, past experience and personality. Only then project managers shift the focus on identified areas to come up to a successful project management system. Since both success and failures are observed on this specific case it is possible to drive a probable way out to a project success through examining competence of each managing team involved in both failed and succeeded projects.

All parties in the industry fall in either of the tripartite field of expertise; Contractor, Consultant or Client subsequently the study can give a clear understanding of which party is responsible for which delay and which one played a big role in making project successful. The tripartite managing team as a whole is evaluated for cumulative project management competence to verify if the harmony expected for a successful completion is developed or not. Subsequently it is possible to identify the responsible party for the result and handle weak part of this interface management.

1.7. Scope of the Study

1.7.1.Geographical Scope

The study uses respondent who are involved in the project, as the project is in and around Addis Ababa all management team starting from well field sites to end users are situated in Addis Ababa. Management group of all tripartite starting from CEO's of each party, process owners and project managers who stations at respective head offices. Moreover project managers, resident engineers, office engineers and site

engineers who are on spot to lead the projects are involved. All these staffs work around Addis Ababa. Therefore geographical scope of the study is bond in Addis Ababa.

1.7.2.Conceptual Scope

Competence is the degree to which a firm meet objectives' and have shown that it is positively associated with the level of knowledge and skill of the responsible managerial group, McGrath et al. (1995: 251). Project management is a core competence of an organization (Roland Gareis, Martina Huemann, 2000). Therefore, project management competence is a competitive level of Knowledge and skill of team members who makes up a responsible managerial group.

Conceptually evaluating the competence of team members involved in the project and correlating with the already succeeded or failed projects proves that project competence is directly related with end result or leads us to a new area of concern about project management.

In a Project Management Competence Model (Waller, 1997) developed a competency model that includes knowledge, skill, intellectual and moral behaviors. These have further been clarified in to vast categories and detailed competency to investigate the PM competencies. Project Management Institute (PMI) identified three competency dimensions these are Knowledge Competencies, Personal Competencies and Performance Competencies. The European based International Project Management Association (IPMA) Identified Key competence on its Competence baseline (ICB) Identified Knowledge competency, Experience Competency and Personal Attitude Competency for qualification and competencies in project management working environment.

These competencies can be summarized and grouped in to three main categories; Knowledge, Personality and Experience. Hence for this study we have categorized requirements for identifying project management competency considering the time limitation for the study, limited project management knowledge experience of Engineers involved and the fact that most of them are not academician but practitioners. Subsequently competency questionnaire is prepared in a manner that suits these practitioners and good enough to collect a reasonable PM competency data from workers took part in the projects.

1.8. Definition of Key Words

Project Management: Project management is the planning, organizing, directing, and controlling of company resources for a relatively short-term objective that has been established to complete specific goals and objectives. It is the application of knowledge, skills, tools and techniques to project activities to meet project requirements, PMI (2009).

Project Management Competency: Is the capability, Skill and knowledge necessary to perform project management process professionally.

Core Competence: is fundamental capabilities and integrated skill of an organization that makes it unique from the rest of its competitors and difficult to imitate, (Prahalad/Hamel 1990; Hamel, 1994).

Project Success: Is substantially completing a project within the time specified, within budget, as per the quality requirement of the specification.

Personal Attitude Competency: is an ability of a person to have qualities in relation to personality characteristics such as confidence, enthusiasm, open mindedness, adaptability, personal integrity, and people management skills such communication skill, motivation ability, influencing ability.

Proven Experience Competency: it is an experience characterized by previous track record, project management exposure duration and scope of project managed.

CHAPTER TWO

LITERATURE REVIEW

Introduction

This chapter focuses on assessing relevant literatures in relation to project management competencies in projects involving the 3Cs in construction industry. It systematically review, analyze, reveal and give direction to the relationship between project management competences and project success. Accordingly the first part of this chapter defines project, project management and project success. The second part reviews literatures that introduced competency paradigm so as to reveal competencies and series of project management competency evolution to date. Moreover this chapter gives a direction of conceptual consideration of this paper to concentrate on the targeted explanation. The final and third part shows the theoretical framework derived from the revision made.

2.1 Project

Organizations produce outputs to meet their target in various forms and systems. The way and trend that enable them produce end results is a production system of organizations. Production systems can be categorized in to three broad categories namely Mass production, Batch production and Project (none-repetitive) systems. Hence a projects is one of a method of producing material that are considered as ultimate goal of an organization's interest in making profit.

A project is a temporary endeavor undertaken to create a unique product or service (PMBOK 2000). It can be more elaborated as a combination of human and non-human resources deployed temporarily to

produce a unique product. It is a one-shot, bounded duration, requires involvement of skilled professionals, tools and resources to come up to an end result.

A project is work performed by an organization one time to produce a unique outcome, elaborating one time as bounded duration and unique as a different product that has never been produced by an organization (Horine, 2009). Kerzner (2009) considers a project to be any series of activities and tasks that have a specific objective to be completed within certain specifications, have defined start and end dates, had funding limits and further consumed resources.

Projects can be determined completed by comparing its end result with previously stipulated requirements of product or specifications set by beneficiary. Generally project can be described as a series of events, commitments, tasks and obligations that an organization or team commit to fabricate a product. A project can be characterized by the following nature.

- Project has its own objective to fulfill
- Project has limited duration (start and end dates)
- Project has limited budget allocation
- Project consumes resources
- Project is multifunctional (implements and requires various functional units, fields or expertise)

2.2 Project Life Cycle

As defined here above project has limited time with start and end hence it has life cycle. Project life cycle refers all phases that a project pass through to fulfil its desired objectives. A project life cycle is composed of five phases these are initiation, planning, implementation, monetary and closure, (PMBOK 2000).

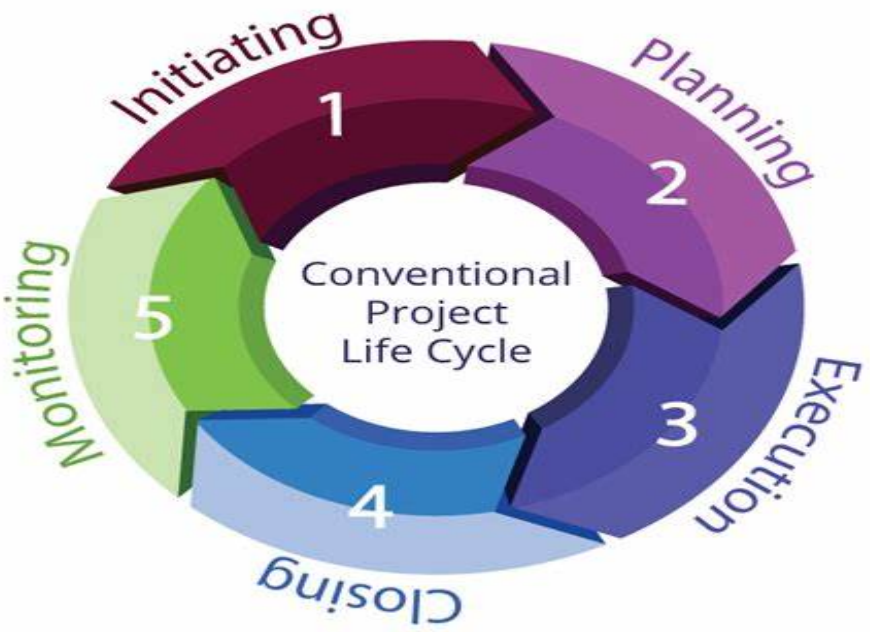

Figure 1 Project life cycle

2.2.1 Initiation

Initiation of a project is a phase of project life cycle that a project is conceived in a mind and pass through necessary steps to finally come up for clearance of understanding the feasibility, scope, deliverables, stakeholders and finally to develop statement of work.

Planning is a stage in a lifecycle of a project whereby breaking down the project in to activities and mentioning the project with respect to time, money, quality and activity are undertaken. Estimation of the project time, cost, quality, stakeholders and risk is the major activity to accomplish. It is a framework that shows series of activities and resource deployment in chronological order.

2.2.2 Execution

Execution is a phase of project lifecycle that ideas perceived are realized by taking action on the basis of the framework devised so far. In this phase tasks assignment are given to task owners, task priorities are communicated, tasks are undertaken, quality control and budget control continues.

2.2.3 Monetary

Monetary phase is the one project implementation are tracked and controlled to fulfill its time, budget and quality requirements set during the initiation/conception stage. It is a continuous task that tracks down the progress of the work vis-à-vis previously stipulated scope of the project.

2.2.4 Closure

Project Closing is a lifecycle phase of a project where evaluating the performance, taking over/transfer the product to client organization, disperse project teams back to other assignments, return remaining resources back to where it belongs and finally sign off the project.

2.3 Project Management

The component processes that explain project managements are the ten components explained in (PMBOK 2017). Project management is a process of applying knowledge, tools, skills and resources systematically to control, guide and manage projects for successful completion to meet desired outcome. The body of knowledge of project management includes twelve knowledge areas and five process groups. The process groups are initiating, planning, executing, controlling and closing; whereas the knowledge area that should pass through each stage of the process group are ten. These knowledge areas are Project integration

management, project scope management, project schedule management, project cost management, project quality management, project resource management, project communication management, project risk management, project procurement management and project stakeholder management.

2.4 Project Success

One of the most difficult tasks is concluding whether a project is successful or not. Previous studies shown that no intuitive factors can be drawn to show if projects are successful or not, (Jeffery K. Pinto and Dennis P Slevin 1988). Studies conducted on management and project success have previously made various consideration for a success of a project. The ten Critical Success Factors (CSFs) through a project life cycle summarized and stipulated by Sleven and Pinto are one of summarized critical factor for project success. These CSFs are Project mission, Top management support, Project Schedule, Client consultation, Personnel, Technical tasks, Client acceptance, Monitoring and feedback, Communication and Trouble-shooting. The authors concluded that it is simply difficult to know what are the factors to make a project successful?, however focusing on role of project manager in managing projects and considering success of a project through its life cycle can impact a success.

In other hand differentiating between successful project and successful project management was made by (De with 1988) on his paper of Measurement of Business Success. In this paper the author considered project success as a success measured against main goal and scope of the project, whereas project management success as performance measures against time, budget and quality. In the other hand success factor and success criteria need to be distinguished to understand success. Success factors are the inputs to management system that have direct relationship with project success and success criteria are measures to judge a project success or failure. Terry Cooke-Davies, on his paper the “real” Success Factor of Projects, mentioned 12 ”real” Success Factors

and finally omitted the factors for not considering human factor on the study as peoples are the one who undertake processes.

Various scholars tried to define success, criterion necessary to bring success and factors affecting successful completion of projects, yet there is no agreed definition about success itself. Paul L Bannerman 2008 on his paper of defining Project Success has explained five types and views of project success.

1. **Project Management Success**: project success with regard to parameters of Time, Budget and scope/quality. It is argued that project is deemed to be successful if these criterions, iron triangle, are met with limited tolerable variance from the original plan. This success is very much acquainted with a close parties involved on project, such as project manager, project team and project governance stakeholders.
2. **Product Success**: Project completed within the three constraints specified above cannot have an impact on product unless it is used for the intended purpose, with adequate information, sustainably and with full intended capacity.
3. **Business Success**: Business success is a success that involves benefit realization, governance, unintended impacts on an organization. De Wit 1988 while distinguishing project successes from project management success he described the former one as a degree of meeting project objectives with organizational objectives. Separating project objectives as goals specified in project plan and organizational objectives as organizational goals related in the business plan.
4. **Strategic Success**: the degree to which stakeholders are addressed and satisfied on the project success. It includes positioning organization for future endeavor, benefiting stakeholder community, external stakeholders trust and acknowledgement among industry peers, investors and public. So a competitive stand and witness in the market can be achieved from bringing project in to success.

5. **Process Success**: It is a success of project management processes in each project life cycles. It require consistent improvement in the process of realization project success, it is like troubleshooting or organizational learning.

Finally most goal oriented managers appointed for project management look only at the time, cost, and quality parameters. Looking only at time, cost, and quality might identify immediate contributions to profits, but will not identify whether the project itself was managed properly. Project success in construction industry is often dependent on the actions of three groups: project client, project consultant, and project contractor. Project success is dependent on team members and team ability to work severally and teamed up well together reinforced by planning, resources allocations and leadership style deployed (D. Koutsikouri, 1 A. R .J. Dainty, S. A. Austin 2006). There are certain actions that project managers and key personnel of each party can take in order to stimulate project success. Successfully completing projects gives advantages for all parties involved on this temporary endeavor including internal and external stakeholders of all parties.

In the case of this study focus is given only for iron triangle success criterion to evaluate effectiveness of project management in bringing up the change expected. Therefore on this study a project is called successful if it is completed under given budget (inside tolerable variations), inside the time allocated (substantially completion) and attaining satisfactory quality (functionality of products).

2.5 Project Management Competency

The importance of project manager or project management team is vital in successful completion of a project. Projects to be successfully completed a knowledgeable, skillful and good mannered project manager need to handle the project. Capability, knowledge and skill of an organization to undertake a work in a better and competitive way is core competence of an organization that differentiate it from peer

industry. The importance of project management competency emerges with the emergence of project itself. It is evident that for successful completion of projects the one who is responsible for it must have such capacity (c.f. Gaddis, 1959).

Core competences are the competence of an organization at corporate level. It is special capacity that differentiate an organization from its competitor of similar industry, (Selznick (1957) and Porter (1986). Other scholars defined core competence as skill and resource that allow a company to meet its goals, (Dosi and Teece, 1998). Hamel and Prahalad (1990) defined core competence as knowledge of an organization. To have sustainable competitive advantage a firm need to find its own core competence such is true for project managers in project oriented organization during their delegation to manage projects.

Scholars have been assessing the competence of organization, and managers to come up to a successful completion of a product. Searching for competitive way of tackling problems/projects, is a vital area that experts in the field should perform to come up to certain ways that can be taken as measures of competitiveness of a project manager/organization. Competence of an organization is changing from time to time and one cannot conclude a unique requirement for a project manager in the future projects to depend on such paradigm for satisfying the then requirement of project clients. Since organizational learning is continuous it is unavoidable that requirements of a project success is different and expectation will be higher in the future, leading a continuous requirements of project management competency in the future.

Project management success and respective competencies are different for different project types (Turner et al., 2009). This perception leads to a conclusion that project managers should not only have certain project management competency but need to adopt these brief competencies to contexts of project they

are going to manage, Moradi et al. (2020). Similarly competence can be characterized by the degree to which project managers perceive and experience their work to come to success, (Sandberg, 2000).

Knowledge of project management competency which includes ability to use skills is not enough by itself to lead a project in to success but in addition emotional competencies and Intellectual competencies take part, Oh and Choi's (2020). The author refers the necessity of interweaved possession of Intellectual Competency, Emotional Competency and Management Competency. Muhammad Ali Warsi (2018) refers Intellectual Competency (IQ) is intellectual, personalities and non-subjective characteristic, Emotional Competency (EQ) is ability to release or express inner feelings and emotions, and Management Competency (MQ) is skill of solving problem, communication skill, team building and sound knowledge of project management. These are competencies a project manager need to possess for leading a project to success.

Since projects are becoming uncertain and ambiguous, it is not enough to become proficient in project management knowledge only; but emotional competencies are some parts necessary to cope up managing sophisticated projects. Human centered skills like leadership, communication and team work are crucial parts of project management competencies (Magano et al.'s 2020). Authors like Sołtysik, Zakrezewska, Sagan, and Jarosz (2020) also mentioned that human centered project management competency built on dependability and personal credibility is essential for project success. Accordingly scholars support that project management competency based on body of project management knowledge cannot be a sole competency a project manager holds to become successful, but personality/attitudes and proven experience along with project management knowledge are essentials.

Emotional intelligence of a project manager in being empathy leader and solving a conflict in a team has impact on project success. Because team members treated well in projects tend to have interest in working for such environment this leads to projects success, Unterhitzenberger & Bryde (2019). In relation to human-centered management competency Moradi, Kähkönen, and Aaltonen (2020b) noted that acquiring trust from clients, team building ability and leadership competencies predict a project success.

Because of current globalization and fast growing world, project uncertainty, ambiguity and sophistication required an innovative way of leading projects to success. Creativity is most appreciated area to lead complex projects to success, (Granado-Alcón et al., 2020). Since projects are ultimate mechanism to meet organization goals, corporate innovations are dependent on project managers (Lavalle and Casale 2020). Hence the competency of project managers in creating innovative environment makes an organization be successful in project management.

Maturity in project management experience came up to a tendency of viewing that human side of project management is a key factor in leading projects to success. The maturity broaden that human side of project management competency is vital in discipline of project management. In experienced project managers focus on technical parts of project management competencies involving management of triple constraints (Badewi, 2016).

Projects especially in constructions sector are implemented by three parties contractually bound. Also surrounded by lots of interested parties that are not bound by contract in projects yet are beneficiary from these projects. Major project implementation works are managed by three contracting parties called 3C or **tripartite**. The project client who finances and owns the end product, project consultant who is the technical team of expert to give professional guidance and finally project contractor who are hired by the

client to supply and install project components. No matter how much resources are provided, weather the contractor is specialist or how experienced the consulting team may be, project will not succeed unless participants are not skillfully managed. Hence competency in project management is essential for project success, especially in construction projects.

Project management competency are qualities that great project managers possess in winning projects successfully. Some of such qualities are communication, risk management, personal attitude, past experience, and project constraints management.

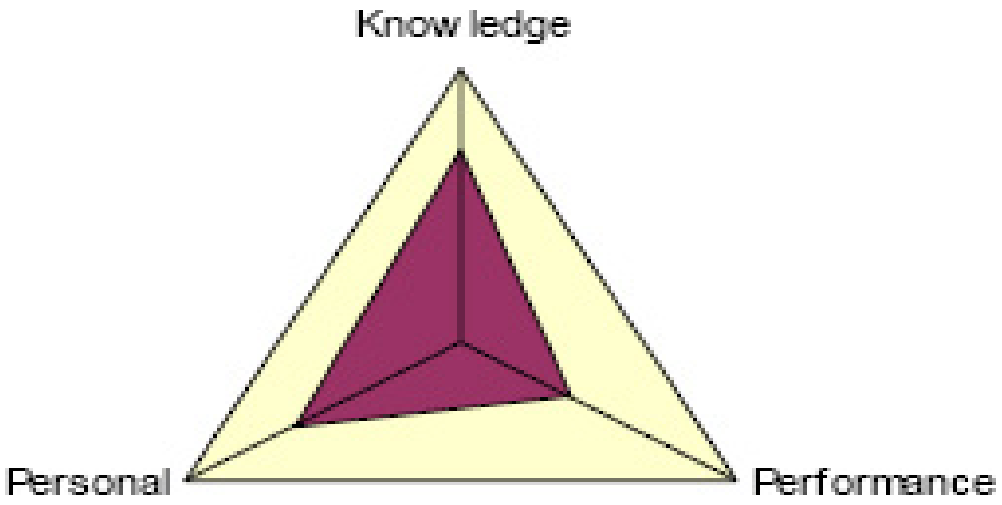

Figure 2 Dimensions of Competence

The dimensions of project management competency are categorized in to three by Project Management Institute (PMI): Knowledge, Personality and Performance. The categories base knowledge areas of project management, personal skills and achievements. Moreover International Project Management Association (IPMA) based in Europe, produced a base line that identifies several of competencies for knowledge,

experience and personality. Australian Institute for Project Management (AIPM) developed national competency standard for project management.

From the literature review above we learnt that to understanding project management competencies general dimensions such as project management competency, personal attitude competency and experience competence need to be assessed. Below here are the three dimensions of competence elaborated for understanding the requirements to identify competent project manager in the field.

2.5.1 Knowledge

Projects are temporary endeavors that use knowledge and resources to produce a unique product as per specification; whereas project management is application of knowledge, skills, tools and techniques to project activities to meet project requirements. Project management has become a core competency in the field of project controlling endeavor. One of the requirements of a project manager is to have sufficient knowledge in project management, because most project managers are handling multiple projects at a time. The knowledge in project management, as categorized in PMI, is the project management body of knowledge. The component processes that explain project management are the ten project management components explained in (PMBOK 2017). Project management is a process of applying knowledge, tools, skills and resources systematically to control, guide and manage projects for successful completion or to meet the desired outcome. PMBOK thoroughly explained the body of knowledge of project management. Hence discussing and explaining body of knowledge area of project management explains it very well. The ten project management components are explained (PMBOK 2017).

2.5.1.1. Project Integration Management

Project Integration Management is an umbrella that covers all knowledge area. It is a coordination of works from planning coordination, execution coordination, and change control coordination to every part of the project. It is a coordination among various parts of the project to come up to required output of a project. It is ascertaining of project realization by harmonizing project implementation process to work in a coordinated fashion.

2.5.1.2. Project Scope Management

Project Scope Management is a process that demarks that the project include works required and only required works for successful completion. It mainly concentrate on controlling what is included in the project and what is not included in the project execution, which is the scope of the project. The processes includes scope planning, scope definition, scope verification and scope change control.

2.5.1.3. Project Time Management

Project Time Management is a process that ensures a timely completion of a project inside the allocated time. It includes activities like defining tasks, breaking down, sequencing, duration estimates, scheduling and controlling of the schedule. Time is one of the resources that can never be compensated once it is consumed. Hence managing time in contrary to all reasons justified for delay is one of key area for a successful completion of a project. Justified evidences for delay of a project might allow for extra time consumption or allowances; however the time value of money can simply shows what it mean to spent extra time for completing these projects.

2.5.1.4. Project Cost Management

Project Cost Management is a process that ensures that a project is completed within budget allocated. This management includes activities like estimating resource requirements, cost estimation, budgeting overall cost to each activities, and cost control/change in budget control. It is an area where most project owners and clients focus. Even though it is difficult to complete a project within budget, managing cost gives various ways of decreasing extra costs in relation to poor estimation and traditional project management.

2.5.1.5. Project Quality Management

Project Quality Management is a process necessary to ensure satisfying required needs of the project client or meeting intended purpose. Project quality management can be obtained through, planning, implementing and control of desired quality through quality assurance processes deployed on the project. Obtaining quality work in project does not mean making perfect product, which is not practical in project managing processes, yet organizational learning is one of the processes that shows perfection is not what is expected from this management. Coordinated processes for proper utilization of resources, decrease reworks and minimize changes occurences through quality management processes. Quality management help in consistent project works, (Flett, 2001).

2.5.1.6. Project Resource Management

Project Resource Management is a process identifying, selecting, utilizing and controlling of resources necessary for the project successful completion work. The process includes human resources whereby professionals with knowledge and skill in the field of expertise are identified, acquired and hired who enable bringing the change required. Team forming, maturing it, identifying gaps among each team and fill this gap by training or pairing with teams of different quality is part of the processes. Establishing

competency of an individual is powerful tool in contemporary human resource management, (Collin 1997). In the other hand non-human resources materials, tools equipment and machineries required for the project must be planned, acquired, mobilize. Proper utilization of same shall be guided and controlled through this processes.

2.5.1.7. Project Communication Management

Project Communication Management is a process of systematic dissemination of information among the project parties. It includes generating information, communication way, receiving information, capturing information, formalizing and notifications of project information. This process includes planning, distribution, performance report and administrative closure.

2.5.1.8. Project Risk Management

Project Risk Management is a process of systematically identifying project risks, assessing and estimating the impact it might bring to projects and find out a mitigation measure. Risk assessed in this management can be a positive one that might be necessary to be exploited more for benefit of projects or it might be a negative risk that might adversely affect projects. In this adverse case mitigation measure are devised to minimize effects on the project implementation. Processes involved in this management includes planning, identification, analysis, response plan, monetary and control of risks, (PMBOK2000).

2.5.1.9. Project Procurement Management

Project Procurement Management is a process of identifying and acquiring necessary goods and services from outside of the organization. Most of the time project owners can only have budget to produce what is conceived in their mind. Hence to study their project, to design and implement they require various

professional organizations that have capability on such fields. Other organization produce and supply materials necessary for project implementations. Accordingly project owner organization needs to select and hire one of the best organization that fit for properly implementation of desired goal. The process of managing this selection is project procurement management. It includes processes like planning, solicitation, source selection, contract administration and contract closeout (PMBOK 2000). The person authorized in managing procurement can be one of the managing groups, (Willey 2011).

2.5.1.10. Project Stakeholders Management

Project Stakeholder Management is a process identifying of parties involved in the project affected by the project and have interest in project so as to create awareness, inclusive decision making, understand concerns and address it in project implementation. It includes writing list of stakeholders, stakeholder's prioritization, communication plan and intensity of their interest on the project (PMI 2017).

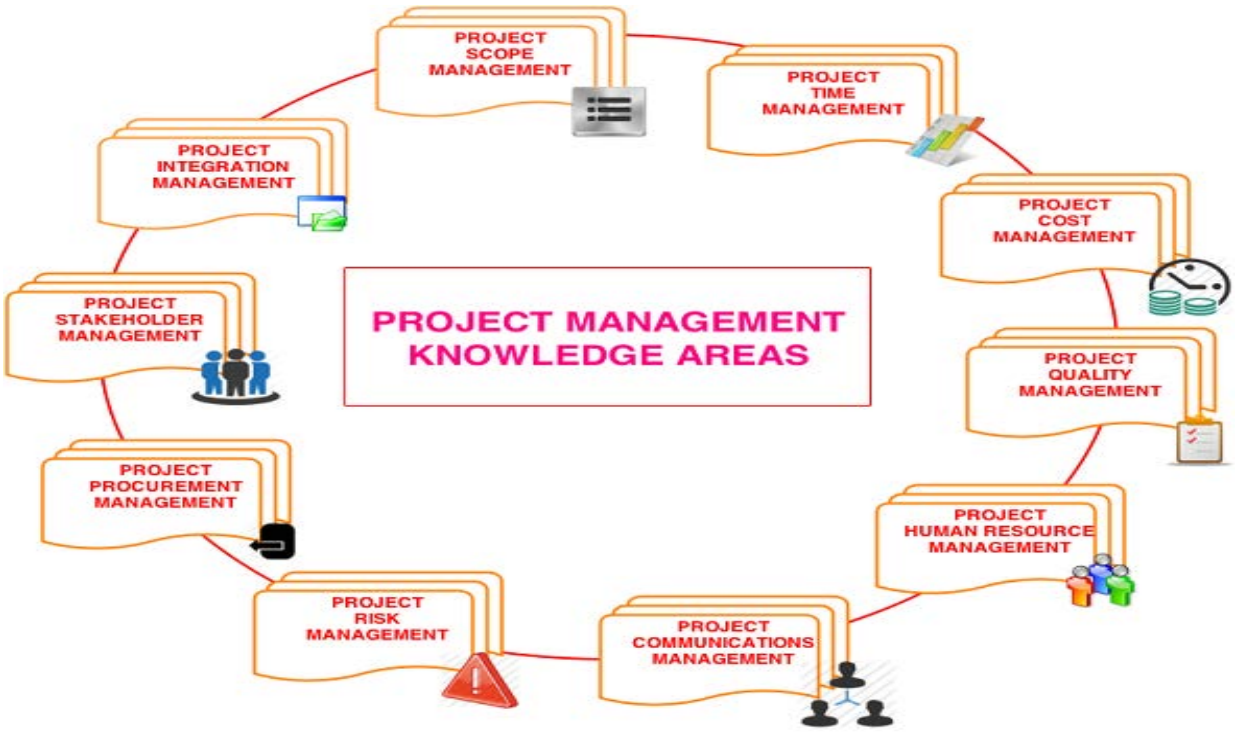

Figure 3 Project Management Body of Knowledge

2.5.2 Personality

Personality is the relative enduring pattern of thoughts, emotions and behaviors that characterizes a persons along with the psychological process behind those characteristics (Organizational Behavior and Leadership, MAPM-503). Understanding the personality of a person and team members in a project helps in understanding and leading a project to success. The big five personality traits more explain the general type of personalities. Conscientiousness is a personality trait that one can be characterized by being dependable, self-disciplined and careful. Agreeableness is a personality trait specifying a person as being courteous, good natured, empathic and caring. Neuroticism includes people with high level of anxiety, hostility, depression and self-consciousness. Openness to experience. It is a personality traits that

categorizes people being imaginative, creative, curious and aesthetically sensitive. Extroversion: is a personality trait that characterizes people being talkative, sociable and assertive.

Generally personality is characterized by the big five personality traits however it doesn't mean one shall be categorized in either of these personalities but can learn to have a competent personality favorable for project management. All personality traits mentioned above has at least one characteristics that a project manager should possess to lead a project, team and an organization.

In seeking the personality competency a project manager should possess in leading projects to success are more related with leadership personality. The personal attitude that shall be considered for evaluating project management competencies can fall in to two major categories, characteristics and people management skill.

2.5.2.1 Characteristics

Characteristics is a personality competency necessary for project management competency it includes, **Flexibility** it is an ability to adapt to changing situations and be open to others perspective trying new strategies for success. **Self-confidence** it is believing in one's own ability, success and showing such characteristics with positive attitude in front of oppositions or problems. **Commitment c**haracteristics of a person having a degree of willingness and obedience to perform tasks assigned. **Proactive** is a characteristics of forward-thinking through anticipating certain situations or outcomes. Accordingly plan a solution and create a way out in response to any issues. **Can-do attitude** is a characteristics of viewing each challenge as an opportunity rather than a threat and an attitude of thinking that there is nothing impossible. **Open-mindedness** is a characteristics of a person to have a recipient of others idea and willing to receive new experience or changes. **Common Sense** it is a characteristics of a person to have sound

judgment with good sense in practical matters. Passing through challenges such persons have an ability not to deviate from the main objective and make good sensed decisions. **Trust worth** it is a characteristics of a person to develop trust among workers and team mates in working area. Similarly shows that having ability and technical expertise of doing the work assigned. **Creative** is a characteristics of a person possessing analytical thinking and creating a conducive environment for innovation and assessing opportunity for success.

2.5.2.2 People Management Skill

People Management Skill is a personality competency necessary for project management competency in relation to team and stakeholders it includes; **Managing interpersonal relationship** is a characteristics of a person to have a skill of understanding concerns and feelings of other people than properly managing each person to focusing on task goal. **Ability to influence** is characteristics of a person to affect others for gaining their support for ideas. **Politically sensitive** is a characteristics of a person to understand the political view of a task, the concern of regional and local governments in tasks. Then include the respective concern on decision making and tune direction of the task in line with such views. **Active listening** is a characteristics of having attentively listening team mates without interruption, without prejudgment and ill-mannered behavior. A good listening ability brings teams and workers to a sense of ownership. **Role model** is a characteristics of a person to have shown exemplary behavior in the work place and convince team mates to work accordingly. **Fairness** is a characteristics of a person to have ability of leading a team with full information about any decisions and to show a clear cut criterion to come up to a decision. It is a characteristics of properly treat each person based on respective merit other than side friendship tendencies.

2.5.3 Proven Experience

Proven experience is a track record of a person throughout their working life in undertaking tasks assigned for. It is a learning experience that a person become tougher and tougher from one project to another project to attain an ideal competent stand for respective field. Accumulating project experience in project management helps in project success by supporting it with cognitive abilities (Hanna et al. 2018). It is understood that it is not only knowledge that brings project in to success but also the experience of a project manager to pass through various characteristics and conditions of the working environment. One of the latest leadership qualities specifically expressed and deemed to be perfect manners are team forming team management and understanding maturity of a team in to harmonize unit. These leadership quality can be possessed through experience, as per Marzagáo & Carvalho, (2016), conflict resolution, motivation and encouragement are capabilities that can be matured through incidents in work places or work experiences.

It is known that projects are full of incidents that are related with personnel deployed, geographical location of the site and culture of societies where projects reside. Passing through different projects a person encounters various people from various field of expertise, different geographical location, and different culture. Cultural diversity in forming team was agreed to be good practice in promoting various cultures and create strong desire of people knowing each other. This in turn may create an environment conducive for workers from any society and cultures. A person who has experienced in diverse cultural trends and cope in passing through them develops a competent personality in managing project. Such experienced managers have the capability to tailor project practices to a specific project goals addressing the interest of societies in relation to the need. Such exposure make experienced managers to create

generalized process that can accommodate most cultures and social groups to lead a project in to success. Acquired project management experiences lead best practices in to processes, (Cicmil & Gaggiotti, 2018).

Generally it is clear that a proven experience in project management gives best quality in leading project to success and it is one of proven competency in the field. Considering proven experience as one of project management competency is believed to be one major criterion to separate researchers from practitioners. Because project management knowledge is evaluated through implemented projects. Through practices and experience in the field of project management and related tasks, project managers develop and acquire competencies in managing and leading projects, (Cicmil & Gaggiotti, 2018), (Badewi & Shehab, 2016; Bjorvatn & Wald, 2018; Conforto et al., 2016). Similarly the authors mentioned that managers develop abilities and competencies in executing projects in to success. Subsequently work experience is a learning which brings project managers in to a competent personality that possesses a capacity to lead projects in to success.

The following competencies are major areas this study considers in evaluating the competency of project managing group who took part in the project under the study. **Strategic Approach**, capability of a person strategic project management that includes his ability to see the greater picture. Flexibility in defining projects, scanning stakeholders beyond the direct ones, performing uncertainty analysis before planning activities, having distant link with business strategy. **Understanding Project Works and Requirements**, Ability to make work breakdowns accordingly and timetables. **Ability of managing to deliverables** is an experience of a project manager to deliver products in time agreed for same, within budget allocated and meeting business needs. **Ability of team forming**, an experience of a project manager in forming team, understanding a maturity period of the team, conflict management experience, and finally creating

harmonious team that leads to success. **Experience in Projects Risk Management**, ability of a project manager to pass through projects of various type, scope, environment, stakeholders and any project issues, identifying it, planning for solution and bringing projects to success. **Experience in Office Works**, ability of project manager of being organized in duty and tasks, communication management, managing in receiving tasks, documenting, responding including office furniture. It also includes extensive experience in work processes in all level of the project.

2.6 Empirical Review

Studies indicated relation between project management competency and project success stating that competencies positively impact project success. Project management competency qualities that a successful project manager possess have significantly affected project success. On a leadership dimensions of respondents in a target group of a study by Linda Geoghegan, and Victor Dulewicz, (2008) with a tittle “Do Project Managers’ Leadership Competencies Contribute to Project Success?” concluded that management competency (MQ) dimensions of leadership contribute around 50% of competency necessary to lead a project in to success. Therefore a project management competency that is related and considered in the body of knowledge of project management plays a significant role in project success. Similarly same study ascertained that emotional competency (EQ) contribute 40% significance in project success. In this regard the study bases that personality characteristics and personal competency leads to long term managerial advancement, Goleman’s (1997). The author explained that personal characteristics are more enduring showing little change through time, whereas personal competencies are capacities that can be changed through learning and training. Subsequently the study shown that 40% of competency that

bring about a project success is emotional/'social competency which is directly related with a project manager who is in charge of implementing projects.

An empirical analysis made by Muhammad Ali Warsi(2018) supported previous study conclusion of Turner and Muller, (2010) which is project manager's intellectual, emotional and managerial competencies impact project success. The study concluded that having these competencies as a project manager helps in leading project in to success. Though this paper tries to involve religious views in to science, which are different in methods of understanding nature, the study is empirical and the religion can be taken as an identity of the sample location social value. The paper concluded that project managers of these three competencies have ability to lead project success through running project smoothly with little conflict, using business opportunity, showing good leadership quality, implementing proper plan, track down execution and implement risk plan in the project. Project manager's skill, ability, characteristics and management qualities have a direct impact in project success, subsequently project oriented organizations are expected to test these qualities before assigning project managers in to the position.

A publication on iberoamerican Journal of Project Management on Measuring the Impact of IT Project Manager's Competencies on Team Commitment conducted in Brazil by Cíntia Cristina Silva, Cristiane Drebes Pedron, Rosária de Fátima Segger Macri Russo and Filipe Quevedo has shown that three findings were critical in team commitment. These are **Team Management** expressed as ability to motivate, collaboration and proper communication, **Project Management** ability to document process, scope management, planning for time, budget, quality, risk and **Personal Characteristics** expressed as credibility, honesty, experience, commitment and empathy. These list of competencies are agreed up on

by all authors to be strictly followed while hiring project managers especially for complex and agile projects.

Generally empirical studies justified that project management competencies have direct impact on project success. Moreover all studies are focused on the three major categories of project management competencies; these are project management, personality competency and experience in the field. Therefore it can be concluded that the study is on right track to draw conclusion or identify any link for project success.

2.7 Project Management Competency and Success

Project management competency and project success are two faces of a coin that are impossible to separate. Unless a competent managers equipped with knowledge, skills and attitude is assigned attaining project success is unthinkable. Essential competency for a project manager is an ability to negotiate, facilitate and control interface management, Ordoñez et al. (2019). The author determined that those project manager with good quality in having flexible behavior to facilitate project works, handling teams in proper manner suitable for team mates and keeping the project goal together can cope projects of any type. Studies support project management competencies have positive impact on projects and on managing group involved in such projects. Mainga (2017) investigated that project management competencies positively impact project success justifying that efficiency on projects and team members increased because of the project management competencies of a manager.

Project management competencies as discussed above includes Leadership styles and abilities the same is supported by (Project Management Institute, 2017b). The ability to motivate teams and inspiring project managing group has significant impact in project success, Raziq et al. (2018). Applying human-centered

project management competencies promote team bondage and knowledge sharing by creating conducive environment to bring successful outcome, De Araújo et al. (2018b). It also noted that technical knowledge of project management applied in project planning and monitoring cannot influence project success.

2.8 Tripartite Project Management Competency

Interface management in a project is one area that experts focus in communicating stakeholders and availing information without delay so as informed decisions are made proactively. Tripartite project management is not a system of communication but it is the combined effort of three major parties of a project that if any of the parties failed the project fails. Therefore tripartite project management competency is taking the cumulative effect of three parties working to meet a common goal of successfully completing a project.

The competencies regarding tripartite project management revolves around same dimensions mentioned above but considering the whole project managing group as a unit is its character that make it a tripartite project management competency. Both three parties are legal bodies that can be evaluated severally to identify respective project management competency, however whenever tripartite is considered all parties that are contractually bind are under consideration. Tripartite in each contract as discussed above are parties that shall be functional and have certain competency level to have project outputs. Understanding the weakest link between tripartite is one of the areas that have little coverage and understanding.

2.9 Conceptual Framework

From the literatures reviewed here above we learnt that project management competencies are generally categorized under knowledge, attitude and proven experience. In each dimension of competencies we

understood what to look for in assessing and verifying a competency of a project manager or team mates of a project managing group.

The concept of the study is that project management competency of each parties involved in project have an impact on success of the respective responsibility. Effectively undertaking respective tasks of each party have an impact on cumulative competency of tripartite. Then the cumulative competency synchronized well in a project leads to project success, but not a single party competency that brings success to project. This concept of project management competency leading to success is shown in conceptual framework below.

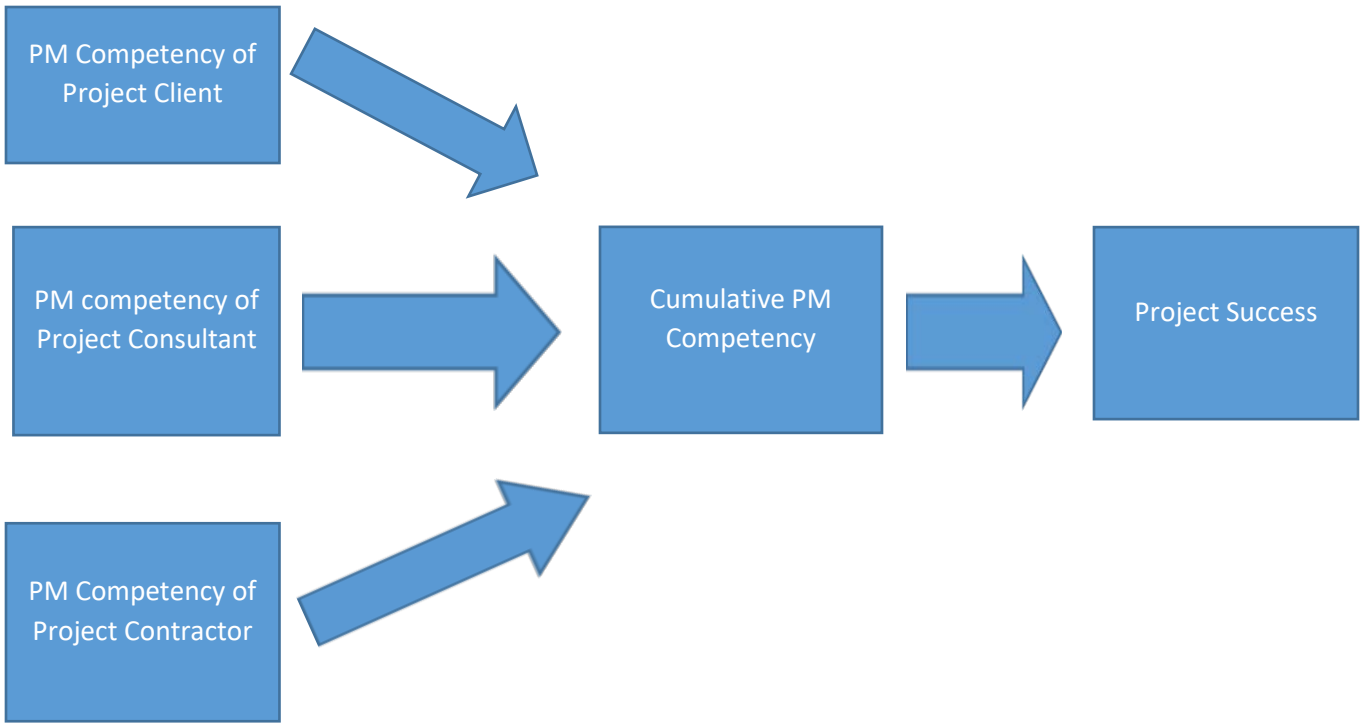

Figure 4. Conceptual Frame Work Developed by the researcher based on literature review

CHAPTER THREE

RESEARCH METHODOLOGY

Introduction

This chapter explains overall approach employed to undertake the study through explaining research design, research procedure, data collection, data analysis and ethical issues in research. Generally the methodology explains why the study is conducted, what data and where from it is collected. Subsequently research methodology explains what is to be studied, what are expected activities to be undertaken, how the study test hypothesis and make analysis to come up to a conclusion. Therefore research method is a science of investigating how the research is done (Creswell, 2003; Singleton et al, 1988).

The study used primary data collected from staffs deployed by tripartite who are involved in the project including managing group from companies' top hierarchical managers through all level to least chronological project manager at site level. The study aims to identify relation-ship between project management competencies and project success so as to assess the gap between successful projects and unsuccessful projects. This helps in configuring ways for successfully completing a project.

3.1 Description of Study Area

The study was conducted in Addis Ababa City over project managers involved in implementing Legedadi Phase II Water Supply Project. Testing project management competencies of project managers whose decision as a managing group impacted project output were conducted. Some of these managers are CEO's of all organizations, process owners, department managers at head office levels, project managers at site

level. Since it is a case study all managers involved and considered as a managing group are the only managers tested for competencies.

3.2 Research Approach

In this study project managers of all organizations involved on the project under study are tested for project management competency. The data is collected using a questionnaire developed following previous studies as shown in literature reviews, identifying global competency requirements and competency measuring approach for extracting manager's competency level from deep inside of them. The questionnaire is found suitable to evaluate project management competencies presented in three categories general management, past experience and personal attitude. Project management competency of each organization is tested and leveled at the begging. Then cumulative project management competency level of a managing group of one project which is cumulative of client, contractor and consultant is analyzed for three projects Lot-1, Lot-2 and Lot-4. Finally the cumulative project management competency level is correlated with the project success of the three projects to draw a conclusion.

3.3 Research Design

Since purpose of this study is to present relationship between project management competency and project success it is descriptive research. Describing project success, background information about the project, clarifying sequences of stages and decisions made by project managers are activities that are undertaken. Since there is no answering the ‘’why’’ question it is descriptive.

Legedadi Phase-2 Project is recent project that have no history or has no plan to undertake series of data through series of years subsequently a cross sectional research is used. The research is conducted through

cross sectional survey conducted at one point in time. More over its simplicity, least costly approach and consistency with descriptive research made it preferable for the study.

Mixed method analysis is adopted for this research while the technique adopted to collect data is qualitative, because project management competencies are explained through words. To level, correlate competency with projects success and explain the report quantitative analysis is used. Since it is a case study qualitative data collecting technique is appropriate and it is adopted. However after coding of competencies in questionnaires quantitative analysis is used to describe the results in a manner suitable for the study.

3.4 Target Population and Sampling

Target population refers to the study population whom the researches generalizes the research results (Singleton et al 1988). Target population of this study refers to management group of all contracting parties involved in the contracts. Purposive sampling is used to decide on target population using expert view on how equivalent representation each company gets. Since the project under study involves only these personnel as managing group all are considered. More over ascertaining all ten participants from each parties have equivalent managerial position. Understanding that it is the maximum number of professionals clients and consultants deploy it is found to be best approach to consider same number of participants in the research. The remaining workers are workers below site engineers, who cannot satisfy project management requirement to consider; such as lab technicians, surveyors, operators, drivers, daily laborers, guards, secretaries and etcetera.

There are one client and one consultant for all three contracts however both contracts have three separate contractors with respective managing group. The sample involves all managers involved in decision making from the top managers namely Division Managers/CEOs/DCEOs of all organization to the least managers counterpart engineers/site engineers of all organization. Accordingly, project managers involved in management group of the project from client side are 10 senior members. Project managing group of the consultant includes 10 senior staffs that are directly involved in decision making of the project. The remaining three contractors each involved 10 senior staffs deployed as managers in respective field of expertise. Totally 30 senior staffs from the three contractors that are directly involved in decision making are included in study. Therefore all managing groups who have direct involvement in decision making for success or failure of the project are identified and considered reliability for the study. A questionnaire was given to each individuals, the respond is gathered to analyze and find generalization of the study.

3.5 Data Type and Source

This study uses primary data to obtain relevant information from senior staffs took part in the project who took part in decision making. Primary data refers to the first-hand data gathered by the researcher surveys, specially designed for understanding and solving the research problem at hand (Ajayi, 2017). The study adopted a questionnaire survey as a best tool for primary data collection from the whole managing group. From final decision makers up to a joint decision making of the tripartite are included. Questionnaire is developed to address major categories of competency that a project manager should possess to manage projects proficiently. Eleven competencies were assessed under project management body of knowledge, nine competencies were assessed under past experience and nine competencies were assessed under

personal attitude. Overall twenty nine (29) competencies of project management were structured in the questionnaire in addition to general information and biographic data.

3.6 Data Analysis Method

The processing of data collected, understanding trend of respondents, coming in to a conclusion and obtain a findings is expected on this section. Analysis of data gathered was conducted using software called Statistical Packages for Social Science (SPSS). Using this software results of data gathered are reported through average, mean, percentiles and frequencies.

For the purpose of analysis the questionnaire identified the competencies level from level 0 where the project managers have no clue about the competency in query up to level 4 where the project manager properly equipped with the competency in query.

Competency levels	**Scores allocated**
Score level 4	4
Score level 3	3
Score level 2	2
Score level 1	1
Score level 0	0

Table 1 Competency Score Allocation

The competencies are classified in to three categories which are general management, past experience and personal attitude.

Categories of competencies to be assessed	**Maximum score (100% Competency level)**
General Management	44
Past Experience	36
Personal Attitude	36

Table 2 Maximum Competency Level Cumulative

In order to define the project management competency level of each organization, an average of actual score from the collected data is divided by the maximum achievable scores. Similarly the tripartite competency is an average of three organization involved in a single contract divided by this maximum achievable score. The competency level among all the three contracts are contrasted and respective correlation with the project success is judged and conclusion is drawn afterwards. Both organizations and personnel deployed are tested for respective competency to come up to a decision.

Finally to verify impact of tripartite project management competency an overall project management competency of the whole tripartite and project success of the whole contract under same project is assessed.

3.7 Ethical Conclusion

The goal of ethics in research is to make sure that no one is hurt because of the research conducted. Ethics are norms of behavior that guide moral choices about our behavior and relationship with others. The ethical consideration on this research included that explanation of the project was revealed for each participants, since there is no names required there was no doubt about information disclosure personally. All the information and data collected are kept confidential, questionnaires focus on professions and no misrepresenting of results are expected, all relevant information about the project is given for participants and hence respondents are not deceived.

3.8 Validity

Effort is made to assure that data collecting instrument is easily understandable, standardized and convenient for respondents so as to collect data intended for specific purpose. Subject matter experts were consulted and shown the instrument for further evaluation and remarks. The constructive comments given were collected to adjust the instrument accordingly. More over the research advisor was shared the instrument for final examination of content validity, prior to starting data collection. Subsequently data collected through this instrument increases trustworthiness of the final result analyzed.

3.9 Reliability

Since it is a purposive sampling used the target samples are senior experts starting from company CEOs, DCEOs, Process and sub-process managers, procurement managers, Team leaders, project managers, resident engineers, office engineers, electromechanical engineers and site engineers. The target sample, therefore have knowledge, ability, experience and capability to understand subject matter, showing that these experts have ability to properly understand questionnaire and respond accurately.

The questionnaire developed following previous studies reviewed, based on global standards of competency requirements and competency measuring approach for extracting manager's competency level. The questionnaire is found suitable to evaluate project management competencies presented in three categories general management, past experience and personal attitude. The target sample selected and the data collection instruments justify reliability of the data.

CHAPTER FOUR

DATA PRESENTATION ANALYSIS AND INTERPRETATION

Introduction

This chapter presents analysis of data collected, interpret it to show findings and properly present findings in a form of table, graph and charts so as to clearly explain what the research is all about and what the benefits of the research are.

A total of fifty senior professionals has participated in the survey most of whom are senior engineers who has direct impact on the project under study. Members involved in all three contracts are evaluated for project management competency so as to analyze its impact on project success. Below here data analysis are explained in five categories which are demographic characteristics, PM competency level of all parties, project success level, tripartite PM competency and correlation analysis between PM competency and Project Success.

4.1 Demographic Characteristics of Sample Population

Here in this chapter demographic characteristics of respondents is assessed to have information about gender distribution, age distribution, working experience and educational background distribution of respondents.

4.1.1 Gender Distribution

Out of 50 professionals involved in this survey, 41 of them are male workers that contributes 82% of sample population. The remaining 9 professionals are female that contributes remaining 18% of population. Table below shows detail gender distribution of sample.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	41	82.0	82.0	82.0
	Female	9	18.0	18.0	100.0
	Total	50	100.0	100.0	

Table 3 Gender distribution of respondents

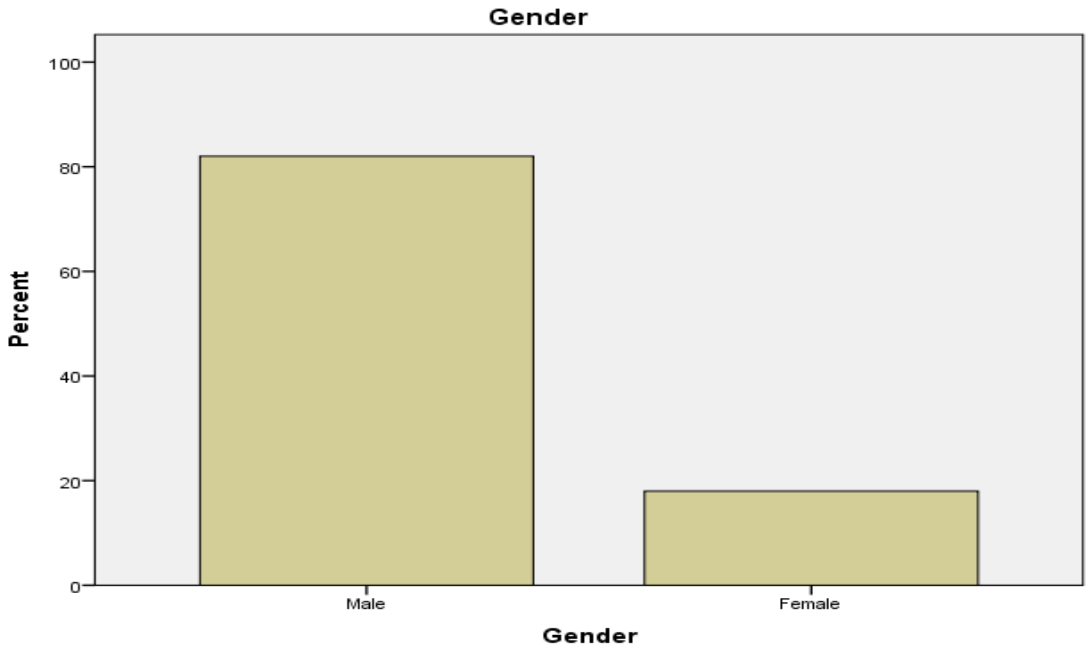

Figure 5 Bar Chart of Gender Distribution

4.1.2 Age and Experience Distribution

The samples population is separated in to three age categories starting from 25years old to age group above 46. All staffs with age between 25years to 35 years are called junior project managers (not junior

staffs), all staffs with age between 36years to 45 years are called senior project managers and all staffs with age above 46years is called Experts. According to data analysis made on the study there are 11 junior projects, 25 senior project managers and 14 experts contributing 22%, 50% and 28% of sample population.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Junior Project Manager	11	22.0	22.0	22.0
	Senior Project Manager	25	50.0	50.0	72.0
	Expert	14	28.0	28.0	100.0
	Total	50	100.0	100.0	

Table 4 Age distribution of respondents

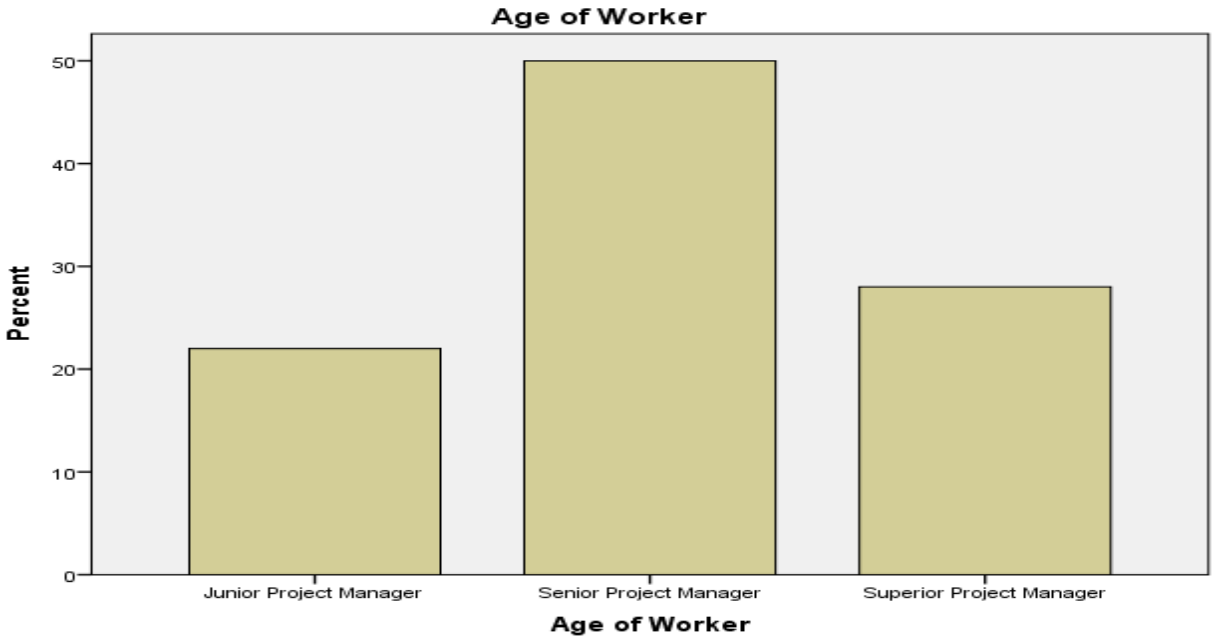

Figure 6 bar Chart of Age Distribution

4.1.3 Educational Background Distribution

All staffs of sample population have educational background of bachelor and Masters Degree in related engineering fields such as Hydraulic, Irrigation, Construction, Electrical, Mechanical, and other experts like construction technology, construction management, hydrogeology and geophysics. Yet for this study we have only categorized educational background in to BSc and MSc/MA. Based on the analysis made out of 50 people of sample 31 of them are bachelor degree holders which contributes 62% of sample population. The remaining 19 people hold MSc/MA degrees and these staffs contribute 38% of sample population.

Education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	BSC	31	62.0	62.0	62.0
	MSc	19	38.0	38.0	100.0
	Total	50	100.0	100.0	

Table 5 Educational Level of respondents

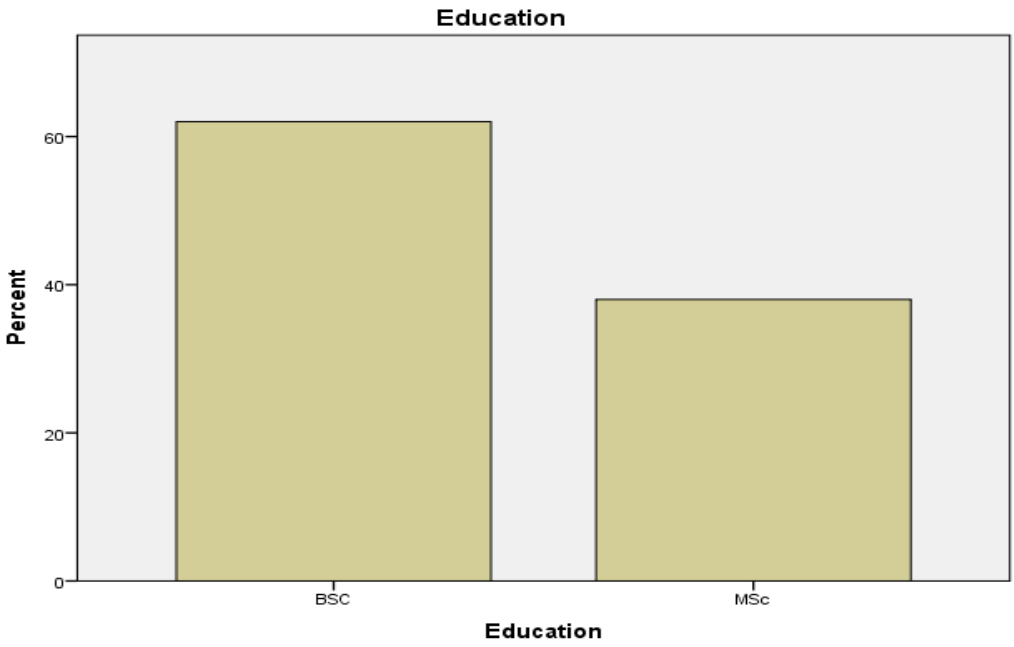

Figure 7 Bar Chart of Education Level

4.2 Project Management Competency Levels

Project Management Competency of workers is evaluated based on the three general categories of competencies; general management, past experience and personal attitude. Each of the tripartite are evaluated for these questionnaires to come up to the following result.

Five competency levels are rated by Leandro Bolzan de Rezende and Paul Plackwell on their paper of project management competency framework. The competency level rating scale shown five different levels these are as follows.

1. Aware: First level where respondent is aware of knowledge for competency but do not have ability for applications.

2. Practiced: Second level where respondent has a working knowledge and can describe the competency. Respondents under this categories can apply this competencies under supervision.
3. Competent: Third level where respondents have comprehensive knowledge and can apply competency knowledge independently in some relatively simple project environments.
4. Proficient: Forth level where respondents have detail knowledge of the competency. Can critically evaluate, adapt the environment and applies the competency independently in complex environment. Respondents in this level have a capacity to supervise other applying the competency.
5. Expert: Fifth level where one has in depth knowledge of competencies. Respondents in this level can even create new ideas and theories to adopt to a complex situation when required. These experts can educate others. Applies competency independently, in any situations. Recognized as experts by other senior professionals and are called to advise others.

Accordingly project management competency level of respondents is applied based on the analysis. Hence respondents with 0-20% rate are **Aware** level, 21-40 % rate are **Practiced** level, 41-60% rate are **Competent** level, 61-80% rate are **Proficient** level and 81-100% rate are **Expert** level. It is known that the maximum level of rating in competency level questionnaires is 4, respondents' answer is evaluated in contrast to this as 100% score for each competencies. Analysis is made based on this rating scale and the result of all parties is explained as follows.

4.2.1 Project Management Competency of Client

From sample population one of the parties is client who owns and benefits from the project. All members that are directly involved on project and influence decisions of the project were assessed. The client has

scored 2.66 mean value with respect to Project Management Body of Knowledge which has a percentage of 66.5% (2.66/4). Client is proficient in Project Management Body of Knowledge competency. With respect to experience as project manager the client has scored 2.77 mean value that leads to a percentage of 69.25% (2.77/4). Client is proficient in project management experience competency. With respect to Personal attitude client has scored 2.87mean value, this result leads to 71.75% (2.87/4) and the client is proficient in personal attitude competency. Table below shows detail analysis

	N	Minimum	Maximum	Mean	Std. Deviation
Competency in Project Management Body of Knowledge	10	1.80	3.45	2.6570	.44826
Working Experience as Project Management	10	1.25	3.56	2.6260	.75337
Personnal Attitude on Works	10	2.17	3.67	2.8760	.49226
Valid N (listwise)	10				

Table 6 PM Competency Level of Project Client

To have overall project management competency of client team divide the sum of mean values of management body of knowledge, past experience and personal attitude to three. Generally management competency of the client have a mean value of 2.72 leading to 67.99%. Therefore competency level of client team involved in the project is level four called **Proficient**.

4.2.2 Project Management Competency of Consultant

From sample population consultant is one of the tripartite of the project who assigned as consultant for leading project as knowledge part of project management team. All members directly involved on specific project and influencing decision making were assessed. Consultant has scored 2.82 mean value with respect to project management body of knowledge which has a percentage of 70.5% (2.82/4) subsequently consultant is proficient in project management body of knowledge competency. With respect

to experience as project manager consultant has scored 2.92 mean value that leads to a percentage of 73% (2.92/4). Consultant is proficient in project management experience competency. With respect to Personal attitude consultant has scored 2.65mean value, this result leads to a percentage of 66% (2.65/4) and the consultant is proficient in personal attitude competency.

	N	Minimum	Maximum	Mean	Std. Deviation
Competency in Project Management Body of Knowledge	10	2.10	3.55	2.8220	.54611
Working Experience as Project M	10	1.50	3.50	2.9190	.65008
Personnal Attitude on Works	10	1.89	3.67	2.6450	.64231
Valid N (listwise)	10				

Table 7 PM competency Level of Project Consultant

To have overall project management competency of consultant team divide the sum of mean values of management body of knowledge, past experience and personal attitude to three. Generally project management competency of the consultant have a mean value of 2.8 leading to 69.92%. Therefore competency level of consultant team involved in the project is level four called **Proficient**.

4.2.3 Project Management Competency of Lot-1 Contractor

From sample population Lot-1 contractor is one of tripartite of the project regarding Lot-1 contract. All members directly involved on this very contract and influenced decision making of this specific project were assessed. Lot-1 Contractor has scored 2.82 mean value with respect to Project Management Body of Knowledge which has a level of 70.5% (2.82/4), subsequently Contractor for Lot-1 is proficient in project management body of knowledge competency. With respect to experience as project manager Lot-1 Contractor has scored 3.28 mean value that leads to a level of 82%(3.28/4). Contractor of Lot-1 is Expert in project management experience competency. With respect to Personal attitude Lot-1 Contractor has

scored 2.98mean value, this result leads to a level of 75% (2.98/4) and hence Contractor for Lot-1 is proficient in personal attitude competency. Below here is table showing the descriptive analysis of collected data.

	N	Minimum	Maximum	Mean	Std. Deviation
Competency in Project Management Body of Knowledge	10	2.00	3.73	2.8200	.51521
Working Experience as Project M	10	2.56	3.78	3.2810	.40270
Personnal Attitude on Works	10	2.44	3.70	2.9800	.44305
Valid N (listwise)	10				

Table 8 PM competency Level of Lot-1 Contractor

To have overall management competency of Lot-1 Contractor team, divide sum of mean values of project management body of knowledge, past experience and personal attitude then divided it in to three. Generally project management competency of Lot-1 Contractor have a mean value of 3.03 leading to 75.67%. Therefore the competency level of the Lot-1 Contractor team involved in the project is level four called **Proficient**.

4.2.4 Project Management Competency of Lot-2 Contractor

From sample population Lot-2 contractor is one of the tripartite of the project specifically regarding project scope under lot-2. All staffs directly involved on this very contract and influenced decision making of this specific project were assessed. Accordingly Lot-2 Contractor has scored 2.91 mean value with respect to Project Management Body of Knowledge which has a level of 72.75% (2.91/4), subsequently Contractor for Lot-2 is proficient in project management body of knowledge competency. With respect to experience as project manager Lot-2 Contractor has scored 3.23 mean value that leads to a level of 81%(3.23/4). Contractor of Lot-2 is Expert in project management experience competency. With respect

to Personal attitude Lot-2 Contractor has scored 2.81mean value, this result leads to a level of 70% (2.81/4) and hence Contractor for Lot-2 is proficient in personal attitude competency. Below here is table showing the descriptive analysis of data collected.

	N	Minimum	Maximum	Mean	Std. Deviation
Competency in Project Management Body of Knowledge	10	1.91	3.82	2.9100	.58621
Working Experience as Project M	10	2.25	4.00	3.2260	.50788
Personnal Attitude on Works	10	1.78	3.78	2.8120	.55870
Valid N (listwise)	10				

Table 9 PM competency Level of Lot-2 Contractor

To have overall management competency of Lot-2 Contractor team, divide sum of mean values of all three competency categories; project management body of knowledge, past experience and personal attitude in to three. Generally Project Management Competency of Lot-2 Contractor have a mean value of 2.98 leading to 74.58%. Therefore the competency level of the Lot-2 Contractor team involved in the project is level four called **Proficient**.

4.2.5 Project Management Competency of Lot-4 Contractor

From sample population Lot-4 contractor is one of the tripartite of the project specifically regarding supply and fixing of Electromechanical equipment. All members directly involved on this very contract and influenced decision making of this specific project were assessed. Lot-4 Contractor has scored 2.95 mean value with respect to Project Management Body of Knowledge which has a level of 73.75% (2.95/4), subsequently Contractor for Lot-4 is proficient in project management body of knowledge competency. With respect to experience as project manager Lot-4 Contractor has scored 3.17 mean value that leads to a level of 81%(3.17/4). Contractor of Lot-4 is Expert in project management experience competency. With

respect to Personal attitude Lot-4 Contractor has scored 2.56mean value, this result leads to a level of 64%(2.56/4) and hence Contractor for Lot-4 is proficient in personal attitude competency. Below here is table showing descriptive analysis of the data.

	N	Minimum	Maximum	Mean	Std. Deviation
Competency in Project Management Body of Knowledge	10	2.36	3.64	2.9460	.38831
Working Experience as Project M	10	2.56	3.67	3.1680	.39963
Personnal Attitude on Works	10	1.89	3.33	2.5590	.44513
Valid N (listwise)	10				

Table 10 PM Competency Level of Lot-4 Contractor

To have overall management competency of Lot-4 Contractor team, divide sum of mean values of all three competency categories; project management body of knowledge, past experience and personal attitude in to three. Generally Project Management Competency of Lot-4 Contractor have a mean value of 2.89 leading to 72.33%. Therefore competency level of Lot-4 Contractor team involved in the project is level four called **Proficient**.

4.3 Tripartite Project Management Competencies

This study focused and concentrated about verifying project management competency of tripartite to determine its influence on project success. Below here is tripartite project management competency of all three contracts to draw conclusion about the study and come to generalized way of success in project.

4.3.1 Tripartite PM competency of Lot-1 Contract

Population of Tripartite of Lot-1 contract are all senior staffs that took part in decision making and who are part of this specific contract managing team representing Client, Consultant and Lot-1 Contractor. After the assessment for cumulative project management competency this team scored 2.77 mean value with respect to Project Management Body of Knowledge which has a percentage of 69.25% (2.77/4), subsequently tripartite management competency of Lot-1 project is proficient in project management competency. With respect to experience this team has scored 2.94 mean value that leads to a percentage of 73.5% (2.94/4). Tripartite management team of lot-1 contract is proficient in project management experience competency. With respect to Personal attitude the team scored 2.83mean value, this result leads to a value of 70.75% (2.83/4) and tripartite management team of lot-1 contract is proficient in personal attitude competency.

	N	Minimum	Maximum	Mean	Std. Deviation
Competency in Project Management Body of Knowledge	30	1.80	3.73	2.7663	.49344
Working Experience as Project M	30	1.25	3.78	2.9420	.65716
Personnal Attitude on Works	30	1.89	3.70	2.8337	.53332
Valid N (listwise)	30				

Table 11 Tripartite PM Competency of Lot-1 Contract

To have overall management competency of Lot-1 divide the sum of mean values of management body of knowledge, past experience and personal attitude in to three. Generally Project Management

Competency of tripartite managing team of Lot-1 have a mean value of 2.85 leading to 71.17% of PM competency Level. Therefore the competency level of this team is level four called **Proficient**.

4.3.2 Tripartite PM competency of Lot-2 Contract

Population of Tripartite of Lot-2 contract are all senior staffs that took part in decision making and who are part of this specific contract managing team representing Client, Consultant and Lot-2 contractor. After the assessment for cumulative project management competency this team scored 2.8 mean value with respect to Project Management Body of Knowledge which has a percentage of 70%(2.8/4) , subsequently tripartite management competency of Lot-2 project is proficient in project management competency. With respect to experience this team has scored 2.92 mean value that leads to a percentage of 73% (2.92/4). Tripartite management team of lot-2 contract is proficient in project management experience competency. With respect to Personal attitude the team scored 2.78mean value, this result leads to a value of 69.5%(2.78/4) and tripartite management team of lot-2 contract is proficient in personal attitude competency.

	N	Minimum	Maximum	Mean	Std. Deviation
Competency in Project Management Body of Knowledge	30	1.80	3.82	2.7963	.52244
Working Experience as Project M	30	1.25	4.00	2.9237	.67039
Personnal Attitude on Works	30	1.78	3.78	2.7777	.55671
Valid N (listwise)	30				

Table 12 Tripartite PM Competency of Lot-2 Contract

To have overall management competency of Lot-2 divide the sum of mean values of management body of knowledge, past experience and personal attitude in to three. Generally Project Management Competency of tripartite managing team of Lot-2 have a mean value of 2.83 leading to 70.83% of PM competency level. Therefore the competency level of this team is level four called **Proficient**.

4.3.3 Tripartite PM competency of Lot-4 Contract

Population of Tripartite of Lot-4 contract are all senior staffs that took part in decision making and who are part of this specific contract managing team representing Client, Consultant and Lot-4 Contractor. After the assessment for cumulative project management competency this team scored 2.81 mean value with respect to Project Management Body of Knowledge which has a percentage of 70.25%(2.81/4), subsequently tripartite management competency of Lot-4 project is proficient in project management competency. With respect to experience this team has scored 2.9 mean value that leads to a percentage of 72.5%(2.9/4). Tripartite management team of lot-4 contract is proficient in project management experience competency. With respect to Personal attitude the team scored 2.69 mean value, this result leads to a value of 67.25% and tripartite management team of lot-4 contract is proficient in personal attitude competency.

	N	Minimum	Maximum	Mean	Std. Deviation
Competency in Project Management Body of Knowledge	30	1.80	3.64	2.8083	.46498
Working Experience as Project M	30	1.25	3.67	2.9043	.63845
Personnal Attitude on Works	30	1.89	3.67	2.6933	.53223
Valid N (listwise)	30				

Table 13 Tripartite PM Competency of Lot-4 Contract

To have overall management competency of Lot-4 divide the sum of mean values of management body of knowledge, past experience and personal attitude in to three. Generally Project Management Competency of tripartite managing team of Lot-4 have a mean value of 2.8 leading to 70% PM competency level. Therefore the competency level of this team is level four called **Proficient**.

4.4 Project Success Level

As is discussed under chapter two section 2.4 for the purpose of this study a project is called successful considering iron triangle success as a criterion. Therefore on this study a project is called successful if it is completed under given budget (inside tolerable variations), inside the time allocated (substantially completion) and attaining satisfactory quality (functionality of products). Since iron triangle are put as continuum and both time, budget and quality/functionality are considered as having equal value in project success each constraints have $1/3^{rd}$ of success in a project. Therefore we make the assessment for relative project success based on this valuation.

Figure 8 Iron Triangle Continuum

Since all the projects are completed currently can be called successful, yet the damage occurred by extra time expenditure, extra budget consumption and omission of some structures explains the relative success rates of all contracts. Below here are succeed rate evaluation of all three contracts under study.

4.4.1 Success Level of Lot-1 Contract

This project under contract of Lot-1 is characterized by its budget, time and quality. According to contract agreement of this specific contract its original budget is ETB 2,019,079,777.17, with Project Duration 540 days and major structures 18 boreholes, two reservoirs and 80KM pipe lines. When the project is completed budget utilized was ETB 2,276,626,439.13, time elapsed to complete the project was 822 days where as regarding major structures 16 boreholes, Two reservoirs and 78KM pipe lines were functional and ready for service.

Every failure of a project are the degree which contractors deviated from contract and damaged client's benefit in either of the three dimensions specified. Accordingly additional budget spent on the project, additional time elapsed beyond original duration and malfunctioned structures out of original project scope are tangible failures. Table below shows deviation of the contract from originally intended benefit of the project client.

S.N	Description	Unit	Original quantity	Final quantity	Deviation/Lost	Failure rate
1	Project Duration	Days	540	822	-282	-52.22%
2	Budget	ETB	2,019,079,777.17	2,276,626,439.13	-257,546,661.96	-12.76%
3	Functionlity/Quality					
	Stractures (half of project scope)	Nr.	18	16	-2.00	-11.11%
	Pipe Lines(half of Project scope)	KM	80	78	-2.00	-2.50%
	Overall functionality	Value				-6.81

Table 14 Success Level of Lot-1 Contractor

I. Time:-Success level of time utilization on the project is computed on the basis of considering every day spent beyond the schedules date as failure and its percentile is deducted from 100% to find out success of the project in time dimension. From table above damage occurred on the project with regard to time is 52.22%. Subsequently the project is 47.78% (100-52.22) successful with regard to time utilization.

II. Budget:-Success level of project with dimension of budget consumption is considered as the amount of money spent beyond allocated budget. Regarding budget lot-1 has used 12.76% of budget more than original contract amount. This value is considered as a failure and is deducted from 100% to obtain success rate. Subsequently the project is 87.24% (100-12.76) successful with regard to budget consumption.

III. Functionality:-Success level of a project in functionality dimension is considered as fulfilling expected service of major structures/scope of the project with little scope creep. Every major part of the project that is not functional during project handing over are considered as a failure

rate. Then deducting it from 100 percent gives success rate of the project in this regard. Subsequently the project is 93.19% (100-6.81) successful with regard to functionality.

Finally the success rate of Lot-1 project is the sum of 1/3 of success rate of three constraints of a project known as continuum in iron triangle.

Project success = 1/3 of success in time consumption+1/3 of success in budget consumption+1/3 of Success in scope fulfillment

=1/3(47.78+87.24+93.19)

=1/3(228.21)

Project Success =76.07%

Therefore Lot-1 project is 76.07% successful considering the three constraints as success criterion.

4.4.2 Success Level of Lot-2 Contract

This project under contract of lot-2 is characterized by its budget, time and quality. According to the contract agreement of this specific contract its original budget is ETB 1,121,333,688.4, with Project Duration 540 days and major structures 1 Pump station, 10 reservoirs and 100KM pipe lines. When the project is completed budget utilized was ETB 1,137,209,143.48 time elapsed to complete project was 848 days where as regarding functionality 1 pump station, 8 reservoirs and 90KM pipe lines were ready for service.

Every failure of a project are the degree which contractors deviated from contract and damaged clients benefit in any of the three dimensions specified. Accordingly additional budget spent on the project, additional time elapsed beyond original duration and malfunctioned structures out of the scope are tangible failures of the project. Table below expresses deviation of the contract from originally intended benefit.

S.N	Description	Unit	Original quantity	Final quantity	Deviation/Lost	Success rate
1	Project Duration	Days	540	848	-308	-57.04%
2	Budget	ETB	1,121,333,688.40	1,137,209,143.48	-15,875,455.08	-1.42%
3	Functionlity/Quality					
	Stractures	Nr.	11	9	-2.00	-18.18%
	Pipe Lines	KM	100	90	-10.00	-10.00%
	Overall Functionality	value				-14.09%

Table 15Success Level of Lot-2 Contractor

I. Time:- Time:-Success level of time utilization on the project is computed on the basis of considering every day spent beyond the schedules date as failure and its percentile is deducted from 100% to find out success of the project in time dimension. From table above damage occurred on the project with regard to time is 57.04%. Subsequently the project is 42.96% (100-57.04) successful with regard to time utilization.

II. Budget:- Success level of project with dimension of budget consumption is considered as the amount of money spent beyond allocated budget. Regarding budget lot-2 has used 1.42% of budget more than original contract amount. This value is considered as a failure and is deducted from 100% to obtain success rate. Subsequently the project is 98.58% (100-1.42) successful with regard to budget consumption.

III. Functionality:- Success level of a project in functionality dimension is considered as fulfilling expected service of major structures/scope of the project with little scope creep. Every major part of the project that is not functional during project handing over are considered as a failure rate. Then deducting it from 100 percent gives success rate of the project in this regard. Subsequently the project is 85.91% (100-14.09) successful with regard to Functionality.

Finally the success rate of lot-1 project is the sum of 1/3 of success rate of the three constraints of a project considered as continuum in iron triangle.

Project success = 1/3 of success in time consumption+1/3 of success in budget consumption+1/3 of success in scope fulfillment

=1/3(42.96+98.58+85.91)

=1/3(227.45)

Project Success =75.82%

Therefore Lot-2 project is 75.82% successful considering the three constraints as success criterion.

4.4.3 Success Level of Lot-4 Contract

This project under contract of Lot-4 is characterized by its budget, time and quality. According to the contract agreement of this specific contract the original budget is ETB 719,508,531.76, with Project Duration 540 days and all supply and installation of major EM parts 18 Submersible Pumps, 12 Standby generators, 20 Surface Pumps and SCADA software. When the project is completed budget utilized was ETB 534,656,341.51 time elapsed to complete project was 845 days where as regarding functionality 14 submersible pumps, 12 Generators 14 booster pumps and software were ready for service on project handing over.

Every failure of a project are the degree which contractors deviated from contract and damaged clients benefit in any of the three dimensions specified. Accordingly additional budget spent on the project, additional time elapsed beyond original duration and malfunctioned structures out of the scope are tangible failures. Table below expresses deviation of the contract from original intended benefit.

S.N	Description	Unit	Original quantity	Final quantity	Deviation/Lost	Success rate
1	Project Duration	Days	540	845	-305	-56.48%
2	Budget	ETB	719,508,531.76	719,508,531.76	0.00	0.00%
3	Functionlity/Quality					
	Submersible Pumps	Nr.	18	14	-4.00	-22.22%
	Generators & SCADA	Nr.	12	12	0.00	0.00%
	Booster Pumps	Nr.	20	14	-6.00	-30.00%
	Overall Functionality	Value				-17.41%

Table 16 Success Level of Lot-4 Contractor

I. Time:-Success level of time utilization on the project is computed on the basis of considering every day spent beyond the schedules date as failure and its percentile is deducted from 100% to find out success of the project in time dimension. From table above damage occurred on the project with regard to time is 56.48%. Subsequently the project is 43.52% (100-56.48) successful with regard to time utilization.

II. Budget: - Success level of project with dimension of budget consumption is considered as the amount of money spent beyond allocated budget. Regarding budget lot-4 has used whole budget as per the original contract amount. Hence with regard to budget consumption this project is 100% successful.

III. Functionality: - Success level of a project in functionality dimension is considered as fulfilling expected service of major structures/scope of the project with little scope creep. Every major part of the project that is not functional during project handing over are considered as a failure rate. Then deducting it from 100 percent gives success rate of the project in this regard. Subsequently the project is 82.59% (100-17.41) successful with regard to budget functionality.

Finally the success rate of lot-4 project is the sum of 1/3 of success rate of the three constraints of a project considered as continuum in iron triangle.

Project success = 1/3 of success in time consumption+1/3 of success in budget consumption+1/3 of success in scope fulfillment

=1/3(43.52+100+82.59)

=1/3(226.11)

Project Success =75.37%

Therefore Lot-4 project is 75.37% successful considering the three constraints as success criterion.

Finally it is observed that success level of each contracts is ranked from best, better and good amongst the three contracts. Tripartite project management competency brought a success of 76.07% for Lot-1, 75.82% lot-2 and 75.37% leveling each managing group as best, better and good success level. Competency level of both contracts fall on Proficient level yet numerical representation of competence levels are 71.17% for Lot-1, 70.83% for Lot-2 and 70% for Lot-4. The project has single client and single consultant evidencing that difference came because of contractors' project management competency. Lot-1 contractor competency level with regard to work experience fall on expert level and its success level is bests. Hence proven experience of contractor's project managing group has higher effect on project success.

Therefore contractors that deployed project managers having an ability in developing strategic approach, understanding project works, managing to deliverables, ability in team forming, risk management ability and efficient office works are success guaranteed.

4.5 Correlation between PM Competency and Project Success

Final stage of this study is to analyze correlation between tripartite project management competency and project success. Correlation analysis verifies an association between independent variables that is a project management competency and dependent variable which is project success, Mukaka (2012). Pearson correlation is used to compete relation between these variables. Interpretation is categorized depending on Pearson correlation value for strength. If Pearson correlation coefficient (r) is between0.7 & 1 the relationship is strong, if this value is between, 0.3 & 0.7 the relationship is moderate, if the value is below 0.3 then the relationship is weak. With regard to the direction of the relationship the sign of these value explains. Accordingly the relationship is direct whenever the value is positive, whereas it is inversely related if the value is negative. The significance of the relationship is dependent on P-value(sig) that is below or above 0.05. Whenever the P-value is less than 0.05 then the relationship is significant, in the other hand if the P-value is more than 0.05 then the relationship is insignificant.

From the analysis undertaken it is understood that the relationship between PM competency and Project success is high. The nature of the relation is positive and the variables are directly related so that an increase of project management competency increases project success. Finally correlation between variables is statistically significant that assures most of the respondents' competency and the respective output of project success relation is acceptable.

	Mean	Std. Deviation	N
Tripartite Project Management Competency	70.6667	.60186	3
Project Success Level	75.7533	.35473	3

Table 17 Statistical description of Tripartite PM Competency and Project Success

		Tripartite Project Management Competency	Project Success Level
Tripartite Project Management Competency	Pearson Correlation	1	.997*
	Sig. (2-tailed)		.047
	N	3	3
Project Success Level	Pearson Correlation	.997*	1
	Sig. (2-tailed)	.047	
	N	3	3

Table 18 Correlation of PM Competency and Project Success

*. Correlation is significant at the 0.05 level (2-tailed).

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMENDATION

Introduction

In previous chapters various explanation were made over subject in study, subsequently a clear understanding of the subject and questions to be answered are identified. On chapter four collected data is computed, analyzed and presented in a certain way that can bring understanding of the research question. In this chapter, since analysis and interpretation made, a conclusion is drawn. Finally a recommendation is made as to how to increase a project success, what to focus and study in the future, any drawbacks observed during the study.

The main objective of this study is to find out impact of tripartite project management competency on project success of construction projects that involve three parties Client, Consultant and Contractor. To evaluate this impact a combined project management competency of Legedadi Phase-2 Water Supply Project was taken as a case study.

5.1 Summary

The population of the study are project managers who are assigned in various positions of respective companies who contribute to a combined decision making of the project under study. The population includes from CEO of a company to project managers at site level. The description of project population is as shown below here.

- Gender distribution of population shows that 82% of project managers are male and remaining 18% are female showing that most professionals that sustain in companies and grow to project Manager level are male.
- The age of the respondents is separated in to three age categories accordingly 22% of respondents are junior project manager with age from 25-35 whereas 50% are senior project manager with age range from 36-45 the remaining 28% are found in expert level where the age of this final category is above 46. Subsequently most project managers involve in decision making are senior project managers.
- Educational level all respondents is first degree and second degree, out of 50 respondents 62% of them have 1st degree in related discipline and 38% of them have 2nd degree. Accordingly, though the staffs are capable of handling the job, specialization in the field of study is still remaining. As most of them not specialized in the field of project management.

Generally the sample population can represent the managing team of all parties involved in the project who have ability and power to make decision severally over respective domain and collectively as tripartite project managing group.

Project management competency of each respondents is assessed to evaluate capability with regard to project management body of knowledge, experience as project manager and personal attitude. Accordingly the result of the study is as bulleted here below.

- With regard to body of knowledge in project management all respondents have scored forth level competency. Most of whom scored least competency showing that there is lack of knowledge in

the field to come up to an expert level. Capacity development work is carried out in project oriented organization so as to attain sustainable and successful project accomplishment.

- ❖ Work experience competency of respondents have a better result even though the range of proficient competency level is from 61% to 80% most of respondents fall in this category to be called proficient in the competency. One contractor has scored expert level (81% to 100%) of competency showing that most respondents have good experience that supported other competencies to score higher rate in overall competency ranking.
- ❖ Personal attitude is other competency which was assessed to evaluate project management competency of respondents. In this respect all respondents scored proficient level of competency. Personal attitude experience is most required quality to bring about successful rhythm project performance through a timely team formation. These qualities are behavior of a leader who reflect a capacity and motive to lead projects in to success.

Tripartite project management competency level of each contracts are a cumulative results of client, consultant and contractor when evaluated together over three competency areas. Accordingly all project management competency level of tripartite PM competency fall over proficient level, yet having different percentage over competency ratings.

Project success level of all contracts are computed based on three constraints of project time, budget and quality. With regard to these qualification lot 1 contract scored a success level referred in percent as 76.06%, Lot-2 contract scored 75.82% success and lot-4 contract scored 75.37% success rate.

The correlation of tripartite management competency and project success is made based on the percentage of both rate rather than generalized name, proficient or successful. Therefore percentage of PM

competency versus percentage of success used in correlation computation to come up to results is shown in analysis made above. From the correlation computation it is found that there is high relationship between PM competency and project success; moreover this relationship is also significant and positive.

The findings of this study is that as project management competency is directly related with project success, then tripartite PM competency definitely impacts project success. More over there is a gap in project managing team with respect to project management body of knowledge area. If there were some way of specialization in project management body of knowledge, project success might increase the success rate.

Most of respondents fall in a competency level of proficient which is way far from becoming an expert level project manager, this makes capacity of project managers in the field of construction industry doubtful.

5.2 Conclusion

The study examined impact of tripartite project management competency over project success; a case study of legedadi phase-II water supply project implemented for Addis Ababa Town Water Supply. The examination of project management competency was done by assessing capabilities in three dimensions, project management body of knowledge, work experience and personal attitude.

The finding of this study shows that majority participants have proficient project management competency level for body of knowledge, for experience as a project manager and for personal attitude. From this the study find out that most senior project staffs engaged in similar scope of project have similar knowledge, personality and experience.

Considering construction projects, it is vivid that most resources deployed on site are of contractor's, subsequently any delay in proficient project accomplishment increases contractors' overhead cost which is very dangerous precedent for business entity. Contractor should decrease unnecessary costs and wages that occurs because of any failure from the contractor side. Subsequently contractor should use state of the art technology and tools that can help win the project.

The study shows that all three contractors have scored project management competency rate above consultant and client, hence the finding is that contractors deploy more competent staffs in such projects than clients and consultants.

Based on the correlation made between tripartite project management competency and project success the study found out that there is a direct and significant relationship between these two variables. It means that the higher a tripartite competency level the higher the project success is. By looking at project management competency scores of each organization project success would have been very high and satisfactory, yet the success rates of these projects is not satisfactory. Subsequently it is understood that only deploying a competent project leading team cannot guarantee project success of an organization that requires a cumulative effort of other stakeholders. In conclusion, construction projects that involves three contractually bonded parties, a combined project management competency of tripartite guarantees success of construction projects.

An academic contribution of this study is that it identified the link between tripartite of a project to lead a successful project. In projects that involve multi parties a diligent work of single party od the contractor cannot guarantee success of a project subsequently any project manager of contractor shall emphasize on strengthening the weakest link among tripartite.

5.3 Recommendation

From the research it is found out that most of respondents possess proficient competency level in all three dimensions evaluated but less score is observed in project management body of knowledge competency hence all project oriented organizations shall give training for all staffs who are delegated for new project. Project kickoff meetings shall be followed by a training sessions to revise project management knowledge and initiate capacity buildings of staffs.

Project oriented organizations shall develop interface management capability because combined effort made by the tripartite brings higher project success rate, as shown in this study. Hence a smooth, coherent and transparent communication is necessary to have a successful project.

The data collected shows most project managers influencing project decision makings are at proficient level of project management competency yet perceived as expert level workers. Hence effort is required to increase project management competency level of senior workers in the industry to an expert level.

The three dimensions of project management competency are very critical in leading project to success, hence at least one person among project managing group shall have expert level competency to guide and support the rest of the teams. All project oriented organizations shall have at least one project management expert at any level of project leading team.

5.4 Limitation and Further Study Area

For future study in addition to tripartite organizations impact of major stakeholders shall be considered and evaluate the impact of project environment in project success. By enlarging the success criterion to include long term economic advantages to assess projects contribute to country macro economy.

One of the limitation to the study is that the bias people make while evaluating themselves. This might give a wrong representation of oneself in project managing team and might mislead the study and the conclusion.

Categorization of project management level shall be further classified among each categories, because the range is very high and most respondents might fall in to same category. All parties evaluated in all dimensions generalized as if all staffs are at proficient level of project management competency.

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Annex

Questionair

Addis Ababa University School of Commerce

Department of Project Management

Post Graduate Program

Dear Sir/Madam

I am performing a graduation paper study titled "Impact of tripartite Competency in Project Success: A case study of Legedadi Phase-II Water Supply Project" for my Masters Degree in Project Management.

This is part of academic research that targets in evaluating the impact of project management competency of a managing group responsible for a project execution. The study undertakes a survey among clients, consultants and contractors to find out a critical part that impact a project success by most. The researcher would like to thank you in advance for all your collaboration in filling the questionnaires and spending your precious time for this

Part I. Personal Information

1. Your service year on project:_____years.
2. Your experience as Project Manager (In Project Works) _____.
3. Current Position _____
4. Educational Level :_____
5. Sex a. Female ☐ b. Male ☐
6. Age a. 25-35 ☐ b. 36- 45 ☐ c) above 46 ☐
7. Do you have a formal training, outside the office, in project management?

   a. Yes b. No ☐

   If yes, please specify the type and level of training you received,

   _____
   _____
   _____
8. Have you taken trainings related to Project Management provided by the Project and Project Management Office?

a. Yes ☐ b. No ☐

If yes, please specify the type of training you received

_____

_____

_____.

9. Have you ever been involved in project management or project teams prior to your current organization?

a. Yes ☐ b. No ☐

Part II. Assessment of Project Management Competency

Number	Measures	Success Level				
		Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
	General Management/Leadership					
1	Success is expected allowing such changes of the scenario above.					
2	Tackling these problems is part of your company vision.					
3	Original schedule is attainable in such changing environment.					
4	Possibility of having strong team to cope such problems and team up for good performance is high.					
5	Project issues cannot be out of control through power confrontation.					

6	Various alternatives could be seen to avoid change made on scenario above.					
7	Gathering full information and task assignment is necessary to control the change.					
8	Negotiation about task was necessary, rather than giving orders to quickly win the situation.					
9	Project teams would be discouraged to work in such situations and is impossible to bring teams to rhythm.					
10	It is possible to avoid schedule slippage, cost variation and risk of quality compromising.					
11	Your company has tools to be used for project management and it uses tackle the scenario mentioned above.					

Core competency areas to be assessed are Knowledge, Proven Experience and Personality. Please score each questions considering the scenario specified below as your project environment and taking your own expertly judgment.

Case Scenario

Assume you are a project manager of a water supply project that was planned to alleviate acute water supply shortage of a big city. Your project is characterized by the following situations.

1. Project has multiple contractors and all contractors must finish to make the project operational.
2. After pipe materials are imported for 100km pipe laying work, a rout change occurred on 50km pipe line.
3. Outbreak of COVID-19 six months after commencement (having a contract duration of 18 months).
4. All pipe materials are manufactured and Import from China (in relation to Covid-19 occurrence).

Mark as / on scales from 1 to 5.

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

Number	Measures	Success Level				
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	Past Experience					
12	All of projects you took part were successful.					
13	Stakeholders were satisfied for time, cost and quality management on the projects.					
14	Contracts are properly closed after physical completion of project.					
15	Capacity of your team was high in mediating interaction among tripartite and stakeholders.					
16	Perceiving a greater picture facilitates project success.					
17	Proficient technical capability in understanding project requirements, planning, preparing schedules and all office works is critical in project management.					
18	Understanding and managing deliverables in line with times and budget allocations can be obtained through experiences.					

19	Understanding Team formation processes is responsibility of project managers for leading to project success.					
20	Experience provides knowledge in project risk management.					

Number	Measures	Success Level				
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	Personal Attitude					
21	It is easy to deal with such ongoing changes, having other prior tasks are burdened on you from line managers (department or head office tasks).					
22	You have power to say No to changes that expose the project and teams to extra/unnecessary burden.					
23	You were calm during sudden changes on project scope and occurrences of force majeure.					
24	Diligently engaged in tasked assigned and Readiness to take responsibility for any failure related to these changes.					
25	Guiding team with proactive thoughts then earning trust and respect from stakeholders.					
26	Influence decision making of stakeholders to make project successful.					

27	Positively receiving of others idea, analytical thinking and using challenges as an opportunity to win projects.					
28	Appreciation of Political view and incorporate stakeholders in decision making of such tasks.					
29	Showing a role model behavior in making fair decision in settling disputes through proper listening.					