ASSESSMENT ON FACTORS AFFECTING THE SUCCESS OF PUBLIC BUILDING CONSTRUCTION PROJECTS IN JIMMA ZONE

A Research Thesis Submitted to School of Graduate Studies, Department of Accounting and Finance, College of Business and Economics of Jimma University in Partial Fulfillment of the Requirements for the Degree of Master of Project Management and Finance

BY:

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JIMMA UNIVERSITY

COLLEGE OF BUSINES AND ECONOMICS

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JUNE 13, 2021

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Assessment on Factors Affecting the Success of Public Building Construction Projects in Jimma Zone

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UNDER THE GUIDANCE OF

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CERTIFICATE

We certify that the Research Report entitled *"Assessment on factors affecting success of public building construction projects"* was done by Miss. Azeb Lema in partial fulfillment of the award of Master of Arts Degree (MA) in Project Management and Finance, is original and has not been submitted previously for any degree either in JU or any other university, and all the materials referred in the process have been duly acknowledged. Therefore, as university advisors, we hereby recommended that it be submitted as fulfilling the requirements set by the university.

Main Advisor Name	Signature	Date
_____	_____	_____
Co-Advisor Name	Signature	Date
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Internal Examiner	Signature	Date
_____	_____	_____
External Examiner	Signature	Date
_____	_____	_____

DECLARATION

I, the undersigned, hereby declare that a research thesis entitled ***"Assessment on Factors Affecting the Success of Public Building Construction Projects in Jimma Zone"*** is my original work and has not been presented for a Degree in any other university; and all the sources of the materials used in the research proposal have been duly acknowledged.

Researcher's Name	Signature	Date
Azeb Lema	_____	_____

Abstract

In Oromia figure of building construction projects is growing from time to time. However, it becomes tough to accomplish projects in the allocated cost, time and quality. This research was carried out to investigate factors that are significant to the success of a project; relating to cost, time, and quality performance during construction under Jimma Zone. This thesis tries to identify and evaluate the main factors. A questionnaire survey was conducted using 21 identified factors which are categorized into 3, totally 70 Questionnaires were distributed, and 61 questionnaires were returned; The results were analyzed using linear regression analysis to determine owners, contractors' and consultants perceptions toward the identified success influencing factors in public building construction projects. Thus, inferential statistical method like correlation analysis was used to assess the relationship between factors and project success. The study found that independent variables showed significant relation with the dependent variable and the independent variables explain 26.7% of variance of the dependent variable success of construction projects in Jimma Zone. The results of the regression analysis also showed, except for quality related factors, the influence factors of project success positively. As per the regression result, from all variable time related factors has the highest beta (β=0. 331) value which specifies the most governing effect in determining the success of project; the next was cost related factors (β=0.185), and they have a strong positive significant relation. While quality related factors (β=0.223) result in negative relationship. Generally, for the public building construction projects effectively and efficiently applying important strategy is a crucial one through considering the above mentioned variables. The conclusion is drawn that reducing of cost related factors and time related factors help projects to succeed. The researcher recommended that Contractors, consultants and clients should to put their efforts on the identified key factors in relation to their magnitudes of influence. Additionally the researcher recommend Considerations on the ongoing external environment especially political instability, through different assistances to contractors will improve the success of projects also sufficient supply of materials on time and in quantity will improve project success. Finally the researcher recommends owners, contractors, and consultants including stakeholders of every project should focus on those success factors in minimizing & mitigating so as to achieve a successful project.

Keywords: Jimma Zone, Construction Project, Project Success, Public Building Construction

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ACRONYMS / ABBREVIATIONS

ADKAR…….A- awareness of the need for change, D- desire to support and participate in the change, knowledge of how of how to change, A- ability to implement the required skills and behavior, R- reinforcement to sustain change

ANOVA…….Analysis of Variance

CoST……..…..Construction Sector Transparency Initiative (CoST)

CRF…….Cost Related Factor

CSF…….Critical Success Factor

E.C……..Ethiopian Calendar

ETB…….Ethiopia

DMUBP……..Dedo Mixed Use Building Project

DV……..Dependent Variable

GC……..General Contractor

IPD…….....Internal Patient Diagnostic

IV……...Independent Variable

JIBT…….....Jimma Integrated Bus Terminal Project

JZCO……...Jimma Zone Consulting Office

JZULMP…….…Jimma Zone Urban Land Management Project

KPI……..…Key Performance Indicator

MMUBP…….Manna Mixed Use Building Project

MoWUD……Ministry of Works and Urban Development

PMBOK…….Project Management Body of Knowledge

PSFs……...Project Success Factors

QRF……...Quality Related Factor

SPSS……..Statistical Package for the Social Science

TRF……Time Related Factor

VIF……Variance Inflation Factors

CHAPTER ONE

1. INTRODUCTION

1.1 Background of the Study

Construction industry is a very important part of country's growth. It highly contributes to the evolution and development of the economy in countries. In recent improvement, witnessed globally, it is observed that the construction industry has become one of the largest industries and its contribution is more than 10% of global economy. (Savita et al., 2014) this shows us the industry is most influential, important and if not handed in the right way it can affect the economy of one country. The Construction Industry makes both direct and indirect contributions to the economic growth of a country. This is because this sector is linked to several other sectors of the economy. A Nation is evaluated as developed, developing or Underdeveloped based on the quantity and quality of completed construction projects in their domain. This is because the Construction Industry can be seen as a driver of economic growth, especially in developing countries. It helps in the achievement of socio-economic development of providing shelter, infrastructure and employment. Haseeb et al. (2011) elaborated on the importance of construction to the economy of a nation as: On a large level, there is no suspicion that the development of a country depends upon its achievement of its advanced plain with elevated construction contents. The mentioned economy growth is achieved if the construction projects succeed in their objectives.

Project success is almost the essential target for every project in construction industry. However, it means different things to different people. While some writers consider time, cost and quality as predominant criteria, others suggest that success is something more complex.(Chan, et al., 2004). The study of project success is often considered as one of the vital ways to improve the effectiveness of project delivery (Chan et al., 2004). In the construction industry, the aim of project control is to confirm that projects finish on schedule, within budget and achieve other project goals. It is a complex task undertaken by project managers in practice, which involves constantly measuring progress, evaluating plans and taking corrective actions when required

(Kerzner, H. 2003). The concept of success in a construction project can be evaluated only when the evaluation dimensions are adequately defined. Even if defining every dimension to evaluate the success is crucial; managing the the projects are the first step needed to be taken so that we can have reliable result.

However managing projects are challenging, one of the reasons of the difficulties in managing a construction project, especially in the government sector, is due to the failure in determining the Critical Success Factors across project phases (Takim et al., 2004). Several researches have been conducted over the years identify factors that are really critical towards project success, (Chan et al., 2004; Anderson et al., 2006; (Toor and Ogunlana, 2009; Mir. F.A. et al 2014; Iona et al. 2015; Nipin J.B 2015; Yada & Yadeta 2016). Thus; highlighting the importance of critical success factors (CSFs) study towards construction project success. However, no universal agreement can be made (Chan et al., 2004).

Completing projects on time is an indicator of efficiency, but the construction process is subject to many variables and unpredictable factors, which result from many sources. These sources may include the cost related, time related and quality related factors. However, it is infrequently happen that a project is completed within the specified time.

Different studies have tried to assess the factors for a successful project for a long time. Lists of variables have been overflowed in the literature; however, the concept of project success remained ambigously defined as there is no universal agreement achieved. It is generally accepted that the major goals of all parties involved in construction projects–owners, contractors, engineers and consultants in either the public or private sector is to successfully complete the project on schedule, within planned budget, with the highest quality and in the safest manner (Chan et al., 2004; Mohammed M. Alkhathami, 2004; Rohaniyati Salleh, 2009).

Like other countries in Ethiopia Public construction projects are parts of the country's growth initiative; they share large of the country's limited financial resources. Neway S. (2018) cites (Kesete, 2018). The construction industry plays a vital role in the social, economic, and political development of a country (Ayalew, T., Dakhli, Z., & Lafhaj, 2016). Nowadays, there has been a large-scale investment in the Ethiopian construction industry. The Ethiopian government and private sectors have been investing widely in the development of infrastructures. Building

construction projects of housing development, educational, health institutes, offices, multipurpose buildings, and other buildings are among these infrastructures (Ayalew, T., Dakhli, Z., & Lafhaj, 2016). In Ethiopia, the construction industry is the highest receiver of government budget in terms of government development programs. Consequently, public construction projects consume an average annual rate of nearly 60% of the government's capital budget (MoWUD, 2006). ibid this shows us more than half of government budget is consumed by construction projects.

Projects are needed to be accomplished within the time frame, budgeted cost, and required quality. However, many projects take longer time to complete, cost more than essential and some projects are cancelled because of various factors directly and/or indirectly related with it Girma Sinesilassie et al. (2017). Additionally (Tariku, 2016) showed in his study that most of the projects in Ethiopia are delivered in the traditional method and have been known for their cost overrun and late completion time. Most of the time public building construction projects in Ethiopia suffer from delay, according to Construction Sector Transparency Initiative (CoST) Ethiopia, half of 16 government financed projects found to be failing to meet budget both in time and cost (Addis Fortune Oct 26, 2014,vol 15 ,no 756). In Ethiopia, only 8.25% projects were finished on the original targeted completion date and the remaining 91.75% delayed 352% of its contractual time (Werku Koshe, K. N. Jha, 2016). Project failures have significant effect from economic as well as political points of view in general. If the project takes longer time, it requires additional resources, and budgets and this increases labor, material, machinery, and equipment cost. This leads to the other projects budget to be affected and in general, it affects the economy. Similarly, due to delay in project implementation the people and the economy must wait for the provision of public and services facility longer than necessary (Lemma T, 2014).

Therefore, to ensure that public building construction projects run smoothly without any delay, understanding of the problems encountered during the construction process should be conducted more thoroughly. The factors that cause delays in the public building construction projects should be well addressed and mitigated so that the projects can be completed within the stipulated time. This research investigated those factors categorizing to cost, time & quality. In this study, the most significant factor that affects the construction success is identified, conclusion was made and recommendation was given.

Jimma zone is one of the target areas where public building expansion programme has been implemented. However, public building construction industry has complication in its nature because it involves large number of participants as owners, contractors, consultants, stakeholders, and other participants. Public building Construction projects in Jimma zone suffer from problems regarding cost and time performance. The study identified the factors that attributes to affecting success of public building construction projects and formulates recommendations to the success of projects in Jimma Zone. In the public building construction projects that are the target of this project work, from the lists of factor affecting the success of construction project discussed in the literature review, the most probable triggers were sorted out and organized in a way to help understand the respondents.

As a result, this study would examine factors that affect success of public building construction projects being in implementation in Jimma zone within the last five years. The study identifies factors such as, cost related, time related, and quality related that effects on success of those public building construction projects. The rationality of this study aimed at clarifying effects to the user of this research and recommending means of mitigation on construction projects.

1.2. Statement of the Problem

(Kibuchi and Muchungu 2012) exposed that regardless of the high quality of training of consultants in the building industry and regulation of the industry in major urban areas, construction projects do not always meet their objectives. This is showed by numerous projects that have cost overrun, delayed completion period and poor quality resulting to collapsed buildings in various parts of the country, high maintenance costs, dissatisfied clients and even buildings which are not functional. Also Previous studies: (Nyangilo, 2012; Lepartobiko, 2012; Mhando & Mrema, 2005), indicate that the failure of any project is mainly related to the problems and failure in performance. Developing countries have higher rate of low project performance than developed countries, Lepartobiko (2012). For this reason the current research will investigate factors that are significant for the success of construction project so that rate of project performance increase in developed countries (Specifically Jimma Zone) and the future construction projects will prepare beforehand, which help them to complete without failure and delay.

Sambasivan and Soon (2007) cite Assaf and Al-Hejji (2006) as saying that in Saudi Arabia only 30% of construction projects are completed within the scheduled completion dates and that the average overrun was between 10% and 30%. In a similar vein, an examination of the records of more than four thousand construction projects by Morris et al, (1998), showed that projects were rarely finished on time or within the allocated budget. In public building construction project the same is true that construction projects suffer mainly time overrun and also cost & quality performance issues. A related decision was reached by Chan and Kumaraswamy (1997) in a study carried out in Hong Kong concluding that timely delivery of projects within budget and to the level of quality standard specified by the client is an index of successful project delivery. This appears to be a conclusion of numerous studies. They additionally detect that failure to attain targeted time, budgeted cost and specified quality result in different unexpected negative impacts on the projects. It is further noticed that normally when the projects are overdue, they are either extended or accelerated and therefore suffer additional cost.

Various factors will play out to determine if the project will be implemented successfully. It is however established that investors have an interest in project being completed in a timely way and according to the budget and that it will meet quality expectations.

When the project is not accomplished according to the original time plan, a delay occurs. A delay is a situation whereby an act or event that extents the time required to perform the tasks under the contract Sambasivan (2007). It is the rescheduling of time from the original estimated completion time which might be caused by the contractor, owner or consultant as well as external factors Koushki and Kartam (2004).

As we can see from other previous studies (Ugwu and Haupt, 2007; Navon, 2005; Iyer and Jha, 2005; Cheung et al, 2004; Kuprenas, 2003; Samson and Lema, 2002; Lehtonen, 2001) that the failure of any project is mostly associated to the problems and failure in performance. Moreover, there are several reasons and factors which point to this problem. Most of these studies mainly focus on three aspect of performance issues mainly Cost, Time and quality related overall factors that affect the success of the project.

As stated by Yohannes Z. (2019), construction projects in Ethiopia are usually completed within a period longer than what is agreed upon by the contracting parties and with greater cost growth

from the contract amount. As a result most of the construction projects don't succeed with their schedule and budget, this occurs variation occurs because of some factors; for this reason the achievement of one's aim will decrease.

Construction delays are occurring in every phase of a construction project and are common problems in construction projects in Ethiopia too. One study shows that in Ethiopia only 8.25% projects have been finished to the original targeted completion date. The remaining 91.75% delayed 352% of its contractual time (Werku K et al 2016), for this reason the current study is anticipated to find those factors that contribute for delay which make the project not to succeed in its estimated schedule and budget. Success factors determine the constructive results of executing projects. They have to be identified before projects' implementation, from the conception phase. But projects environments are dynamic, so success factors might change their level of influence in time. Hence, undying observing of these factors is necessary and whenever needed the project manager should impact certain factors in order to increase chances of accomplishing success criteria. (Ioana Beleiu et.al. 2015)

Ethiopia as a country has witnessed a substantial increase in the number of stalled projects due to in appropriate project organization structures and ineffective leadership. There is proof that the performance of the building construction in Oromia, Ethiopia is poor as time, cost and quality performance of projects are to the degree that over 70% of the projects begun are likely to increase with time with a magnitude of over 50% and over 50% of the projects likely to increase in cost with a magnitude of over 20% (OIUD, 2007). Therefore the current study is initiated to find the significance of cost related factor on project success.

Thus without a doubt there are factors which take part in account to affect success of public building construction projects. This is because it is a global occurrence that construction projects have not enjoyed a smooth execution all the way to completion. As a result numerous projects have been affected by various challenges greatly affecting their success. It is a major matter for every stakeholder in a project to recognize these factors. This research study therefore looked at factors that affect success of construction projects that the stakeholders needed to address. It look forward to that in addressing these factors, the success of construction projects will greatly be enhanced.

1.3. Objectives of the Research

1.3.1. General Objective

The general objective of the research is to assess factors affecting the success of public building construction projects in Jimma Zone.

1.3.2. Specific Objectives

- To assess the status of public building construction performance in terms of time in Jimma Zone
- To identify the effect of Cost related factors on the success of public building construction projects in Jimma Zone
- To identify the effect of Time related factors on the success of public building construction projects in Jimma Zone
- To identify the effect of Quality related factors on the success of public building construction projects in Jimma Zone

1.4. Research Hypotheses

A research hypothesis is a foretelling statement, capable of being examined by scientific methods, that connects independent variables to some dependent variable (Kothari, 2004). It is a statement about the relationship between the dependent and independent variables to be studied.

The development of the research model is based on theoretical framework mentioned in the literature review, the null (Ho1) hypothesis are used under this study. Traditionally, the null hypothesis is assumed to be correct, until research demonstrates that the null hypothesis is incorrect (Mathers, Fox & Hunn 2007). Because, it does not have matter only using of Ho1 which it can be going to be proved Hol or disproved to Hal using regression model.

- Ho_1 Cost related factor has no statistically significant effect on the success of public building construction projects in Jimma Zone
- Ho_2 Time related factor has no statistically significant effect on the success of public building construction projects in Jimma Zone
- Ho_3 Quality related factor has no statistically significant effect on the success of public building construction projects in Jimma Zone

1.5. Significance of the Study

Construction projects are composed of many interrelated elements of labor, cost, material, schedule and other resources, making it difficult to discern which factors were the main causes for delay and cost overrun on a given project. Companies would be able to avoid or minimize these delays and cost overrun if major contributing factors were identified and planned for in a timely manner.

This study helps construction professionals increase the success of construction projects completion by managing well the factors that will help their successful completion. The architects, engineers, quantity surveyors, construction and project managers may profit (gain) from this study by employing the results of its findings while executing construction projects. Additionally Project developers/clients may also benefit from the findings of this study and therefore achieve greater success in their construction projects. This is because they may apply the findings of this study in ensuring the factors that may cause their projects not be delivered successfully are mitigated.

This Project inspects the success factors and determines which success factor is more significant in a successful completion of a project. This will offer organizations engaged in the construction industry with the foundation on which such strategies can be established in the future. Hence, this study was initiated to generate scientific information that may help policy makers to make informed decisions towards improving the performance of the building construction sector in the region.

Furthermore the thesis will:

- Serve as guidelines for further formulation and evaluation of project success.
- Generally the finding and conclusion of the study may help project managers in decision making process by understanding the problems from the finding of this project.
- The research will also contribute to the academic world and can be considered as a reference for future study purposes.

1.6. Scope of the Research

This research was limited to public building project in Jimma Zone: building projects that are under construction and the study used data from 2008 to 2013 with projects budget of above Br 2.5 Mill, this budget is used because all projects that are under this budget limit; the contractual time interval is less than one year (most of them less than 6month).

The study was focused on under construction projects between 2008– 2013 G.C because for the sake of getting relevant information most of the project time frame is 1-5 year given. The research targeted ongoing (under construction) public projects with in the last five Ethiopian fiscal years. Target respondents for this study are the principal actors in construction industry namely: the Owners, the Consultants and the Contractors.

1.7 Limitation of the Study

This research is done on the project which is under construction and the respondents tried to respond for this study in a prospective way and the researcher might consider continuation bias as a limitation. And the study is only focusing on Jimma Zone Participants. It is also qualitative and quantitative in nature and the finding might not able to be generalized.

It is also important to state that the findings of this study will not be generalized due to its limited scope. Though the study covered projects in Zone, the findings are be based on analysis of data collected from only Jimma Zone public building construction projects that have at least one overrun (time or cost) occurrence in its current stage. Again the study will be based on self-reported perception of factors affecting success of projects by project parties (namely; contractors, consultants and clients) which tend to vary and may not always be reliable. Furthermore, the study did not distinguish between ranking by individual project parties. However, the findings are consistent with similar studies assessing the factors affecting construction project success.

In this study the sample projects were selected purposively based on the year and availability of data. This may introduce bias inherent with non-probability sampling method. However, this is because there are only five projects that have complete data for the study period. Therefore, these projects were selected purposively.

This study contains another limitations firstly, the responses gathered from project stakeholders were based on their perceptions so possible bias that might have been created when respondents answered some of the questions. Secondly, different respondents may hold different views on the points of the rating scale.

Budget allocated for the study and required cost during the study was not practical. Finally, the respondents were one of the limits since the total sample of the zone (public construction projects) is large as conducting and taking sample from the whole population is not possible because of money and time constraints at this level.

1.8 Organization of the Study

This study is organized into five chapters. The first chapter is the introductory part of the study which consists of background of the research, statement of the problem, research question, objectives, significance, scope and limitation of the study.

The second chapter deals with related review of literature relevant to this study. It is presents review of related literature enclosed in project success. It also dwells on both models used to assess success factors, conceptual/theoretical literature elsewhere in the world in the light of the objectives and the nature of variables considered in the study.

The third chapter focuses on discussing the Research design & methodology, and describes target population and sampling, data collection instruments, methods of data analysis and interpretation; finally ethical concerns considered in the study.

Fourth chapter present both quantitative and qualitative data, their analysis, findings and interpretation. The collected data from the subject of the study are carefully analyzed and interpreted.

Chapter five finally puts together findings of the study, draws conclusions from those findings which are substantially supported by empirical evidence and then forwards reasonable recommendations for involved stakeholders at different levels, including suggestions for further study. Lastly, Reference and appendix which include questionnaire are also being part of this study paper.

CHAPTER TWO

2. LITERATURE REVIEW

2.1 Introduction

This section focuses on the relevant literature about project success in general and success factors in particular. A comprehensive literature review was conducted related to Theories, project success, characteristics, selection criteria, and success factors.

2.2 Theoretical Review

This part discusses the theoretical background and present the most relevant theories with previous studies related on factors affecting the success of project. For this study all of the theory could be used accordingly for example contingency theory applied when the situation are deviated from the normality .such as: the nature of organization structure, the technology we are using, different cultures, and cost strategy. The other theory that were base for this study is general system theory in which the combination of all stem or parts were essential averting or reducing project delay, Lastly ADKAR model of change in which non reacting to the changes due to lack of knowledge, skill can result project delay.

2.2.1 Contingency Theory

For this story the situation and responses should take into consideration in order to determine the nature of the situation accordingly. Since, projects are unique and complex by their nature; that need management attention according to its characteristics and environment of that occasion (Sawega 2015).

Contingency theory recognizes these situations in order to identify practices that can give solution for different projects and realizing project needs. According to this theory project management can be determined case to case, which mean that managing project do not have definite formula, because the situation makes how to vary the management system. According to Mutema et al (2003) giving management decision requires the relationship between organization and its environment at all.

So effectively applying this theory help project managers how to avert project uncertainties. For this theory different factors can affect projects differently. For example: the nature of organizational structure, technology we are using, different cultures, cost strategy we followed and etc. According to S H Murithi*,S et al.(2017) contingency theory have pivotal role in providing the manager with project schedule; though properly estimating the project completing time in order to minimize time overrun.

2.2.2. General System Theory

According to system theory the combination of all parts of unifield can realize the objectives of this thought. According to S H Murithi*, et al. (2017) if one part of the system is removed, the nature of the system is changed as well. For example, a functioning computer is a system if you remove the nature of the system is changed as well.

Projects are simply an integrated system that consists of inputs, process and output. So this will imply that missing of some or one parts of the system affects project success or completion. To generalize this theory there should be integration and harmonization among project stakeholders. According to S H Murithi*, et al. (2017) an improvement method indicate that; the failure of different project member on the works of the projects can effect on success of the project.

2.2.3. The ADKAR Model of Change

This theory tells us how projects can be fail. For this theory project can be fail if any change happened to our project and if any project stakeholders are not enough to response or resist the changes accordingly (Sawega 2015). For example, these project failures might be emanating from the change of extensive knowledge, failure to learn new skills, unable to responding different behaviors. Under the context whenever there is a change; project team employee or project manager should react to the change accordingly to avert project failure & to make it the project successful.

2.3 Empirical Literature Review

2.3.1 Project Success

According to Brown and Adams (2010), project success is an elusive term and has not been clearly defined over the years, but there are several research works that attempt to build a framework to evaluate and distinguish some success factors inside the construction industry. It must be emphasized that the ambiguity in the definition of the term project success can be traced to the fact that humans see the constituents of success from different lenses.

A successful project is that, when the project meets time, quality and cost goals. PMBOK Guide, (2008); Cost: cost is successful if it fitting the budget; Time: time is success if it fulfills the schedule; Quality: defined by how match a set of essential features reach requirements.

A project is considered to be successful when it satisfies project objectives (the time, cost, quality, performance) and also the satisfaction of the parties involved. By most accounts, if the client, end-user, project manager, project team and developer all feel that their expectations were met or exceeded; the project must be considered successful (Nicholas, 2004).

Chan and Chan (2004) have proposed two groups of key performance indicators for construction project success. The first group was objective measures, which were the issues of time; cost; safety; and environment. The second category was subjective measures, which contained quality; functionality; and satisfaction of different project participants. They have tied the performance indicators with success criteria, but those indicators were limited to operational and tactical levels and did not include the strategic stages of the project.

Lim and Mohammed (1999) spotted that there are macro and micro dimensions to project success. In their description, the micro success factors can be traced to the implementation stage of construction projects where there is a high entail for the project to meet the prerequisites' of quality, cost, time among others. Then again, the macro elements of project success demand the satisfaction of project end-users and stakeholders. It can be deduced from the observations of Lim and Mohammed that, the focus of their success factors is on timely project completion and satisfaction.

2.3.2 A Projects' Success Criteria

The increased level of complexity when approaching aspects of projects' success is normal and determined by the dynamic environment where projects are implemented. While in project management literature the list of success criteria is supplemented constantly with measurable or non-measurable items, in practice the situation becomes confusing, project managers having to deal with situations of implementing projects that don't have clearly defined success criteria. One of the success conditions mentioned by Davis (2014), based on a comprehensive literature study, is that "success criteria should be agreed on with stakeholders before the start of the project, and frequently at arrangement review points during the project"

A differentiation should be made between the two related concepts: success criteria and success factors. First, important success criteria have to be identified and then, success factors should be determined in order to escalate the chances of project success (Müller, Turner, 2007). Success criteria are defined by Muller and Turner (2007) as variables that measure project success.

Westerveld (2003) emphasizes the importance of stakeholders' satisfaction as main success criteria, complementary to the golden triangle of time, budget and quality, and adds that different time lags should be considered. Creating a set of criteria applicable to any type of project is unrealistic (Mir, Pinnington, 2014). Though certain criteria might be applicable in measuring the success of most projects, they should be adjusted to size, complexity, duration, type and stakeholders' requirements.

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Even though, cost, time, and quality are prime project objectives but according to Chan, Scott, & Lam (2002), these prime objectives are not the only key performance indicators. Further, success criteria can be divided into objective and subjective categories.

Objective measure – Time, cost, health and safety, profitability.

Subjective measure – Quality, technical performance, functionality, productivity, satisfaction, dispute, educational, social, and professional.

2.3.3 A Projects' Success Factors

In earlier project management literature the main focus was on identifying generic factors that contribute to projects' success. Within the last years, authors emphasized on the existence of different success factors depending on project type. The effort to identify the critical success factors is an ongoing subject, considered by various researchers especially due to the high pressure of implementing successful projects in active worldwide market and all the time varying business world (Crisan, Borza, 2014), where nonstop improvement is a must in order to get competitive advantage (Salanta, Popa, 2014).

Davis (2014) studies project management success in literature from 1970s to present, classifying the evolution of success factors into decades. According to this study, approaches of success factors evolved from focusing on the operation level of a project in 1970s to embracing a stakeholder focused approached after 2000s (Davis, 2014). As a result of the numerous studies that approached the topic of project success, several lists of success factors exist. Pinto and Slevin's paper from 1987 represents a reference point by establishing a list of ten success factors, recognized by other authors as accurate (Turner, Müller, 2005): project mission, top management support, schedule and plans, client consultation, personnel, technical tasks, client acceptance, monitoring and feedback, communication, trouble-shooting (Pinto, Slevin, 1987). Davis (2014) adopted in the paper a group of nine premises in order to describe success factors of projects: which are cooperation and communication, timing, identifying/ agreeing objectives, stakeholder satisfaction, acceptance and use of final products, cost/ budget aspects, competencies of the project manager, strategic benefits of the project and top management support. These lists of factors stated above, completed by inputs from experts, are the base of the empirical research stated in this paper. A combination of factors reveal the success or failure of a project and influencing these factors at the right time makes success more possible (Savolainen, 2012).

Yu et al. (2005) discussed the timing of project evaluations which aim analyzing the success, concluding that the process is useful at any time between the first milestones until the completion of the project. These results of these evaluations might indicate inconsistencies that can have

negative influence on the final outcomes. Whenever these situations occur, project managers should act in order to increase success chances by influencing the previously identified success factors.

The Success can be measured by key indicators for evaluation. Success is related to many topics and factors such as time, cost, quality, client satisfaction; productivity and safety Ahmed, Azhar, Castillo and Kappagantulla (2002). Success factors can be seen as main variables that play a role to projects' success (Dvir, 1998)

Project success factors are the components of a project that can be affected to increase the like hood of success; these are independent variables that make success most likely possible. Success factors are the inputs to management system that show the way directly or indirectly to the success of the project. Project success factors are not universal for all projects since different projects and different people prioritize different sets of success factors. Project success criteria also differ from project to project and what is acceptable in one project without impact on perceived success is considered failure in another project. Some PSFs seem to be more significant than others. These criteria and factors are generic and can influence most types Some PSFs seem to be more significant than others.

2.3.4 Cost Factor

Cost is amongst the major concerns throughout a project management life cycle and is counted as crucial factor of success. Then again, it is uncommon to see project completed within the predicted cost ((Azhar,Farooqui, & Ahmed, 2008)). In today's construction industry, cost overrun is very common phenomenon worldwide. This problem/issue is essential and needs to be more understood and improved ((Angelo & Reina, 2002)).

(Flyvbjerg, Holm, &Buhl, 2003)) Concluded that 9 out 10 projects faced cost overrun. (Azhar et al., 2008)) Studying construction projects in Pakistan found that a minimum cost overrun recorded was 10% of the estimated cost. Further, the authors mentioned that this trend is sometimes more severe in developing countries where cost overrun sometimes exceeds 100% of the anticipated cost of the project. In Uganda, there was cost overrun of more than 100% of the contract price in the Northern-by-pass project as reported by (Apolot, Alinaitwe, & Tindiwensi,

2011)). In Nigeria, (Omoregie & Radford, 2006)) reported that the minimum average percentage of cost escalation was 14%. In Portugal, construction projects faced a minimum of 12% of cost overrun ((Moura, Teixeira, & Pires, 2007)).

Certainly, every project is reliant on its cost or budget. Cost has been referred as a very important success criterion; whereas having rational budget plan and proper cost estimation have been mentioned as prominent success factors in some studies.

Amusan, (2011) researched factors affecting construction cost performance in Nigerian construction sites. It was revealed from the analysis that factors such as contractor's inexperience, inadequate planning, inflation, incessant variation order, and change in project design were critical to causing cost overrun; whereas project complexity, shortening of project period and fraudulent practices are also responsible.

2.3.5 Time Factor

"Time" or "Schedule" as one of the most essential project success criteria for any project. Time has been referred as a criterion by which to measure a project's degree of success. It is found that the definition of ―Time is of great importance. "Time" as the date when a project is most likely to finish can be a criteria, but "Time" as a manageable element might be considered as a factor.

Shaban (2008) in his research on factors affecting the performance of construction projects in the Gaza Strip, found out that the most significant factors agreed by the owners, consultants and contractors were: average delay because of closure and materials shortage, availability of resources as planned through project duration, leadership skills for project manager, escalation of material prices, availability of employees with high experience and qualification and quality of equipment and raw materials in project were the factors.

2.3.6 Quality Factor

Quality, whether it involves the product or process, has been deemed as both a project success criterion and factors. Hence, some researchers considered quality management process as a project success factor, which facilitates the success of other criteria and factors. As Muhammad

Abas et.al (2015) stated “quality is one of the influential key performance indicators of a construction project which may cause cost overrun and time delays”.

Bui and Ling, (2010) in the study that was carried out in Vietnam on factors affecting construction project outcomes revealed that most enablers that escort to project success are foreign experts’ involvement in the project, government officials examining the project and very close monitoring when new construction procedures are used. A factor which heads to weak performance is the shortage of accurate data on soil, weather, and traffic conditions.

Pheng and Chuan (2006), through case studies, has shown that total quality management a successful management philosophy in the manufacturing and service industry could be replicated in the construction industry with similar benefits. The profits might be in terms of decreasing in quality costs, and better employee job satisfaction. Iyer and Jha (2005) did a research on factors affecting cost performance evidence from Indian construction projects and found out that the project manager’s competence and top management support are found to contribute significantly in enhancing the quality performance of a construction project. He observes that a contractor’s quality assurance system, which ensures consistent quality, is essential in preventing problems and the reoccurrence of problems. His study also directs to the lack of documentation of a quality system for the majority of the contractors.

2.3.7 Assessment of Factors Affecting the Success of Construction Projects in Different Countries

Ali Yassin Sheikh Ali (2019) examined project performance in construction industry. A total of 200 employees from construction companies in Mogadishu were included in sample size using purposive sampling technique. Data was collected using semi structured questionnaire and analyzed using SPSS. The result of the linear regression showed that the project performance had statistically significant correlation with the eight predictors namely cost factors, productivity, time factors, quality factors, people factors, health and safety, innovation and leaning factors, environment factors and project performance.

Maqsoom et al. (2018) investigated and analyzed the causes influencing the time overrun in Pakistani construction projects. Totally 130 responses replied and 113were considered for

statistical analysis as they were usable (39 from building, 26 from electrical and mechanical, 43 from civil works and 5 from other specialization) which represent a response rate of 62.7%. The main factors causing time overrun were design changes during construction and improvements to standard drawings, bad performance of subcontractors and suppliers, shortage of technical staff, poor technical performance, shortage of material and material fluctuation, and problem in land acquisition.

According to T. Anoop, SS. Asadi, A.V.S. Prasad in NovemberDecember 2016, Volume 7, Issue 6. In this research they had prepared a framework on the performance of the construction projects on developing countries. They had given some factors which may affect the project performance and they are as follows- cost, quality, site, dispute, safety, project time. They primarily indicated six factors in their respective paper which factors are affecting the success of the construction projects, client related factor, consultant related factor, extreme environmental related factor, supply chain related factors, contractor related factor. These are the mainly responsible factor for affecting the project success of the paper. The data of this paper has been analyzed by using SPSS (Statistical Package for the Social Science) Person's correlation and Regression Analysis.

According to samart Homthong and wutthipong, 2ndApril 2016 the major focus of this study was to group the factors in different categories and conduct survey for all of those categories to analyze which are the major responsible factors amongst them. They proposed nine categories of 179 identified. And listed top 10 factors from each category and ranked them accordingly. There are some most valuable factors are mention- major group, time performance, cost performance, quality performance, health and safety performance, environment performance, productivity, risk management, human resources. They applied RII method for ranking.

According to Nipin Joseph Babu, in (March-April 2015) Vol. 12, Ver.V As the complexity and difficulties are very common now days and construction projects are facing many problems due to this. They have tried to focus on those factors which are responsible for the complexity of the project and tried to minimize them hypothetically. Shortage of material has been listed number one in this research. Mainly focused factors in this paper are Cost factors, time factors, quality factors, productivity factors, client-satisfaction factors, regular and community satisfaction

factors, people factors, health and safety factors, innovation and learning factors, environment factors. They have determined the data by RII method.

According to Alis Kahwajian1), Shukri Baba2), Omar Amudi3), Mohammed Wanos4), Jordan Journal of civil engineering, volume 8, 2014. The prime focus of this was paper to collaborate the public and private sectors for the economic and social development. While working on this partnership they have faced many challenges such as weakness in the administrative and legal difficulties of public sector, lack of legislation. They have proposed this partnership on the legal grounds for the development of Syria. 22 main factors were find out and analyzed by questionnaire based investigation. The top most 5 critical factors are favorable legal framework, political support, good governance, stable macro-economic environment, appropriate risk allocation and risk sharing.

According to Zarina Alias, E.M.A. Zawawi, Khalid Yusof, Arish, NM, 2014 Main motive of this research is to enhance the construction project success. This paper was done by a wide study done from the past/previous papers in which different variables have been proposed and listed on the top as the most affected factors for the successful projects. They held one survey and targeted experienced folks such as architects, engineers, manufacturers and so on, they discussed some factors which should be minimized for improvement of construction industries of Malaysia, and also they should practically implement on the construction sites. They investigated all the influencing factors, and mainly focused on 5 (CSFs) – project procedure, project management action, external issues, human factors, project related factors.

According to Afshin Pakseresht29, Dr Gholamreza Asgari30 in December 2012, Vol 4, No 8. In this paper a research have been performed in Pars Garma Company. Two stage programme have been performed in this research. They prepared one questionnaire and distributed in 58 employees of the company (staff manager, technical expert, project manager). And in the second stage they eliminated the lowest factors and again prepared one questionnaire and it circulated in 15 organizational experts. And the final proposed critical factors are given respectively contractor related factors, consultant related factors, contract related factors, employer related factors, effective factor in project management, project management related factor, project logistics related factor. The collected data has been analyzed by Z-test and SPSS software 16.

According to Muhammad Saqib, Sarosh H. Lodi, in August, 2008, Karachi, Pakistan. As the intricacy and complications present in the construction projects. To reduce these types of inconvenience during the construction project they have been gone through one survey to identify the main issues which are affecting the success of construction projects. And they revealed out 77 such small and big causes. And divided them in 7 different sections top 5 factors from every section have been analyzed by their ranking. And they finally proposed 5 major factors which were top ranked amongst all of the sections, which are mentioned as; Contractor-related factor, project related factors, procurement related factors, design team factors, project management factors.

Assaf and Al-Hejji (2006) studied the causes of delay in large building construction projects in Saudi Arabia. They found 73 factors that cause construction delays. They categorized these factors into 9 groups. Some of the most important causes of delay included approval of shop drawings, delays in contractors' payment by owners, design changes by owners, cash problems during construction, the slowness of the owners' decision-making process, design errors, excessive bureaucracy in project-owner organization, labour shortages and inadequate labour skills.

Albert P.C Chan, David Scott, Ada P. Chan in 2004 did conceptual frameworks for the success affecting factors has been given in this paper. Hypothetically they have been proposed the construction project will be more executed and successful and also of shorter duration and overall management should be smoother if complexity of the project becomes less. They have been mainly focused on the critical factors affecting success and not on the success of a project. Mainly there are 5 major critical factors are given which are having numbers of factors there are 44 such factors have been investigated top 4 factors of this investigation where project management actions, external environment, and project related factors.

2.3.8 Assessment of Factors Affecting the Success of Construction Projects in Ethiopia

Werku Koshe1, *, K. N. Jha2 (2016) did a study on Investigating Causes of Construction Delay in Ethiopian Construction Industries. From the outcomes it was revealed that all the three groups of respondents generally agreed that out of a total of 88 factors the top ten influencing factors are

Contractor's financial difficulty, Escalation of materials price, and Infective project planning and scheduling, Delay in progress payments for completed works, Lack of skilled professional in contractor organization, Fluctuating labors availability, Late delivery of materials, Low productivity of labor, Unqualified / inadequate experienced labor, Insufficient data collection and survey before design. The 88 factors were categorized into eight main groups and were ranked. The results show that clients, consultants, and contractors all agreed that the contractor group of delay factors was the most effective factor. Material related factors were deemed the second most important factor causing delay in construction projects followed by Designer's related factors and Consultants /supervisors related factors.

Yada and Yadeta (2016) did a study on Factors affecting the performance of construction project under Oromia Industry and Urban Development Bureau, Ethiopia. Therefore, this study was carried out to identify factors that affect cost, time, and quality and leadership style performance during construction projects under Oromia industry and urban development Bureau. Questionnaire surveys with desk study were employed to collect data on time and cost overrun. A total of 30 questionnaires from respondents (owner, consultants and contractors) were collected and a desk study of 10 completed building construction projects in Oromia industry and urban development were investigated. The result shows that 100% of the building construction projects suffered both time and cost performance. The actual rate of cost performance ranges from a minimum of 12% to the maximum of 60% of the contract amount and the actual time performance ranges from at least 7% to the maximum of 170% of the contract time. Respondents recognized 13 factors affecting cost performance, 31 factors affecting time performance, 5 factors affecting quality performance and 3 factors affecting leadership performance for under Oromia industry and urban development Bureau building construction projects case.

Fetene, (2008) did a study on causes and effects of cost overrun on public building construction projects in Ethiopia. The result shows that it was found that 67 out of 70 public building construction projects suffered cost overrun. The rate of cost overrun ranges from a minimum of 0% to the maximum of 126% of the contract amount for individual projects.

Construction Projects takes place in a difficult and challenging environment. A reliable way to minimize the difficulty of construction project is to work on those factors and try to minimize

them which are the prime causes of complexity and coming in-between the success of the construction projects, some of such factors have been investigated while studying various researches papers. – Cost related factors, Time related factors, and quality related factors

2.4 Conceptual Framework

The conceptual framework in this study was used to show various variables that affect the success of construction projects. Hence, based on theoretical and empirical literature, conceptual framework is developed as follows;

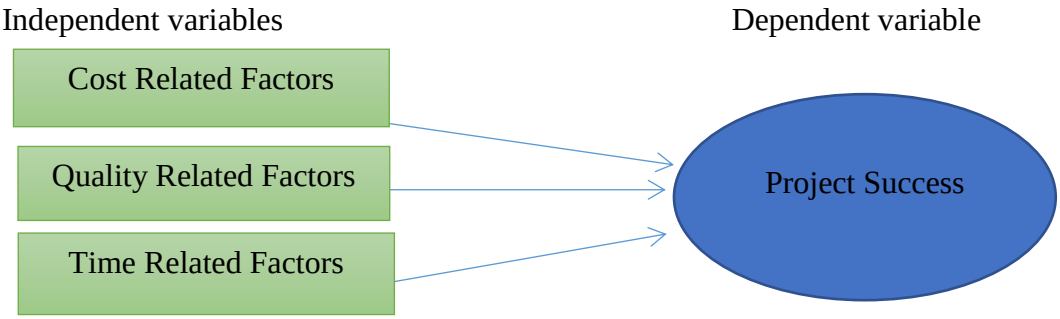

Figure 2.1: Conceptual framework

(Source: Modified by the researcher 2021 for this study)

2.5 Summary of Literature Review and Research Gap

The reviewed literature examined the various business and project management theories that support the conceptualized variables. The review identified project cost, project time, and project quality as the main variables affecting success of project. Critique of the relevant literature observed that schedule performance of construction projects undertaken in Ethiopia has been given less importance than it ought to. Jimma Zone public building projects has not even been touched.

According to Menches and Hanna (2006), schedule performance is an important aspect in determining project success, however there has been little research done on schedule performance of construction projects in Ethiopia, especially in Jimma zone. In addition, most of the traditional publications on project management present approaches to project management that in some cases are stretched to the limit or are deemed ineffective (Al-Carlos 2014). It is

important therefore to look for adaptive project management approaches that best fit our unique environment.

Those various studies in different parts of the world have largely touched on factors relating to project Success in terms of cost, time and quality; however, those researches haven't been conducted in Jimma Zone, for this reason this research is needed to be conducted. Additionally To be able to respond to both internal and external factors in a construction project success, it was necessary to investigate and understand these factors and establish to what extent they individually or collectively contribute to project success. Towards the end, the research identified what are those factors which affect the success of public building construction project in Jimma Zone.

Most of the previous data are done by binary logistic and relative importance index, but the current study used linear regression system to analyze data.

CHAPTER THREE

3. RESEARCH DESIGN AND METHODOLOGY

3.1 Research Design

Research design is the main frame work which provides guidelines for whole research. The choice of research design depends on the type, depth and extent of the issue under the study. According to Kothari, (2004) research design refers to arrangement of conditions for collection and analysis of data. Survey, Desk study, design was used and it was attempted to collect data from the related population (client, consulting, and contractors) to evaluate the perception on the issues of factors that affect success and their frequency. Categorical factors- based cross-sectional study with quantitative approach was conducted.

The type of research design that employed under this study was descriptive and explanatory research. The major purpose of descriptive research is descriptive of the state of affairs as it exists at present. Then this study describes and critically assesses the factors affecting success of public building construction projects in the study areas which is Jimma Zone. Descriptive analysis refers to the transformation of raw data into a form that will make them easy to understand and interpret. The types of research design that would have been effective under this study were through calculating of frequency and percentage distribution which was the most common form of summarizing data in this research. Second, the study was employed explanatory research design in that the relationship between variables is correlated with an aim of estimating the integrated influence of the factors on success of public building construction projects. According to Sekaran (2004) explanatory research design helps us to infer relationship between variables from the existed data through analysis of the association between two or more variable and how several independent variables might explain the variance in a dependent variable.

Research Approach

The research obtained both qualitative and quantitative in nature. The methodology considered and adopted for this project work focus on literature review and, structured questionnaire survey designed and employed to assess the knowledge and practice on the factor affecting the success of public building construction projects. It used a mixed research method in data collection process. The quantifiable responses are analyzed through a quantitative method as the name implies. The qualitative data gives more emphasis to the non-quantifiable responses and it is chosen due to its flexible nature. Mixing the two methods allows the flexibility of the project work to produce and gather efficient information by minimizing the limitation of the one method and maximizing the strength of the other method. Therefore, the qualitative method used to support the quantitative data that collected in the project work. Finally, based on the data obtained analysis was done, conclusions and recommendations are provided.

3.2. Study Area and Study Period

This research is conducted in Jimma Zone, which is located 355km from Addis Ababa. Jimma zone has 20 Weredas. They are namely (Kersa, Seka-Chekorsa, Mana, Goma, Dedo, Gera, shebe-sombo, Nada, Sekoru, Tiroafeta, Gumey, Sigmo, Setema, Chorabotor, Limu-seka, Limu-kosa, Nono benja, Mencho, botter-Tolay and Omo-beyem) which is in Oromia Region, Southwestern Ethiopia. Jimma is known as a green gold coffee land city. The city is located 7.667^0 North latitude and 36.833^0 East longitude and at an altitude range of 1,720-2011 Masl and gets an average annual rain fall amounting to 1503-1800mm. The long wet period extends from late May to early June. In addition, July, August and September are months of rainy season. Most parts of the zone are bounded by three main rivers: Gibe, Didessa and Gojab. According to the 2004 National census. (Report, 2007) the rural and urban population of Jimma was 2,486,155. About 49.7% of the rural inhabitants were females. All weredas are accessible by all-weather roads from Jimma town but most of the rural areas of each wereda do not have all weathered road that connect to the main way.

Agaro, Dedo, Gera, Gomma, Limu kosa, Mancho, Manna, Omo Beyam, Seka chokorsa, Setema, Shabe and Shabe Sombo weredas are considered for the current study; including Jimma Town.

To conduct the research the location is selected based on accessibility of information from the concerned party and the access to collect data by the researcher is considered. Finally the study was conducted from February, 2021 up to June, 2021.

3.3. Sampling Design

It is true that surveys require so much time, effort and money. To this end, social science research is generally about inferring patterns of behaviors within a specific population. It is difficult to study the entire population because of feasibility and cost constraints. Hence, it is reasonable to select a representative sample from the population /target group/ of interest for survey (Bhattacherjee 2012). Stratified sampling method was used for this study. This sampling is a mixture of deliberate and random sampling techniques. If the population from which the sample to be drawn does not constitute a homogeneous group, stratified sampling technique is used in order to obtain a representative sample.

This study employed a probability sampling technique. Because; it avoided ambiguity of sample size and had rules. Probability sampling is the most commonly associated with survey-based research strategies where we need to make inferences from our sample about a population to answer our research questions or/and meet our research objectives.

3.3.1 Sampling Size

The size of samples or respondents was taken by employing the stratified sampling technique and the required number of samples calculated as follows. Since the target population is finite, the researcher used determination of size through the approach based on precision rate and level of confidence.

Yamane (1967), suggested a formula for calculating the sample size which is as following; $n=N/1+N\ (e)^2$ where, n-represents sample size, N-represents target population, e-represents the level of precisions (1%), 99% level of confidence. In order to increase the number of sample sizes, the researcher preferred to select 1% level of confidence.

$n=N/1+N\ (e)^2$

$n=240/1+240\ (0.1)^2$

n=240/1+240(0.01)

n=70

3.3.2 Sampling Technique

Al-Najjar J.M (2008) defined the sampling as the process of selecting representative units of a population for the study in research investigation. A sample is a small proportion of a population selected for observation and analysis. In this study public projects were observed; those that have cost overrun and/or time overrun. Respondents for questionnaire survey were professionals. There were a total of 70 professionals who were selected using by Yamane (1967) Sample size determination.

The study comprised of the stakeholders involved in construction projects; as Owners, Contractors and consultants who was involved in construction projects during study time considered. For this study, projects started from 2008 E.C was been taken based on data availability in the construction management unit and on getting contractors involved.

The questionnaire was distributed to engineers & other professionals who knew the concerned construction projects during the specified time.

In stratified technique, the population is stratified into a number of non-overlapping subpopulations or strata and sample items are selected from each stratum. In the item selected from each stratum is based on simple random sampling the entire procedure, first stratification and then simple random sampling, is known as stratified random sampling (Kothari 2004). In this study stratified sampling technique was introduced to gather data. The strata were formed by categories of construction projects contractor grade in order to get representative sample size. Each category of contractor grade acts as a single stratum. Hence, the numbers of strata were five. Therefore, the number of the sample sizes was the summation of samples of each stratum. i.e., $n = n_1 + n_2 + n_3$. And to determine the sample size of each stratum, the following formula was employed and they were distributed as shown in the table 3.1 below:

$\frac{nh}{n} = \frac{Nh}{N}$ (Cochran 1977).

Nh - represents total population of each stratum

n_h - is a sample size selected from the total population of each strata using Yamane formula.

Table 3 1 Sample size

Organization	Number of Projects	Nh	Nh
GC 1	1	37	11
GC3	1	33	10
GC 5	1	33	10
GC 8	16	82	23
GC 9	9	55	16
Total	28	240	70

Source: Survey, 2021

In order to come up with participants of the study, the researcher choose purposive participant selection technique as the most important kind of non-probability participant selection method, to identify the primary participants since the study looking for those who have had experiences relating to the phenomenon to be researched.

Purposive sampling technique was used to select all the three groups of respondents. According to Tongco M.D.C. (2007), despite its inherent bias, purposive sampling can provide reliable and robust data. Experts in purposive sampling are encouraged to discuss and discover ways of finding the best type of informant for each research question, as well as the strengths and weaknesses of these methods.

Likewise, according to Kothari (2004) and Cooper & Schindler (2003) the following reasons are mentioned for choosing purposive sampling:-

- Satisfactorily meet the sampling objectives,

- The investigator is impartial, work without bias, and has the necessary experience to make sound judgment; results obtained from an analysis of the deliberately selected sample may be tolerably reliable.
- The total population may not be achievable for study in certain cases.

3.5 Sources of Data

The data is collected from both primary and secondary sources of data. The primary data is obtained through questionnaire from Owners, Contractors and Consultants of those public building construction projects stated in Jimma Zone. The secondary data is obtained from review of documents, in which contract documents, project reports, correspondence letters and payment certificates investigation, which were very important in identifying the recurrent problems related to project success problem under Jimma Zone construction projects.

3.5.1 Primary Data Sources

It was obtained from the source of information. The primary data were more reliable and have more confidence level of decision-making with the trusted analysis having direct intact with the occurrence of the events. Primary data were collected from interviews, questionnaires.

3.5.2 Secondary Data Sources

Secondary data sources have been obtained from the literature regarding success factors in construction project, journals, books, websites, research findings, and the remaining data were from the general conditions of a contract, employer requirement, and minutes of the meeting was included under the desk review. Reputable journals, books, different articles, periodicals, proceedings, magazines, newspapers, websites, and other relevant material sources were considered.

3.5.3 Data Measurement

In this research, ordinal scales were used. Ordinal scale as shown in Table 3.3 is a ranking or a rating data that normally uses integers in ascending order of importance. The numbers assigned as (1, 2, 3, 4, 5) do not indicate that the interval between scales are equal, nor do they indicate

absolute quantities. They are merely numerical labels. Based on Likert scale, we have the following table and SPSS program was used to analyze the data.

Table 3 2 Rating scale for affecting level of factors on project success

Item	Very high	High	Medium	Low	Very low
Scale	5	4	3	2	1

3.6 Method of Data Collection

In order to collect sufficient data so as to answer the research questions, researcher designed two surveys; the first was a questionnaire to get quantified results. The second survey was unstructured interviews aimed to collect data from Construction developers, construction consultants, contractors and experts in the area research data. In addition to questionnaire and interview secondary data source has been also used.

3.6.1 Interview

Unstructured interview was conducted with experienced senior employer, employer's representative, and contractor's personals, mainly targeted at the manager, senior legal advisor of the employer. Design review team members, contract administrators, resident Engineer, project supervisors of the employer's representative.

3.6.2 Questionnaire

The researcher used structured questionnaire to assess the significance level among the project stakeholders regarding the challenges from both reviewed literature and unstructured interviews. The questionnaire was both close-ended and open-ended. The close-ended was a five-point Likert Scale, where 5 = Very high, 4 = High, 3 = Medium, 2 = Low, and 1 = Very low to measure the success of a project.

The first section comprised of questions targeted educational qualification, specific information about the respondents' general experience within the construction sector, the respondent's period of involvement specific to the project, marital status of the respondents, area of felid of expertise of the respondent, and the respondent experience in project. This part of the questionnaire aims

to get some background information about the respondents' experience and exposure as well as their involvement in the implementation public building project.

The second set of questions comprised a list of factors likely to be encountered during the construction stage of the project. This section aims to investigate the existence of these factors and to see the significance those factors.

Both close and open ended questions were asked in the questionnaire. The close ended questions had a number of choices of possible answers and the respondents selected whatever they feel was most appropriate. The closed ended questions were selected because they are easier to assess and answer considering how busy the respondents were and to get direct information from respondents. Open ended questions were applied only in few places where the extra response options were needed and but unfortunately none of the respondent used these parts to specify their answers.

3.7 Method of Data Analysis & Presentation

Data analysis is the process of bringing order, structure, and interpretation of the mass of collected data. It involves the coding, editing, and cleaning of data in preparation for processing. The completed questionnaires were received, checked for completeness, and edited for correctness. Descriptive statistics such as frequency distribution mean scores, used to analyze the data in this study with Statistical Package for Social Science (SPSS, V20) as the main tool for data analysis and presentation. Both qualitative and quantitative research analysis was used. Qualitative analysis was given along with a quantitative presentation and for the interview section of the study. Quantitative data were analyzed through the use of frequency distribution and percentiles.

The analysis part was combined based on all groups of respondents (contractors, consultants and owners) in order to obtain significant results. In order to meet the stated research objectives, the collected data was analyzed based on the nature of the objective. In order to be able to select the appropriate method of analysis, the level of measurement must be understood. For each measurement, there is a suitable method that can be applied. Saleh S.A.Sh (2008)

Table 3 3 Summary for research method and tools used

Research question	Method	Tools
What is the status of public building construction performance in terms of cost, and time in Jimma Zone?	Unstructured interview & Secondary data	Excel/Table
What are Cost related factors that affect the success of public building construction projects in Jimma Zone?		SPSS
What are Time related factors that affect the success of public building construction projects in Jimma Zone?	Literature review, questionnaire,	SPSS
What are Quality related factors that affect the success of public building construction projects in Jimma Zone?		SPSS

Source; Survey, 2021

3.7.1 Model Specification

The factors analyzed using the linear regression analysis. Linear regression is a method for modeling the relationship between a dependent/explained variable 'Y' and one or more explanatory variables denoted by 'X'. The model was specified as follows:

$$Y= \beta 0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

Where,

Y= Project Success was identified based on the specified time and cost in contract which mean the time and cost deviate according to the agreements are time delay and cost overrun.

$\beta 0$ = the constant

$\beta_1, \beta_2, \beta_3$= the coefficients,

X_1 = CRF

X_2= TRF

X_3= QRF

ε = the error term.

Y represents Success of construction projects which is dependent on the explanatory variables X1, X2, X3,

Statistical Package for Social Sciences (SPSS) computer software version 20 will be used for this purpose.

Table 3 4 Model specification of variables

S.No	Predictor Variable (X)	Beta coefficient	Predictor X-value assigned
1	Cost related factors	β_1	X1
2	Time related factors	β_2	X2
3	Quality related factors	β_3	X3
	Project Success	Constant	Y

Source: adopted model, 2021

3.7.2 Definition of Variables

Dependent Variable

- Project Success

Independent Variable

- Cost related factors
- Time related factors
- Quality related factors

Operational definition:

In this study a successful project is that, when the project meets time, quality and cost goals. PMBOK Guide, (2008); Cost: cost is successful if it fitting the budget; Time: time is success if it fulfills the schedule; Quality: defined by how match a set of essential features reach requirements.

A project is considered to be successful when it satisfies project objectives (the time, cost, quality, performance) and also the satisfaction of the parties involved.

In this research, the project success is represented by independent variables. Each variable was measured by likert scale measure on 5-point scale. For the purpose of this study the three categorized variables had defined as.

Cost related factor: - Inflation, Corruption Level, Unexpected occurrence of things (Ex Labor injuries), Accuracy of project cost estimate, Unclear & inadequate details in drawings, Changes in Material types & Specifications during constructions, Damage of sorted material, Equipment's Breakdowns

Time related factor:- Delay in procurement process, Shortage of construction materials, Unforeseen adverse ground condition & geological problems at the site, Un stability (Political cases, security issues) in the environment, Planning & Schedule of the project, Lock down effect (because of Covid-19), Rework due to errors in construction

Quality related factor: - Unavailability of competent (Skilled) Staff, Type of Equipment & Raw material used for construction, Site management & Supervision, Type of Project bidding and award (Negotiation, Lowest Price), Adequate Monitoring & Control, Building Codes

3.8 Ethical Consideration

The researcher gave a brief explanation about the study to introduce the participants about the purpose, benefits, the confidentiality of the participants and their rights. The researcher asked their willingness to take part in the study. Their full consent to participate in the study is obtained. Those who want to leave or interrupt the research had the right to self-determination at any point in time. The personal information of the participants kept confidentially. The collected data is used for this research purpose only. In addition, I used paramount care to ensure privacy,

confidentiality and anonymity of participants. Ethics is one of the major considerations in research.

The researcher of this study is also subject to the following ethical considerations. Respondents are clearly communicated about the objective of the research before they are asked to give their answer. There is no physical or psychological damage to them because of the research. Respondents are not asked about their name, race, religion, etc.

3.9 Dissemination Plan

A copy of the final report of this study will be given to department of accounting and finance, college of business and economics, Jimma University, Jimma University construction office, and Jimma Town & Zone construction office. The findings will be presented in different seminars, meetings and workshops and may also be made publically accessible through publications in international reputable journals.

CHAPTER FOUR

4. RESULTS AND DISCUSSION

4.1 Introduction

This chapter describes the results and discussion of questionnaire survey and document review concerning cost, time, & quality from contractors, consultants and owners viewpoints. First, data that deals with respondent's profile, including their current position in the organization with their experience, and their educational qualifications is presented. Next, document analysis and unstructured interview result upon project specific related is presented and discussed in detail. 28 projects were used to answer the first specific objective using secondary data while only five projects were used to collect primary data. Regarding the response rate, the student researcher prepared 70 questionnaires and distributed for professionals in the field for five selected projects to answer the other specific objectives. However, due to some difficulty, it took too much time to distribute and collect data from the participants. Even though effective follow ups were made for the collection few of the respondents left without completing the questionnaire. The respondents are almost homogeneous since they are engaged in construction with different level of specialization and experience in projects. Finally, most of the questionnaires were filled and returned successfully. Hence, the response rate is 87.1% which is of course good.

4.2 General Characteristics of Respondents

Table 4 1 General respondents' number

STATEMENT	NUMBER	PERCENTAGE
QUESTIONNAIRE DISTRIBUTED	70	100%
GC 1=11		
GC 3=10		
GC 5=10		

GC 8=23		
GC 9=16		
QUESTIONNAIRE COLLECTED	61	87.1%
GC 1=11		
GC 3=10		
GC 5=10		
GC 8=16		
GC 9=14		

Source: Field survey, 2021

A total of 70 questionnaires were distributed for respondents. Out of 70 set of questionnaires distributed (11 for GC1, 10 for GC 3, 10 for GC 5, 23 for GC 8, and 16 for GC 9), unfortunately all questionnaires were not fully responded, only 61 responded, the feedbacks comprise of 11(18%) GC 1, 10(16.4%) GC 3, 10(16.4%) GC 5, 16(26.2%) GC 8 and 14(23%) GC 9 of total responses.

4.2.1 Type of Respondents Organization

Table 4 2: The frequency and percent of each type of respondent's organization

	Frequency	Percent
Owner	13	21.3
Contractor	34	55.7
Consultant	14	23.0
Total	61	100.0

Sources: Survey, 2021

The general response rate was 87.1 % and the total number of respondents for the three parties was 61 respondents. It implies that the owner, consultant and contractor respondents were taken

from each construction projects, it is sufficient to find out the perceptive of the relative importance of project success indicators.

4.2.2 Respondent's Gender

Table 4 3: Sex of respondents

	Frequency	Percent
Male	41	67.2
Female	20	32.8
Total	61	100.0

Sources: Survey, 2021

As shown in table 4.1 above, 41(67.2%) were male and 20(32.8%) were female. This shows that respondents are dominated by male. Here, gender is not used in analysis but simply put to indicate absence of gender bias or simply relatively equal female and male participants in the study.

4.2.3 Marriage Status of Respondent

Table 4 4: Marital status of respondents

	Frequency	Percent
Single	36	59.0
Married	19	31.1
Divorced	3	4.9
Widowed	3	4.9
Total	61	100.0

Sources: Survey, 2021

The Marital status was single 36(59 %), married 19(31.1%), divorced 3(4.9%) & widowed 3(4.9%).

4.2.4 Respondents' Educational Background

Table 4 5: Educational background of respondents

	Frequency	Percent
Diploma	4	6.6
Bachelor Degree	34	55.7
Masters	22	36.1
Others	1	1.6
Total	61	100.0

Sources: Survey, 2021

Table 4 6: Relation to the project and Education level crosstabulation

Relation To The Project * Education Level Crosstabulation

		Education Level				Total
		Diploma	Bachelor Degree	Masters	Others	
Relation To The Project	Owner	0	9	4	0	13
	Contractor	4	16	13	1	34
	Consultant	0	9	5	0	14
Total		4	34	22	1	61

Sources: Survey, 2021

In table 4.5 above, educational background of respondents was presented. With regard to the educational background of the respondents', 34(55.7 %) have at least Bachelor degree, 22(36.1%) have at least master degree and 4(6.6%) were below bachelor degree (See table 4.5.), While there was no respondent who had a PhD. Hence, we can see that the majority of the

respondents meet the required educational level for the position on which they were working. As a result, their views were worthy and provide significant insight into the research questions under investigation. When we are comparing the educational qualification of the respondents, the contractors has higher education qualification and also the overall respondent qualification is strong enough to get a professional and unbiased reflection (See table 4.6).

4.2.5 Respondents Job Title

Table 4 7: Job title of respondents

	Frequency	Percent
Project Manager	2	3.3
Site/Office Engineer	16	26.2
Material Engineer	2	3.3
Organization Manager/Deputy	3	4.9
Surveyor	6	9.8
Consultant	7	11.5
Store Manager	3	4.9
General Foreman	2	3.3
Supervisor	8	13.1
Team Leader	4	6.6
Other	8	13.1
Total	61	100.0

Sources: Survey, 2021

Respondents' job title indicated in table 4.7 above. It shows that 2(3.3%) are project manager, 16(26.2%) which are majority of the respondents' their responsibility in the project were

Site/Office engineers, 2(3.3%) are material engineers, while 3(4.9%) organization manager/deputy, additionally 6(9.8%) respondents were surveyors, 7(11.5%) consultants responded in the survey, with 3(4.9%) Store manager, 2(3.3%) General foreman, 8(13.1%) Supervisor, 4(6.6%) Team leader, and finally 8(13.1%) respondents does have other job title. From this result we can see that our respondents are professionals and they can meet the required position needed for the survey.

4.2.6 Service Year/S of Respondent: (Experience)

Table 4 8: Respondents Experience

	Frequency	Percent
>1	3	4.9
1-2	7	11.5
3-5	18	29.5
5-10	16	26.2
more than 10	17	27.9
Total	61	100.0

Sources: Survey, 2021

Respondents' experience is indicated in table 4.8 above. It is shown that majority of the participants (27.9 %) have an average experience of more than 10 years, while 26.2% have between 5-10 years of experience, 29.5% between 3-5 years, 11.5% between 1-2 years and finally 4.9% respondents have less than 1. This shows that participants were able to share their experience they have accumulated during this extended period in the project. This shows that the respondents are relatively experienced professionals.

4.2.7 Number of Projects Executed By Respondent

Table 4 9: Number of projects executed by respondent

	Frequency	Percent
1 up to 5	34	55.7
5 up to 10	13	21.3
More than 10	14	23.0
Total	61	100.0

Sources: Survey, 2021

Table 4.9 shows that only 14(23%) respondents indicate that they executed more than 10 projects by them, 13(21.3%) respondents executed 5-10 projects, while 34(55.7%) respondents executed 1-5 projects which make them professionals in their expertise.

4.3 Results of Secondary Data and Interview

The first specific objective of this study was assessing the status of public building projects in Jimma zone, for this reason using secondary data of progress report and unstructured interview data was collected and generalized (See Annex II). According to (Al-Sayaad, Rabea, & Samrah, 2006) as cited by (Bassam, 2013) making result interpretation using percentage is the easy one.

From this table (see annex II) we can see that most of the projects are not progressing according to their estimated time (schedule). Out of the 28 projects in Jimma zone only 3(10.7%) (P4, P9, P3) are progressing in their schedule. As the status of the project and time & cost they have used and correlated in average 6(21.4%) which are P3,P5, P10, P11, P21, P22 projects will complete in the estimated schedule and budget if those mentioned factors are minimize. In some cases even if those factors are eliminated time overrun will occur because the amount of time they used are too much; (see annex II) show they are progressing below their means, which will result in time overrun; from 28 projects 14(50%) (P1, P2, P7, P12, P14, P15, P16, P17, P18, P19, P20, P23, P24, and P25 show such weakness. While the rest five projects progress report show us all

the five have time overrun and the two have additionally cost overrun, P6, P8, P26, P27, and P28 which make 5(17.9%) out of 28.

The result explained that from 28 public building construction projects in Jimma zone 19 projects will possibly face time overrun. Empirically, the study of Werku Koshe, K. N. Jha, 2016 found that in Ethiopia construction industry 8.25% projects have been finished to the original targeted completion date, the remaining 91.75% delayed 352% of its contractual time .This study is consistent to with these findings. This implies that, the result of the study was consistent with this empirical evidence cited.

4.4 Respondents' Perception towards Factors Affecting the Success of Public Building Construction Projects

This section deals with the specific information with regards to specific objectives of the study. Finding a solution to a problem requires first admitting its existence and then getting an understanding of the background of the particular problem and issues around it. This section highlights the findings on success of projects and discussion is made. Calculating frequency & percentages were commonly used to summarize the data for the interval scale of independent variables (CRF, TRF, and QRF) and dependent variable (project success).

As described before, the questions related with both the dependent and independent variables were prepared using a likert scale. That means, from each perspective questions were prepared in the form of ordinal scale.

In order to explore respondents' perception of success affecting factors on every variable according to the response of the study, percentage for the independent variables were calculated. According to (Al-Sayaad, Rabea, & Samrah, 2006) as cited by (Bassam, 2013) making result interpretation using percentage is the easy one.

4.4.1 Project Success Parameters

Table 4 10: Respondent perception toward dependent variable

Project Success Measures		Percentage of Respondents'				
No	Variables	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
PSM1	Success of public building project are affected; by cost related factors	0	0	31.1	54.1	14.8
PSM2	Success of public building project are affected; by Time related factors	0	18.0	44.3	37.7	1.6
PSM3	Success of public building project are affected; by Quality related factors	1.6	0	29.5	62.3	6.6
	Average grand point%	0.53	6	35	51.4	7.7

Sources: Survey, 2021

Different group of respondents might have different level of view based on their own interpretation; According to table 4.10 above, the percentage of strongly agreed respondents on project success with regard to cost related factors were 14.8%; 54.1% of respondents were agreed which show us most of our respondents' agreed; 31.1% respondents does not agree nor disagree they choose neutral; lastly both disagree and strongly disagree respondents were 0%. Secondly, the percentage of neutral respondents on project success with regard to time related factors were 44.3% which is majority; 37.7% respondents were agreed; 18.0% respondents were disagreed; 1.6% respondents were strongly agreed and 0% strongly disagreed. Thirdly, the percentage of agreed respondents on success of project with regard to quality related factors were 62.3% which is highest; 29.5% of respondents were neutral; 6.6% respondents were strongly agreed; while1.6% strongly disagreed and 0% disagree.

Finally, the average grand percentages of success of projects with regard to the variables were deductively stated. Such as 51.4% respondents were agreed; 35% of respondents were neutral to the answer; 7.7% respondents were agreed; while 6% disagreed and 0.53% of respondents were strongly disagree. These imply that dependent variable (project success) could be affected by independent variables (CRF, TRF and QRF) factors with in the study area on public building construction projects.

4.4.2 Cost Related Factors

Table 4 11: Respondents perception toward cost related factors

No	Cost Related Factors	Percentage of Respondents'				
		Very low	Low	Medium	High	Very High
CRF1	Inflation	1.6	4.9	14.8	34.4	44.3
CRF2	Corruption Level	19.7	23.0	14.8	34.4	8.2
CRF3	Unexpected occurrence of things (Ex Labor injuries)	26.2	13.1	14.8	44.3	1.6
CRF4	Accuracy of project cost estimate	14.8	21.3	31.1	26.2	6.6
CRF5	Unclear & inadequate details in drawings	21.3	14.8	29.5	27.9	6.6
CRF6	Changes in Material types & Specifications during constructions	6.6	3.3	31.1	45.9	13.1
CRF7	Damage of sorted material	9.8	8.2	24.6	44.3	13.1
CRF8	Equipment's Breakdowns	11.5	11.5	29.5	39.3	8.2
	Average grand point%	13.9	1.7	23.78	37.09	12.7

Source: Survey, 2021

Cost is an amount that is needed to construct the projects. Construction projects can be fundamentally affected by cost related factors. Many researchers have already identified elements of cost related factors.

As per the result of table 4.11 above the respondents perception towards problem with Inflation 44.3% agreed in the impact on project success very high; 34.4% were high; 14.8% respondents' response shows that the impact of this factor is medium; while 4.9% respondents say low and 1.6% very low. According to the table 4.11 above respondents' responses on corruption level were 34.4% high, 23% low, 19.7% very low, 14.8% medium and 8.2% low. The respondents perception towards problem with unexpected occurrence of things (Ex Labor injuries) were rated 44.3% High, 26.2% very low, 14.8% medium, 13.1% low and 1.6% very high. The respondents perception towards problem with accuracy of project cost estimate were rated 31.1% medium,

26.2% high, 21.3%low, 14.8% very low and 6.6% very high. According the table Unclear & inadequate details in drawings were rated by the respondents in similar vein which is 29.5% medium, 27.5% high, 21.3% very low, 14.8% low and 6.6% very high. Changes in Material types & Specifications during constructions factor was percept by the respondents and the result was; 45.9% high, 31.1% medium, 13.1%very high, 6.6% very low, and 3.3% low. The respondents perception towards problem with Damage of sorted material 44.3% agreed in the impact on project success high, 24.6% medium, 13.1% very high, 9.8%very low and 8.2% low. In similar vein the respondents perception towards problem with Equipment's Breakdowns 39.3% agreed in the impact on project success high, 29.5% medium, 11.5% both low & very low is rated by respondents', and 8.2% very high.

Generally, the average grand percentages of cost related factors deductively stated. Such as: respondents were agreed to the impact of factors on project success 37.09% high, 23.78% medium, 13.9% very low, 12.7 high and 1.7% low; this is the response the researcher get from the respondents regarding the listed factors impact in project success. This implies that project success were affected CRFs of public building construction projects with in the study area.

The respondent's answer implies that CRF is very crucial for project success. This finding is in line with Ghanim A. Bekr (2017), which found, for project success' basic requirement is tracking cost, time and quality of a project. Narbaev (2013) citing Pewdum et al. (2009) observes that the primary purpose of managing a facility construction project is to complete it on time and within the budget while conforming to the established requirements and specifications (Pewdum et al., 2009).

4.4.3 Time Related Factors

Table 4 12: Respondents perception toward time related factors

No	Time Related Factors	Percentage of Respondents'				
		Very low	Low	Medium	High	Very High
TRF1	Delay in procurement process	4.9%	3.3%	31.1%	44.3%	16.4%
TRF2	Shortage of construction materials	0.0%	1.6%	13.1%	42.6%	42.6%
TRF3	Unforeseen adverse ground condition &	1.6%	1.6%	39.3%	39.3	18.0

	geological problems at the site				%	%
TRF4	Un stability (Political cases, security issues) in the environment	0.0%	1.6%	11.5%	36.1 %	50.8 %
TRF5	Planning & Schedule of the project	0.0%	1.6%	34.4%	42.6 %	21.3 %
TRF6	Lock down effect (because of Covid-19)	0.0%	4.9%	13.1%	27.9 %	54.1 %
TRF7	Rework due to errors in construction	6.6%	3.3%	32.8%	45.9 %	11.5 %
	Average grand point%	1.87%	2.56 %	25.04%	39.8 %	30.6 7%

Sources: Survey, 2021

As per the result of table 4.12 above the respondents perception towards problem with Delay in procurement process 44.3% agreed in the impact on project success high; 31.1% were medium; 16.4% respondents' response shows that the impact of this factor is very high; while 4.9% respondents say very low and 3.3% low. The respondents' perception towards problem with Shortage of construction materials were rated 42.6% both high and very high, while 13.1% medium, 1.6% low, and 0% very low. The respondents perception towards problem with unforeseen adverse ground condition & geological problems at the site were rated 39.3% both medium & high, while 18% agreed in very high, and1.6% were rated both very low & low. According the table instability (political cases, security issues) in the environment were rated by the respondents in similar vein which is 50.8% very high, 36.1% high, 11.5% medium, 1.6% low and 0% very low. Planning and schedule of the projects factor was percept by the respondents and the result was; 42.6% high, 34.4% medium, 21.3%very high, 1.6% low, and 3.3%very low. The respondents perception towards problem with lockdown effect(because of Covid-19) 54.1% agreed in the impact on project success very high, 27.9% high, 13.1% medium, 4.9% low and 0% very low. In similar vein the respondents' perception towards problem with Rework due to errors in construction 45.9% agreed in the impact on project success high, 32.8% medium, 11.5% very high, 6.6% very low & 3.3% low is rated by respondents'.

Generally, the average grand percentages of time related factors deductively stated. Such as: respondents were agreed to the impact of factors on project success 39.8% high, 30.67% very high, 25.04% medium, 2.56% low, and 1.87 very low; this is the response the researcher get

from the respondents regarding the listed factors impact in project success. This implies that project success were affected TRFs of public building construction projects with in the study area.

This finding agrees with Sambasivan and Soon, (2007) who identify poor site management and supervision and poor contract management as contributing highly to success of construction projects. They also identify contractors' inexperience and incompetence as affecting the success of project. This therefore clearly identifies supervision/inspection to be key in ensuring projects are completed successfully when there is good supervision, projects are done to the design specifications and therefore work is not repeated due to incorrect installations which have to be re-done. Doing the work afresh means schedule interrupt and increased costs.

4.4.4 Quality Related Factors

Table 4 13: Respondents perception toward quality related factors

No	Quality Related Factors	Percentage of Respondents'				
		Very low	Low	Medium	High	Very High
QRF1	Un availability of competent (Skilled) Staff	14.8%	27.9%	16.4%	31.1%	9.8%
QRF2	Type of Equipment & Raw material used for construction	0.0%	13.1%	18.0%	29.5%	39.3%
QRF3	Site management & Supervision	1.6%	14.8%	36.1%	31.1%	16.4%
QRF4	Type of Project bidding and award (Negotiation, Lowest Price)	14.8%	39.3%	26.2%	13.1%	6.6%
QRF5	Adequate Monitoring & Control	3.3%	23.0%	42.6%	24.6%	6.6%
QRF6	Building Codes	11.5%	26.2%	14.8%	39.3%	8.2%
	Average grand point%	12.3%	24.05%	25.68%	28.12%	14.48%

Source: Survey, 2021

As per the result, table 4.13 above shows the respondents' perception towards problem with Unavailability of competent (skilled) staff 31.1% agreed in the impact on project success high; 27.9% were low; 16.4% respondents' response shows that the impact of this factor is medium;

while 14.8% respondents say very low and 9.8% very high. The respondents perception towards problem with Type of Equipment & Raw material used for construction were rated 39.3% very high, 29.5% high, 18% medium, 13.1% low and 0% very low. The respondents' perception towards problem with Site management & supervision were rated 36.1% medium, 31.1% high, 16.4% very high, 14.8% low and 1.6% very low. According to the table Type of project bidding and award (Negotiation, lowest price) were rated by the respondents which is 39.3% low, 26.2% medium, 14.8% very low, 13.1% high and 6.6% very high. Adequate monitoring and control factor was percept by the respondents and this result was gotten; 42.6% medium, 24.6% high, 23% low, 6.6% very low, and 3.3% very low. The respondents' perception towards problem with Building codes 39.3% agreed in the impact on project success high, 26.2% low, 14.8% medium, 11.5%very low and 8.2% low.

Generally, the average grand percentages of quality related factors deductively stated. Such as: respondents were agreed to the impact of factors on project success 28.12% high, 25.68% medium, 24.05% very low, 14.48% very high and 12.3 very low; this is the response the researcher get from the respondents regarding the listed factors impact in project success. This implies that project success were affected QRFs of public building construction projects with in the study area.

This finding agrees with Ali Yassin Sheikh Ali (2019) as this factor affects project success strongly and may even result in total project failure. Chan A. and Chan D. (2004) also obtained that accurate construction planning is a key determinant in ensuring the delivery of a project on schedule and within budget. Those authors identified that quality and importance of project planning had been considered a major cornerstone of every successful project. The authors therefore conclude that thorough, adequate and effective quality for all work should be provided to the project team to meet the project objectives during project implementation.

4.5 Inferential Analysis

Under inferential analysis linear regression model is the one and the basic. This model types require numerical types of data which the analysis and its output is in terms of number. Inferential analysis is concerned with the various tests of significance for testing hypotheses in order to determine what validity data can be said to conclusions. Pearson's correlation and linear

regressions are the main inferential statistical methods employed in this study to analyze the relationships between the dependent variable and the independent variables.

Correlations are the measure of the linear relationship between two variables. A correlation coefficient has a value ranging from -1 to +1. Values closer to the absolute value of 1 indicate that there is a strong relationship between the variables being correlated whereas values closer to 0 indicate that there is little or no linear relationship. It is extremely useful for getting idea of the relationships between independent variables and dependent variable, and for preliminary look for multi collinearity (Field, 2009).

Table 4 14: Results showing correlation analysis

Inter-Item Correlation Matrix				
	Project Success	Cost Related Factor	Time Related Factor	Quality Related Factor
Project Success	1.000			
Cost Related Factor	.471	1.000		
Time Related Factor	.597	.887	1.000	
Quality Related Factor	-.373	.721	.462	1.000

Source: Survey, 2021

Therefore, using table 4.14 (SPSS output of survey), the above results of the dependent and independent variables is discussed in detail basis.

4.5.1 The Relationship between CRF & Project Success

According to the table 4.14, there is a significant positive relationship between cost related factors and project success ($r=.471$, $p<0.05$). This implies that CRFs have moderate and positive level of correlation with project success.

Empirically, the study of Ali Yassin Sheikh Ali (2019) found that the construction cost factors have positive relation with success of construction projects (r=0.797, p<0.01). This study is consistent to with these findings. This implies that, the result of the study was consistent with this empirical evidence cited.

4.5.2 The Relationship between TRF & Project Success

According to the table 4.14, there is a significant positive relationship between time related factors and project success (r=.597, p<0.05). According to Hinkel, Wiesma and Jurs (2003) the magnitude of correlation are the relationship between the two variables were low.

Empirically, the study of Ali Yassin Sheikh Ali (2019) found that the construction time factors have positive relation with success of construction projects (r=0.777, p<0.01). This study is consistent to with these findings. This implies that, the result of the study was consistent with this empirical evidence cited.

4.5.3 The Relationship between QRF & Project Success

According to the table 4.14, there is a significant positive relationship between quality related factors and project success (r=.373, p<0.05). This implies that QRFs have low and negative level of correlation with project success.

Empirically, the study of Ali Yassin Sheikh Ali (2019) found that the construction quality factors have positive relation with success of construction projects (r=0.599, p<0.01). This study is not consistent to with these findings. This implies that, the result of the study was not consistent with this empirical evidence cited.

4.6 Linear Regression Analysis

Testing assumption of regression analysis models is very important before running regression analysis to assess whether the collected data violate some key assumptions of the standard linear regression model; because an assumption violation can result in distorted and biased parameter estimates. So each assumption results were discussed in the in the following subtopics. The assumptions include sample size, normality, multi-collinearity, homoscedasticity, linearity, and independence of residuals crucial to confirm them.

This paper the descriptive and inferential analysis was carried out separately with the existence of association between the dependent and independent variables with the identifying factors affecting project success of Jimma Zone.

4.6.1 Assumption of sample size

Regression analysis is often sensitive to sample sizes. The common rule of thumb regarding the sample size in standard linear regression is fifteen (15) cases of data per predictor (Field, 2009). According to Green (1991), to test the overall model the recommended minimum sample size of N=50+8*k*, where *k* is the number of independent variables. Taking into account the three number of independent variables in this study; 50+8(3) =74 which is less than sample size. 50+8(3) =74 almost equal to 70. Based on the criteria, the sample size exceeds the minimum to run the standard multiple linear regressions.

4.6.2 Multi collinearity Test between Independent Variables

Table 4 15: Results of Multi collinearity test

	Tolerance	VIF(Variance Inflation Factors)
Cost Related Factor	.660	1.516
Time Related Factor	.739	1.353
Quality Related Factor	.826	1.210

Sources: survey result, 2021

According to Gujarati (2003) Multi collinearity tests helps identify the high correlation between explanatory variables and to avoid double effect of independent variable from the model. When independent variables are multi collinear there is overlap or sharing of predictive power. Predictor variable should be strongly related to dependent variable but not strongly related to each other. This may lead to the paradoxical effect, whereby the regression model fits the data well but, none of the explanatory variables (individually has a significant impact in predicting the dependent variable. For this purpose variance inflation factor (VIF) and tolerance test were used to check Multi collinearity for variables if the value of VIF is less than 10 there is no Multi collinearity and on the other hand if VIF greater than or equal to 10 there is a serious Multi

collinearity problem. According to Gujarati, (2004) to avoid serious problem of Multi collinearity omitting the variable with 10 and more from the analysis. In addition tolerance is an indicator how much of the variability of independent variable is not explained by the other independent variable in the model and is calculated using the formula 1- R2 for each variable. If the value is very small (less 0.1), it shows the multiple correlation with other variable is high.

Table 4.15 shows the computation result that the value of VIF all variables were by far less than 10 and the value of tolerance statistics being above 0.1; this indicates the fitness of the model in explaining the factors affecting project success, as a result they were accepted and entered in to regression model for the estimation of variables.

4.6.3 Normality Test

Normality assumption is around the mean of the residuals is zero and used to determine whether a data set is well modeled by a normal distribution or not and also to indicate un underlying random variable is to be normally distributed (Gujarati.2010). There the researcher was used histogram methods of testing the normality of the data. If the residuals are normally distributed about its mean of zero, the shape of histogram should be a bell-shaped and regression standardized residual plotted between -3.3 and 3.3. From the figure below data normality can be indicated.

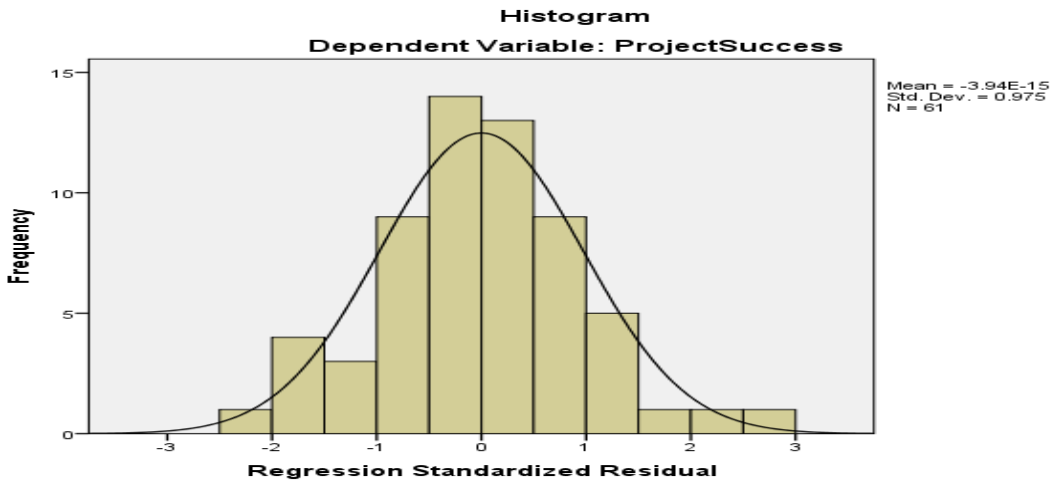

Figure 4.1: Normal distribution Histogram results

Source; survey result, 2021

4.6.4 Linearity Test

Linearity is used check whether all the estimates of regression including regression coefficients, standard errors and tests of statistical significance are biased or not (Keith, 2006). This can be checked by p-p plot residuals as indicated by figure 4.2 below. There is no linearity problem on the data for this study if p-p residual follow at straight line.

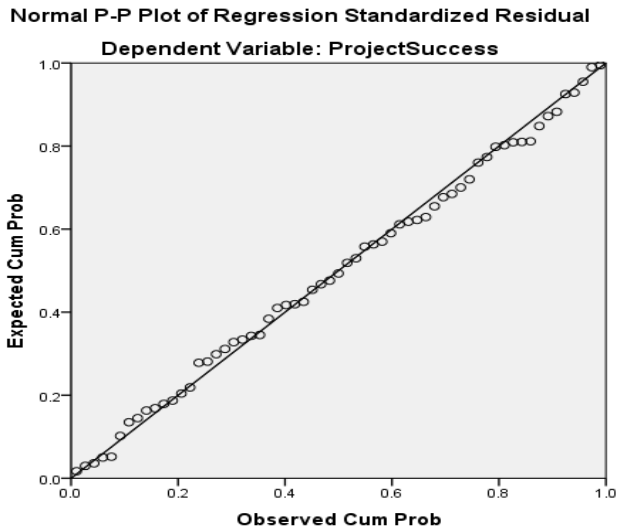

Figure 4.2: p-p plot; Linearity test results

Source; survey result, 2021

4.6.5 Heteroscedasticity Test

Heteroscedasticity is the equality or violation of the residuals for every set of values for independent variable. So the researchers assume that errors are spread out constantly between the variables. Heteroscedasticity problem exist when scatterplot is greater than 3.3 and less than -3.3. Therefore as it was indicated in figure 4.3 below the data did not violate Heteroscedasticity assumption and instead it was homoscedastic.

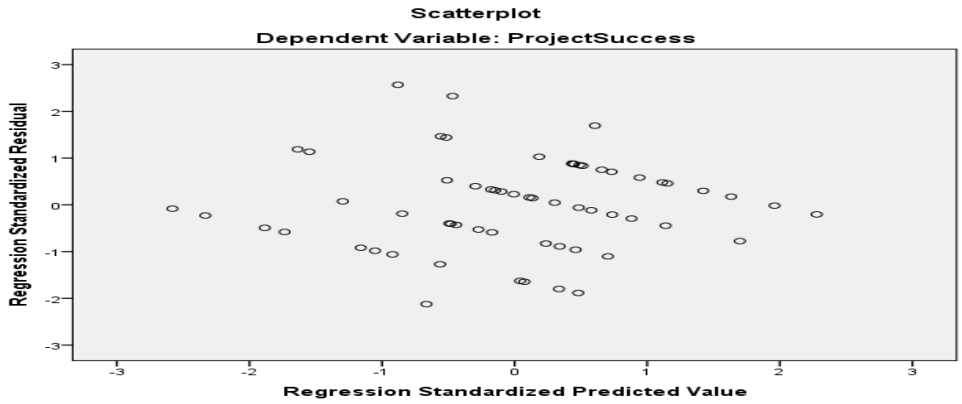

Figure 4.3: Scatterplot Heteroscedasticity test result

Source; Survey result, 2021

4.6.6 Assumptions of Independence Residuals

Table 4 16: Durbin-Watson statistics for independence of residuals

Model Summary [b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.517[a]	.267	.229	.36502	2.384

a. Predictors: (Constant), Quality Related Factor, Time Related Factor, Cost Related Factor

b. Dependent Variable: Project Success

Source: Survey, 2021

The last assumption was for linear is the independence of the residuals can be measured by Durbin-Watson statistics. The value of the Durbin-Watson statistic ranges from 0 to 4. As a general rule, the residuals are independent (not correlated from one observation to the other one) if the Durbin-Watson is approximately 2, and an acceptable range is 1.50 – 2.50 (Muluadam, 2015). For this study table 4.16, the output value of Durbin-Watson is 2.384; approximate to 2, indicating that there is no correlation among the residuals.

4.7 Reliability

Table 4 17: Measure of internal consistency-Cronbach's alpha

Dimension	No of items	Cronbach's alpha	Remark
Cost related factors	8	.670	Reliable
Time related factors	7	.741	Reliable
quality related factors	6	.786	Reliable
Project Success	3	.645	Reliable
Entire	24	.784	Reliable

Data source: SPSS output from survey, 2021

Reliability must be addressed in every study because the accuracy, dependability, and credibility of the information depend on it. The study used Cronbach's alpha (a measure of the internal consistency of the questionnaire items). Using data from 61 sample respondents the Cronbach's alpha coefficient for the twenty-four items reliability statics shows 0.784, suggesting that the items have high internal consistency. Note that a reliability coefficient of 0.70 or higher is considered "acceptable" in most social science research situations. The value of coefficient alpha ranges from zero (no internal consistency) to one (complete internal consistency) (Muriro, 2015). The closer the reliability coefficient gets to 1.0, the better. Sometimes a scale with a Cronbach's alpha greater than 0.6 is usually used as a reliable scale (Sanders et al, 2009). In this study the Cronbach's coefficient alpha is well over 0.6 in all cases (see table 4.17). Thus, the level of alpha can be considered as reliable enough to proceed in to other data processing steps.

In this study the Cronbach's coefficient alpha is well over 0.6 (see table 4.17). Thus, the level of alpha can be considered as reliable enough to proceed in to other data processing steps. From the table 4.17, the lowest Cronbach's alpha registered is 0.6450 (project success) and highest is 0.786 (QRF).therefore; it can be inferred that all measure are internally consistent.

4.8 The Effect of Factors on Project Success

To test the hypothesis, it was deemed appropriate to use linear regression estimations for testing the proposed hypothesis. Since linear regressions refers to an analysis concerned with the study of the dependence of one variable, the dependent variable on more other variables, the

independent variables, with a view to estimating and/or predicting the percentage value of the former in terms of the values of the latter (Gujarati, 2006).

Due to the existence of significant correlations between cost, time and quality related factors with project success, it was necessary to establish the strength of the predictive relationships between the variables. In line with the existence of significant associations amongst constructs, regression analysis was conducted in order to examine the correlation more closely and to examine the effects of the independents variables on the dependent variable. To test the predictive relationships cost, time and quality related factors were used as independent variables & project success was used as dependent variable.

Table 4 18: Results showing regression analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.517[a]	.267	.229	.36502

a. Predictors: (Constant), Quality Related Factor, Time Related Factor, Cost Related Factor

Source; Survey result, 2021

From the model summary in table 4.18, the value (R=.517) is the correlation coefficient between independent variables (CRFs, TRFs & QRFs) and a dependent variable namely project success. R value indicates there is a positive relationship between project success and independent variables (or it indicates the dependent variable of the study is correlated with the independent variable).

The value of R^2 is a measure of how much variability in the outcome is accounted for by the IV. The output shows that R^2=.267 this implies 26.7% of project success accounted for by independent variable as a result the three or all independent variables are able to measure/predict project success at 26.7% (0.267 x100) percent. However, the remaining 73.3% could be some other variable which had not been considered in this study. The marginal value provides the impact that unit changes in the individual independent variable have on different levels of project

success when all other variables held constant. The R Square shows the ratio of interdependence and 26.7% of the variance in the dependent variable can be predicted from the independent variable. In another word, 73.3% of variation in project success cannot be explained by this three IV.

In the model summary adjusted R square tells us the goodness fit of the model and its value which is 0.229 (See table 4.18); it gives some idea of how well the model generalizes and ideally one would like its value to be the same, or very close to, the value of R square. In the present study, the difference between the value of R square and adjusted R square is (.267 - .229=.038) about 3.1%. This reduction means that if the model was derived from the population rather than from the sample, it would account for approximately 3.1 percent less variance.

The standard error of estimate is measure of variability of multiple correlations. Therefore, as shown in the model summary for the regression analysis table above, the standard error of the estimate of this is .36502. This implies that the variability of multiple correlation is as much this numeral.

Positive and significance of all value shows that model summary is also significant and therefore gives logical support to the present study model. The model is statistically significant or the p-value for the model is less than (0.05). This means the fitness of the model in explaining project success is influenced by the independent variables considered.

4.9 Coefficients of Regression Analysis

Table 4 19: Result showing coefficient of regression analysis

Coefficients [a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.726	.493		5.533	.000

Cost Related Factor	.185	.091	.283	2.026	.047
Time Related Factor	.331	.143	.306	2.318	.024
Quality Related Factor	-.223	.068	-.410	-3.287	.002

a. Dependent Variable: Project Success

Source; Survey result, 2021

The dependent (Y) and independent (X) variables relationship can be explained as; $Y=\beta0+\beta1X1+\beta2X2+\beta3X3+e$, Where β0 is constant, βn is the coefficient of independent variables. The researcher was used unstandardized beta coefficients to compare or prioritize the effect of independent variables on independent variable and to construct regression equation. If we substitute the coefficient from the above table the equation becomes;

Project success = 2.726+ (0.185) cost related factor + (0.331) time related factor + (-0. 223) quality related factor, From this we can understand that the marginal values provide the impact that a unit change in the individual independent variables has on different Project success when other variables are held constant.

According to table 4.19 above, coefficient of regression shown between independent variables (CRFs, TRFs & TRFs) and a dependent variable project success. The Beta values tell what degree each independent variable affects the outcome if the effects of all other predictors are held constant. each of the beta values has an associated standard error indicating to what extent these values would vary across different samples , and these standard errors are used to determine whether or not beta value differ significantly from zero. The t-test associated with b-value is significant (if the value in the column labeled sig. is less .05) then the predictor is making significant contribution to the model.

The smaller value of the significance and the larger value of the t in the table 4.19 show the greater contribution of independent variables towards dependent variable. Cost related factors t=2.026 larger than zero and significance 0.047 which is $p<.05$, time related t=2.318 greater than zero and significance 0.024 is $p<.05$, and quality related t=-3.287 less than zero and significance 0.002 which is $p<.05$.

When the standard error is small even a small deviation from zero can reflect a meaningful difference because beta is representative of the majority of possible samples.

The following hypotheses were tested using regression analysis to know if there is an effect of independent variables on the dependent variable. According to the decision rule: accept the null hypothesis (Ho) if the significance level (α)of the variable is greater than the (0.05) significance level, reject **(Ho)** if the significance level (α)of the variable is equal or less than (0.05) (sekaran, 2004).According to the previous decision rule, the researcher has tested the proposal hypotheses and found the following results: Results showed that there was a statistically significant effect for all the three independent variables (cost, time and quality related factors) on the dependent variable(project success).

Beta values were calculated to examine the individual contributions of the independent variable towards the dependent variable. It was calculated by relating independent variable towards dependent variable. It was calculated by relating variable jointly with independent variable, and also t-value was calculated to know the significance of the level of the independent variables to be explained individually t-value in this model was calculated by taking each independent variable separately with dependent variable. As the model clearly shows, t- values in all cases support the hypothesis of the study according to the statistical rule which says, if t-value is greater than two (2), then hypothesis can be accepted (Bryman and Bell 2003).

Beta coefficient

To compare the different variables, it is important that you look at the standardized coefficients, not the unstandardized ones. Standardized means that these values for each of the different variables have been converted to the same scale so that you can compare them. If you are interested in constructing a regression equation, you would use the unstandardized coefficient values listed as B (Pallant, 2016).

Unstandardized Beta Coefficient

By recalling the model specifications of the variables from the chapter three of methodology part, it was said that, the unstandardized coefficients ($\beta 1$ up to β3) are the coefficients of the

estimated regression model. Hence, the model of project success can be written by including error term (ε), in the below form**.**

$$\mathbf{Y=\beta 0 + \beta 1 x 1 + \beta 2 x 2 + \beta 3 x 3 + \varepsilon}$$

Where, Y= dependent variable

$\beta 1$= unstandardized regression coefficient of cost related

$\beta 2 =$ Unstandardized regression coefficient of time related

$\beta 3$= unstandardized regression coefficient of quality related

ε= error term

Taking into consideration the results from table 4.18, the regression equation for the study was as follows:

Y=2.726+.185X1+.331X2-.223X3+ ε

Interpretation:

Standardized, Beta Coefficient

The standardized coefficients are the coefficients which explain the relative importance weight of explanatory variables. These coefficients are obtained from regression after the explanatory variables are all standardized. The idea is that the coefficients of explanatory variables can be more easily compared with each other as they are then on the same scale.

From the above table 4.18 that the time related factors standardized coefficient is larger than the other 2 determinants of project success. The other is cost related, & quality related factors respectively. The larger the standardized coefficient, the higher is the relative importance and contribution of the factor to the project success of the public building projects.

Interpretation:

- For every one-unit (one amount) increment on cost related factors, the percentage of project success increases by 28.3(percent).

- For every one-unit (one amount) increment on time related factors, the percentage of project success increases by 30.6(percent).
- For every one-unit (one amount) increment on quality related factors, the percentage of project success decreases by 41(percent).

4.10 Analysis Of Variance (ANOVA)

Table 4 20: ANOVA table

ANOVA [a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	2.773	3	.924	6.938	.000[b]
	Residual	7.595	57	.133		
	Total	10.368	60			

a. Dependent Variable: Project Success

b. Predictors: (Constant), Quality Related Factor, Time Related Factor, Cost Related Factor

Source; Survey result, 2021

This ANOVA table indicates that the regression model predicts the outcome variable significantly well and also indicates the statistical significance of the regression model that was applied. As indicated in table 4.20 the total sum of square (10.368) is equal to the sum of explained sum of square (2.773) and residual sum of squares (7.595). The study of these total sum squares is known as analysis of variance (ANOVA) from regression point of view. To assess the statistical significance of the result, it is necessary to look in the table labeled ANOVA. The ANOVA table indicates the model as a whole is reasonably fit and significant association between independent variables and project success. This means the value of F is 6.938 (mean square of regression divided by mean square of residual), and it is significant at p value 0.000 ($p<0.001$), which means, the applied regression model can statistically significant to predict the outcome variable. The overall regression model was significant, $F(3,57)=6.938$, $p>0.05$, $R^2=.267$

❖ **Discussion**

According to table 4.20 above shows; ANOVA of regression analysis between independent variables considered and a dependent variable project success were examined. The ANOVA tells us whether the model, overall, results in a significantly good degree of predition of the outcome variable (Field 2009). The table depicts that in regression, the value of sum of squares is 2.773, the value of degree of freedom (df) is 3, and the value of mean square is .924.

The most important part of the table is the F-ratio, which is calculated using the below equation, and the associated significance value of that F-ratio. F-ratio is a measure of how much the model has improved the prediction of the dependent variable (project success) compared to the level of inaccuracy of the model (Field, 2009). The value of F-statistics is 6.947. Which is significant at $p<0.001$ (because the value in the column labeled Sig. is less than 0.001). This result tells us that there is less than a 0.1% chance that an F-ratio this large would happen if the null hypothesis true. The significant level in ANOVA table shows that the combination of the significantly predicts the dependent variable. On the other hand, in residual, the value sum of squares is 7.595, the value of df is 57 and the value of sum of squares is .133 were

$$F\ ratio = \frac{mean\ square\ regression\ (.924)}{mean\ square\ residual\ (.133)} = 6.947$$

According to Field (2009) if a model is good, then we expect the improvement in prediction due to the model to be large and the difference between the model and the observed data or mean square residual to be small. In short, a good model should have large F-ratio (greater than 1 at least) because the mean square regression will be bigger than the mean square residual. According to table 4.20, the ANOVA table result shows a relationship between the independent variables and the dependent variable of the study with F-statistic or F-ratio of 6.947.

4.11 Hypothesis Testing and Discussion

4.11.1 Hypothesis Testing

Hypothesis testing is the method of testing whether claims or hypothesis is regarding a population is likely to be true. The goal of hypothesis testing is to determine the likelihood that a population parameter. Here there are two hypotheses: null (Ho), and alternative (Ha). The

significance (sig.) value expresses a value to accept or reject the (null) hypothesis. It is also called the p-value. The p-value is the probability that the correlation is one just by chance. Therefore the smaller the p-value, the better will be. The general rule is reject H_o if $p<.05$ and accept Ho if $p \geq .05$ (Pallant, 2016).

Table 4 21: Coefficient and P-value of the Independent variables

Coefficients [a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.726	.493		5.533	.000
	Cost Related Factor	.185	.091	.283	2.026	.047
	Time Related Factor	.331	.143	.306	2.318	.024
	Quality Related Factor	-.223	.068	-.410	-3.287	.002

a. Dependent Variable: Project Success

Source; Field survey, 2021

In this part of the study, proof of null hypothesis is made based on table 4.21 above for the variables. Because, to test the research hypothesis already set in chapter one, it is possible to find out if the independent variables are significant predictors of the dependent variable. To test these relationships, the regression analysis was applied.

Hypothesis:

- Ho1-cost related factors have no statistically significant effect on the success of public building construction projects.

- Ho2-time related factors have no statistically significant effect on the success of public building construction projects.
- Ho3-quality related factors have no statistically significant effect on the success of public building construction projects.

The research is being done at 95% confidence interval. Hence, each hypothesis should be either accepted or rejected with reference to 5% level of significance; i.e. the hypothesis must be rejected If P-value is less than 0.05 otherwise accept it.

Ho_1: cost related factor has no statistically effect on the success of public building construction projects.

Cost related factors do not have statistically significant effect on success of public building construction projects. (Reject Ho1 if $p<0.05$) otherwise accept it. From table 4.21 the significant value for cost related is 0.047 which is less than p value of 0.05.Therefore, Ho1 is rejected, which indicates that cost related has a statistically significant effect on success of public building construction projects.

Besides, the value of beta for cost related factors is ($\beta=0.283$) this shows that cost related factors has positive and significant effect on success of public building construction projects. Hence, the above proposed hypothesis rejected and alternative hypothesis is accepted; which indicates that cost related factors has a statistically significant effect on the success of public building construction projects. Thus, the above result is supported by Ali Yassin Sheikh Ali (2019), in which cost related factors has a significant influence on the success of public building construction projects. Also, the above result is supported by Ghanim A. Bekr (2017), which described that cost is the basis for every construction work. Ineffective usage has a significant impact on construction project success.

Ho_2: time related factor has no statistically effect on the success of public building construction projects.

Time related factors do not have statistically significant effect on success of public building construction projects. (Reject Ho2 if $p<0.05$) otherwise accept it. From table 4.21 the significant value for time related is 0.024 which is less than p value of 0.05.Therefore, Ho2 is rejected,

which indicates that time related has a statistically significant effect on success of public building construction projects.

Besides, the value of beta for time related factors is (β=0.306) this shows that time related factors has positive and significant effect on success of public building construction projects. Hence, the above proposed hypothesis rejected and alternative hypothesis is accepted; which indicates that time related factors has a statistically significant effect on the success of public building construction projects. Thus, the above result is supported by Ali Yassin Sheikh Ali (2019), in which cost related factors has a significant influence on the success of public building construction projects.

Ho_3: Quality related factor has no statistically effect on the success of public building construction projects.

Quality related factors do not have statistically significant effect on success of public building construction projects. (Reject Ho3 if $p<0.05$) otherwise accept it. From table 4.21 the significant value for quality related is 0.002 which is less than p value of 0.05.Therefore, Ho3 is Failed to accepted, which indicates that quality related has a statistically significant effect on success of public building construction projects.

But, the value of beta for quality related factors is (β=-0.410) this shows that quality related factors has negative and significant effect on success of public building construction projects. Hence, the above proposed hypothesis is accepted; which indicates that quality related factors has no statistically significant effect on the success of public building construction projects. Thus, the above result is not supported by Ali Yassin Sheikh Ali (2019), in which quality related factors has a significant influence on the success of public building construction projects.

Generally Cost and Time related factors have significant positive relationship on project success, while Quality related factors have negative relationship on project success.

Table 4 22: Summary of hypothesis test result

No.	Hypothesis	Tool	Result	Effect
H_a1	cost related factor has statistically significant effect on the project success	Regression	Accepted	Positive
H_a2	time related factor has statistically significant effect on the project success	Regression	Accepted	Positive
H_a3	quality related factor has statistically significant effect on the project success	Regression	Fail to Accept	Negative

Source; survey, 2021

4.12 General Discussion of the Finding/Model Interpretation

Linear regression was performed to test the spotted independent variables to answer the research questions based on the research problem and objectives. Among factors affecting construction project success in Jimma zone, cost and time related factors independent variables were significantly affecting Jimma zone public building construction project success. The variables were found to affect project success significantly at less than 0.05 probability levels.

The adjusted R square (Coefficient of Determination), can be defined as the proportion of the total variation or dispersion in the performance of construction projects (dependent variable) that explained by the variation in independent variables in the regression. (Gujarati, 2004) So with adjusted R Square value of 0.229, meaning, 22.9% of the variation in public building construction project success is explained by the linear relationship with all the independent variables. The corollary of this is 77.1% of the variation in public building construction project success is unexplained by the relationship. Thus when adjusted R square it means that the independent variables included in the study play an important part in affecting the dependent variable.

The individual effects of the independent variables can be explained by their respective beta coefficients. As per the regression result, the project success and cost related factors have the strongest positive relationship. 1-unit increment in improving cost related factors can cause about 18.5% improving success of construction projects. This collaborates with the views of Nipin Joseph Babu (2015), Chan et al., (2002) and Assaf et al., (2001) who found in their respective

studies that increasing the cost related factors would have a positive impact on construction success. They noted that high experience and qualifications of personnel involved in a construction project will assist the project parties to implement their project goals professionally leading to better performance of quality, time, and cost of the project. Understanding and identifying success factors are a key determinant in ensuring the project success. They also studied that cost performance on the cost's degree of involvement and how that affects their performance and found positive result. The second factor under study was Time related factors, and this factor has a positive relationship with the project success with 1-unit increment in improvement of time related factors will cause about 33.1% increase in project success. The findings under the study of Nipin Joseph Babu, (2015) examined factors affecting the success of a construction project and project related factors is one of the identified factors crucial to project success. The third factor under study was Quality factors, and this factor has a negative relationship with the project success with 1-unit increment in improvement of quality factors about 22.8% decrease in project success. The findings under the study of Ayodeji Oke, (2017) shows that efficient quality is very important at the very outset of the project to carefully consider all factors when selecting the most appropriate quality approach for a construction project. This is because each system has its own feature and peculiarity that will have effect on the cost, time and quality of the project success. But the current study revealed that quality does not have positive relationship with success of project rather it was negative.

4.13 Qualitative Analysis: Discussion of Interview Results

Ricky (2007) explained that qualitative research helps in understanding a phenomenon more deeply by analyzing the reasons behind it, while quantitative tools analyze the phenomenon itself, without bothering about the human perception of "WHY". Hence, as to supplement the quantitative analysis, interviews were conducted with the manager of Jimma town construction office. The manager said that, construction projects success should come to the picture when any construction project begun, thus to complete according to the time specified in agreements of the parties. Because the project is not everlasting rather it has a beginning and ending period.

There is high magnitude of construction projects not progressing according to their plan in the town. There are many factors that contributed to this in the industry. Such as: labor issue, finance, weather condition, inflation, price escalation of construction materials, design

modification, political and social problems and others are factors identified by the manager. So, these success factors have negative impacts on project success and working environments if not handed accordingly. As a result, it abandons the projects; while semi-finished, the rest parts of the total project remain without completing.

According to the managers' description, mostly such problems exist on public construction projects rather than private construction projects. On their speech, the manager emphasizes that, it is important to mitigate for the factors through strong management, properly investigation of project site or monitoring, through giving necessary attention to design and ground civil work as well as foundation, through developing communication system with each stakeholder, offering incentive based contractual agreements, and also hiring professional experts.

The researcher also interviewed the team leader of the 'construction projects supervision and monitoring team' from the office. When the interviewee explained the factors that contribute to project success, some of the factors of success factors include communication barrier, high level of corruption within the government and construction industry, poor contract management, changes in site condition, shortage of material and improper planning, were mentioned.

According to the respondent, contract management is the basic factor for all above mentioned factors in the town. Then the respondent explained the issue defining the concept 'contract management'. "Contract management is the process of managing contract creation, execution and analysis to maximize operational and financial performance at an organization, all while reducing financial risk. Therefore, poor contract management is the inability to manage a contract well thereby increasing its financial risk which could lead to delay in construction projects. Changes in site condition imply unexpected changes that a contract could encounter while executing a construction project. This could be in the form of climate changes, and additional structures. When a contractor encounters this change, it would definitely cause a delay in the completion of the project. Shortage of material here simply means a situation whereby the materials available for a project execution is not enough as a result of damages, theft, and improper estimation by the contractor. This is linked to improper planning which is solely the fault of the contractor because of his human errors and inadequate management strategies."

The respondent also explained that the problem of Contractors incompetency, inadequacies in industrial infrastructure, supply of resources and clients and consultants also leads to unsuccessfulness and project failures. Contractors' incompetency here means that either the contractor is not knowledgeable enough about the construction project or lacks the equipment, good construction technique and manpower required in the execution of the project work.

CHAPTER FIVE

5. CONCLUSIONS AND RECOMMENDATION

5.1 Introduction

This chapter presents the conclusion, recommendation and suggestions for further research. The discussions will be guided by the findings of the preceding chapter, the research objectives and the research hypothesis.

5.2 Conclusion

As the SPSS results of the descriptive statistics shows; most of the respondents gave positive response concerning how these factors highly affect project success within the study area. Because most of responses show that strongly agree; this implies that those independent variables are affecting project success highly

The pre-model fitting assumptions (i.e. normality of distribution, linearity, multi co linearity of the variables, homoscedasticity, and independent of residuals) of linear regressions are met accordingly.

This research was conducted in Jimma zone public building projects, working with the identifying factors affecting the success of its construction projects these factors and sees their relation with the success of public building construction projects. The ANOVA test showed that a P-value of 0.000^{**} which is below the alpha level, i.e. 0.01. This means that the overall independent variables (CRFs, TRFs, & QRFs) have statistically significant relationship with that of the dependent variable, i.e. Success of projects. 22.9% of the variation in jimma zone public construction projects success is explained by the linear relationship with all the independent variables. As per the regression result, from all variable TRFs has the highest beta (β=0. 331) value which specifies the most governing effect in determining the success of project; the cost related factors (β=0.185), and time related (β=0. 331) have a strong positive significant relation. While quality related factors (β=0.223) result in negative relationship. This shows that working on cost & time related factors will have higher positive effect on success of public building

construction projects in jimma zone. This is aligned with previous studies (Ali Yassin Sheikh Ali (2019); Ayodeji Oke (2017); Nipin Babu Joseph, (2015)). The result also showed quality factors in negative relationship with success of projects. This implies that all poor actions in these factors will reduce the overall success of construction projects.

The results show that clients, consultants, and contractors all agreed that the TRFs group of success factors was the most influential factor. Cost related factors were considered the second most important factor affecting success of public building construction projects in Jimma zone.

The conclusion can be drawn that reducing of cost related factors and time related factors help projects to succeed. Generally, for the public building construction projects effectively and efficiently applying important strategy is a crucial one through considering the above mentioned variables.

Based on literature reviews and the results of questionnaire responses; the following are identified as potential factors affecting timely completion of private building construction projects.

- Cost related factor: - Inflation, Corruption Level, Unexpected occurrence of things (Ex Labor injuries), Accuracy of project cost estimate, Unclear & inadequate details in drawings, Changes in Material types & Specifications during constructions, Damage of sorted material, Equipment's Breakdowns.
- Time related factor:- Delay in procurement process, Shortage of construction materials, Unforeseen adverse ground condition & geological problems at the site, Un stability (Political cases, security issues) in the environment, Planning & Schedule of the project, Lock down effect (because of Covid-19), Rework due to errors in construction.
- Quality related factor: - Unavailability of competent (Skilled) Staff, Type of Equipment & Raw material used for construction, Site management & Supervision, Type of Project bidding and award (Negotiation, Lowest Price), Adequate Monitoring & Control, Building Codes.

5.3 Recommendations

The researcher recommend that availability of meeting before bid submission date may help contractors to get valuable information on their price setting and understand scope of works. In addition to this Consultants need to conduct site visits to reduce risk associated with physical environment especially on material & labor availability. Proper construction planning and management to ensure the delivery of a project on schedule and within budget is only possible by having technically capable skilled staffs. Contractors need to work on that.

It is necessary for construction implementing organization (owner) to evaluate the volume of Works and local condition to estimate proper time before tendering and entering into contract. Bigger contractors may be invited for critical construction projects that won't be separated into smaller projects. This will help in balancing cost & available time. Project leaders needs to have early & continuous involvement in the project to get on time information about their sites, to work on problems, adjusting plan to mate actual site conditions and others faced during actual implementation.

In addition to the abovementioned recommendations, contractors, consultants and clients are recommended to put their efforts on the identified key factors (TRF & CRF) in relation to their magnitudes of influence. By doing so, the impact of factors in Jimma public building construction sector could be significantly reduced or controlled, which will ultimately lead to the project success. However, effects of mentioned factors on project cost should also be considered as part of the whole process to successfully complete the construction project. Hence, this will enhance the sector's performance and consequently contribution to the nation's economy.

Considering time related factors the researcher recommends;

- Sufficient supply of materials on time and in quantity will improve project success. Therefore contactors should buy and store materials that are needed for construction.
- Adequate planning before and during implementation time, working on procurement process, will result timely completion of projects. Contractors should work on that
- Considerations on the ongoing external environment especially political instability, through different assistances (flexible schedule, technical assistance) to contractors will

improve the success of works. Therefore owners should communicate with concerned government body and give solution for contractors.

- Effective and continuous assistance to contractors will help them in their planning and project management effort. Consultants should work on this matter actively.

Considering cost related factors the researcher recommends;

- Taking consideration for possible change of material price during tendering time will help contractors from the small risk of escalated material prices, and improve financial liquidity. Owners should provide this kind of consideration for contractors.
- Details of the drawing should be clear and double checked with the specification. Hence accuracy of the project estimate becomes the same as the actual cost. Contractors should have to work on that matter in detail.
- Properly using the sorted materials and construction equipment's will save unnecessary expenditure. Regarding these matter contractors should train their employees.

Generally, owners, contractors, and consultants including stake holders of every project should focus on those success factors in minimizing & mitigating so as to achieve a successful project. All the construction project players should be trained on all factors that affect construction projects. They should especially be educated on the key success factors of public construction projects like; cost related, time related, and quality related. Then, success of public building construction projects can be realized.

5.4 Suggestion for Future Work

For future, study should find out between public and private construction projects, which one was affected by those factors severely and frequently.

Since the study was confined to public building construction companies in Jimma zone, the conclusions in this study cannot be generalized to all construction companies in the whole country. Additionally, this report presents the preliminary results findings of the assessment of success factors of project. Thus, other elements of project success factors are unaddressed in the present study. Lastly, time constraints restricted exhaustive examination of factors project

success in Ethiopia. To complement findings of the present study, further study covering many construction companies across all regions of Ethiopia is recommended higher success level.

Regarding quality related factors; in this research, as the result shows that the impact shows negative and significant effect on success of public building construction projects. Hence, the proposed hypothesis is accepted; which indicates that quality related factors has no statistically significant effect on the success of public building construction projects. Depending on this the researcher recommends that for future study to investigate why contractors, owner and consultants of public building construction project gave this response and the source of those problems should be thoroughly investigated.

The research study that is presented here in this article aims to identify the success factors which determine the nature of outcome in implementing projects which then makes this study relevant and appropriate as some of the project success factors have higher influence than others. So the researcher recommend strongly that future and further study be made so as to continue for larger samples and then test the association among the rankings of the prominent project success factors.

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APPENDICES

Questionnaire

Dear Sir/Madam

The researcher is a graduate student of MA in Project Management and Finance, in Jimma University College of Business and Economics, the requirement of the program is to come up with a research related to the field of study.

The aim of this questionnaire is to study factor affecting the success of construction projects in Jimma Zone and Town. This questionnaire is required to be filled with exact relevant facts as much as possible. All data included in this questionnaire will be used only for academic research and will be strictly confidential.

Your response, in this regard, is highly valuable and contributory to the outcome of the research.

Regards,

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Jimma

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

1. **Relation to the Project:** ☐ Owner ☐ Contractor ☐ Consultant

2. **Gender** ☐ Male ☐ Female

3. **Marriage status** ☐ Single ☐ Married ☐ Divorced ☐ Widowed

4. **Current Educational level**

   ☐ Diploma ☐ Bachelor Degree ☐ Masters ☐ PHD

5. **Job title of the respondent:**

☐ Project Manager/ deputy	☐ Site Engineer/ office engineer	☐ Material Engineer
☐ Organization Manager/ deputy	☐ Surveyor	☐ Consultant
☐ Store manager	☐ Procurement and Facility Management	☐ General foreman
☐ Supervisor	☐ Team Leader	☐ Others (specify).....

6. **Service Year/s of the respondent: (Experience)**

   ☐ >1 ☐ 1 - 2 ☐ 3 - 5 ☐ 5 - 10 ☐ More than 10

7. **Number of projects executed in the last five years:**

   ☐ 1 up to 5 ☐ 5 up to 10 ☐ More than 10

Part Two: Indicate your level of Agreement to each of the following success factors of projects at Jimma Zone.

Evaluate them in relation to your project and then put a tick mark (√) under the choices below. Where, **5** = Very agree, 4= Agree, 3= Neutral, **2** = Disagree and **1**= Very Disagree

No	Project Success Measurements	Rate				
		(1)	(2)	(3)	(4)	(5)
1	Success of public building project are affected; by cost related factors					
2	Success of public building project are affected; by Time related factors					
3	Success of public building project are affected; by Quality related factors					

1. If your answer in the above question is 1 & 2, what are the major reasons for cost overrun?

   _____

   _____

   _____.

2. If your response for "Time" is 1 & 2, what are the major reasons for untimely completion of projects (the reason for delay of projects)?

   _____

   _____

   _____.

3. If your answer in the above question is 1 & 2, what are the major reasons for not completing with specified quality?

   _____

   _____

   _____.

Part Three: Assessment on Factors Affecting the success of Public building construction projects in Jimma Zone.

The following tables consist of lists of possible factors that affect the success of construction projects identified from literatures and desk study. Based on your experience what is the likely contribution of these factors to affect success of public building construction projects in Jimma Zone that you have involved in? Please indicate the degree to which these factors are affecting the success of construction projects.

After you read each of the factors, evaluate them in relation to your project and then put a tick mark (√) under the choices below. Where, **5** = Very High, 4= High, 3= Medium, **2** = Low and **1**= Very low

List of possible factors	Degree of factors to affect success of project, you are engaged with				
	(1) Very low	(2) Low	(3) Medium	(4) High	(5) Very high
Cost Related Factors					
1. Inflation					
2. Corruption Level					
3. Unexpected occurrence of things (Ex Labor injuries)					
4. Accuracy of project cost estimate					
5. Unclear & inadequate details in drawings					

6. Changes in material types & Specifications during construction						
7. Damage of sorted material						
8. Equipment Breakdowns						
Time Related Factors						
9. Delay in procurement process						
10. Shortage of construction materials						
11. Unforeseen adverse ground condition & geological problems at the site						
12. Un stability (Political cases, security issues) in the environment						
13. Planning & Schedule of the project						
14. Lock down effect (because of Covid-19)						
15. Rework due to errors during construction						
Quality Related Factors						
16. Un availability of competent (Skilled) Staff						
17. Type Equipment & Raw material used for construction						
18. Site management & Supervision						
19. Type of project bidding and award (Negotiation, Lowest Price, etc.)						
20. Adequate Monitoring & Control						
21. Building Codes						

THANKS!!

ANNEX II

No	Project Name	Contractor	Consultant	Location	Financial (Million)Eth Birr		% of Cost Overrun	Time Taken (Day,Month/Year)		% of Time Over run	Status (%)
					Budget	Financed		Planned	Executed		
P1	O/Beyam Wereda Police Office Construction	Nejat, Ashenafi & Wendimagegn (GC8)	JZCO	Omo Beyam	8,808,450.43	20%	-	18 month	7 month	-	On Progress 21%
P2	Gatira Model School	Adee & Shamse plc (GC 9)	JZCO	Setema	4,861,034.81	54%	-	24 month	20 month	-	55%
P3	Meeting Hall Project	Mohamed, Roza & Kulefi (GC 8)	JZCO	Setema	5,109,088.37	38%	-	24 month	12 month	-	40%
P4	Residence for Obba Chariko	Hasen, Seyid & Abdi (GC 9)	JZCO	Gera	3,679,781.73	98%	-	24 month	18 month	-	98%
P5	Gera Health Center	Tofik, Mandid & Abdulkerim (GC 8)	JZCO	Gera	6,759,152	55%	-	24 month	18 month	-	55%
P6	**DMUBP**	**Kalid, Muktar & Kedir (GC 8)**	JZCO	**Dedo**	**4,512,409.73**	**59%**	-	**24 month**	**48 month**	**200 %**	**80%**
P7	Extension Building of Defkela Health Center	Esmael & H/Isa (GC 8)	JZCO	Dedo	2,949,078	41%	-	24 month	20 month	-	45%
P8	**G+2 Tiro Afeta Municipality Office**	**Seyid Mohamed (GC 5)S**	JZCO	**Tiro Afeta**	**13,846,016.76**	**86%**	-	**2Yr & 5month**	**3Yr & 2month**	**128 %**	**83.9%**
P9	ODP Office	Ne'im, Temam & Ahimed (GC 8)	JZCO	Tiro Afeta	5,234,414.32	89%	-	1Yr & 8month	1Yr & 6month	-	91%

P10	Extension Building of Busa Health Center	AyishNaimfi H/isa (GC 9)		Tiro Afeta	2,949,078	65%	-	1Yr & 8month	1Yr & 6month	-	75%
P11	Tiro Afeta TVET Workshop			Tiro Afeta	2,547,671.00143	88%	-	1Yr & 8month	1Yr & 6month	-	90%
P12	Limu Kosa High Court	Melkamuu Haile & Adugna (GC 9)	JZCO	L/Kosa	2,934,452.82	73%	-	2Yr	1Yr & 6month	-	33%
P13	Finance and Economic Development Office	Kedija,Abdulwahid & Shemsedin (GC 9)	JZCO	L/Kosa	5,784,433.89	98%	-	3Yr	2Yr & 8month	-	98%
P14	Kishe Health Center	Sultan, Belete & H/Isaa (GC 8)	JZCO	Sh/Somboo	2,949,078.06	65%	-	12month	8month	-	75%
P15	Meeting Hall	Sadam & Abdoo (GC 8)	JZCO	Shabe	5,345,021.8	31%	-	2Yr	1Yr & 8month	-	35%
P16	Agaro Claster	Birhanu, Wubalem & H/I (GC 8)	JZCO	Agaro	4,559,389.23	38%	-	2Yr	1Yr & 8month	-	40%
P17	Extension Building of Kedamasa Health Center	Shueb & Mubayid (GC 9)	JZCO	Gomma	2,949,078	61%	-	2Yr	1Yr & 8month	-	63%
P18	Dalecho Health Center	Sisay, Alemu &Abdulhkim (GC 9)	JZCO	Gomma	6,759,152	65%	-	2Yr	1Yr & 8month	-	66%
P19	Gomma Municipality Building	Wolda Umar & Hamza (GC 8)	JZCO	Gomma	6,398,422.21	27%	-	2Yr	1Yr & 8month	-	29%
P20	Staff Residence	Husen, Umer, Remedan (GC 8)	JZCO	Gomma	3,679,791.18	28%	-	2Yr	1Yr & 8month	-	30%

P21	Education Office	Nizam & H/Isa (GC 8)	JZCO	Gomma	5,482,329.44	89%	-	2Yr	1Yr & 8month	-	75%
P22	Residence for Geta Health center Staff	Wol Nebiyu, (GC 9)	JZCO	Seka Chokorsa	3,679,791.18	88%	-	2Yr	1Yr & 5month	-	85%
P23	Health center	Semir, Mubarek & H/Isaa (GC 8)	JZCO	Seka Chokorsa	6,759,152	59%	-	2Yr	1Yr & 5month	-	59%
P24	Extension Building for IPD	Wol Sebsib & his friends (GC 8)	JZCO	Omo Nada	2,945,521.15	25%	-	12 month	8 month	-	26%
P25	Education Office	Feti, Abdulkerim fi Saliha (GC 8)	JZCO	Mancho	2,810,044.52	49%	-	12 month	8 month	-	55%
P26	**MMUBP**	**Husen ,shukuri & H/Isa (GC 9)**	**JZCO**	**Manna**	**2,837,591.11**	**Variance (774,493.97)**	**127.3%**	**2Yr**	**3Yr & 6month**	**150 %**	**91%**
P27	**JZULMP**	**Sash Construction**	**Jimma Zone Consultant Office (GC 3)**	**Jimma Town**	**46 Million**	**Variance (54 Million)**	**217.3%**	**16 month**	**24 month**	**150 %**	**68%**
P28	**JIBTP**	**Homa Construction (GC 1)**	**Arcon Design Building Consultant**	**Jimma Town**	**160,815,807.18**	**37.3%**	**-**	**540days**	**600days**	**111 %**	**45%**

Source: Jimma Zone Construction Office & Jimma Town Construction Office (Progress Reports of Projects)