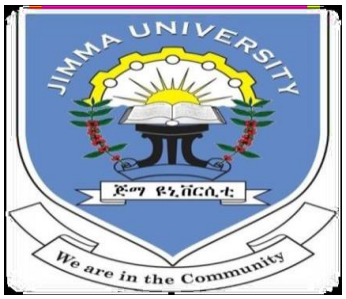

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FACULTY OF CIVIL AND ENVIRONMENTAL ENGINEERING

CONSTRUCTION ENGINEERING AND MANAGEMENT CHAIR

FACTORS THAT AFFECT MONITORING AND CONTROLLING PRACTICES ON PUBLIC BUILDING CONSTRUCTION PROJECTS IN JIMMAZONE.

By:

Abera Birhanu

A Thesis paper submitted to the School of Graduate Studies of Jimma University in partial fulfillment of the requirements for the Degree of Masters of Science in Construction Engineering and Management.

January, 2020

Jimma, Ethiopia

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FACTORS THAT AFFECT MONITORING AND CONTROLLING PRACTICES ON PUBLIC BUILDING CONSTRUCTION PROJECTS IN JIMMA ZONE

ABERA BIRHANU ZEGAYE

APPROVED BY BOARD OF EXAMINERS

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DECLARATION

I undersigned declare that this research entitled "Factors that affect monitoring and controlling practice on public building construction projects in Jimma Zone" is my original work and has not been presented by any other person or for the award of any degree in any other University. I have undertaken the research work independently with the guidance and support of my research advisors.

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ABSTRACT

Construction industry is an industry, which is concerned within the Initiating, planning, execution, Monitoring and controlling& Closing of all types of civil works. Now a days in Ethiopia construction industries were booming due to implementing major infrastructure projects together with many public buildings, Office building, Staff residential, High school building construction project.

The study aims at identifying were to factors that affect monitoring and controlling practices on public building construction in Jimma Zone from the view point of different respondents including Clients, Consultants, Contractors, Regulatory and other who have experience in public building construction and provides recommendations with reference to handling of construction building. About 66 Factors were identified through literature review and grouped into six groups. Respondents were required to rate how 66 factors of project monitoring and controlling practices with respect to their importance.

The 6 groups of factors which have significant impact on the project monitoring and controlling practices are ranked depending on their RII as: Communication Factor, Cost Factor, Stakeholder engagement Factor, Schedule factors, Quality Factor and Scope factor. According to the result of the study the top factors of project monitoring and controlling practices includes: Price fluctuation, Shortage of material, Lack of communication between parties, Inadequate design without site investigation, Cost variations, Scope change within time, cost and quality change, Payment delay, Schedule changes and Delays in decisions making.

The major impact lack of monitoring and controlling practices are time delay, cost increase and quality factors from initial contract on this project are originated by the employer, contractor, regulatory and consultant. The selected projects are comprises of the completed three and one ongoing projects and those critically suffering by abandonment and/or termination of the contract. Gatta high school, Sombo Dosha high school and Kusaye high school are the completed projects and Ilke High school is under construction projects.

It's recommended that building construction organization assign project manager and construction supervisors with sufficient management skills in project, minimize Accident and any safety problems, develop human resources through proper and continuous training programs frame a strong assignment, vision and a planned approach to overcome poor project monitoring and controlling. It's recommended that the government should consider as major concern, to enforce hard and fast laws and regulation that help to obtain practices work force in the building construction.

Key words: *project monitoring and controlling practices, building construction.*

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GLOSSARY

B/n	Between
ERA	Ethiopian Road Authority
M&C	Monitoring and controlling
M&E	Monitoring and Evaluation
PCC	Project cost control
PMBOK	Project management Body of Knowledge
PMI	Project Management Institution
SME	Small, Medium and Micro contractor
RII	Relative Importance Index
3c's	Three parties such that Contractors, consultants and clients

CHAPTER ONE

INTRODUCTION

1.1. Back ground of the study

Construction trade is industry that is concerned within the Initiating, planning, execution, monitoring and controlling & Closing of all construction project. The Project monitoring and control practice is an important process in assessing any information system. The purpose of project observance Associate industry management must offer an understanding of the project progress so applicable corrective actions may be taken once the project performance deviates identify general measures for the particular goals and its specific practices of Project observance and management. A comes documented set up is that the basis for observance activities, act standing, and taking corrective actions. Progress was primarily determined by examination actual work product and task attributes, effort, cost, and schedule to the set up at prescribed management levels among the project schedule.

Factors that affect monitoring and control were essential to observe the deviation of the project set up and to require applicable actions, once required. However, to work out the action that ought to be taken isn't a simple task. We should offer vital data to project managers so as to boost monitoring and control activities of the projects.

According to PMBOK, 2013 context was the project monitoring and control should be planned before of project work commencing. The Project Manager, project team, and different stakeholders should establish what was measured, however progress was measured, and once the monitoring cycle would occur. The Project Manager should truly implement the setup, though, and follow through to identify new risks and continue the unvarying method of project set up refinement through amendment requests. To maximize impact for successful completion, project monitoring and control should be planned for and enforced systematically.

Factors that affect monitoring and control of comes was the method of following, reviewing, and control the accomplish meet the performance objectives outlined within the project management plan. Monitoring contains standing coverage, progress measuring, and prediction whereas analysis is systematic and freelance. In regard to factors that affect monitoring & controlling practices, performance offers information on the projects performance regarding scope factors, schedule factors, cost factors,

resources factors, quality factors, and risk factors, which might be used as inputs to other processes (PMBOK, 2001).

Monitoring &controlling practices plays a very significant role in helping those involved with projects to assess if progress was being achieved in line with expectations. Monitoring controlling practices functions of a project are carried out by the Monitoring Controllingpractices on building construction project. According to (Kahilu, 2010) doesn't have direct access to the projects monitoring controllingpractices resources and have limited funds. An efficacious project was an important role in achieving organization growth and development. Project monitoring and controlling practices exercise adds value to the overall efficiency of project planning, management and implementation by offering corrective action to the variances from the expected standard.

1.2. Statement of the problem

Now a day's construction industries in Ethiopia were booming due to implementing major infrastructure projects together with many public buildings. However, construction monitoring and controlling practices were becoming serious problems in Ethiopia, especially on public building projects at Jimma Zone and no attention was given to such subject. Construction managers often fail to identify monitoring and control practices in the construction process, because the absence of appropriate tools to measure problem. In the present situation, the contractors and the design consultants were mainly concerned on how to control cost, time, and quality without any emphasis on monitor and control practices. Generally, it's accepted that value of materials accounted for an excellent proportion of the overall value of construction projects.

Factors affect monitoring and controlling was normally emanates at different stages of construction which can be during planning, estimating or construction stage. Therefore, this researchesto determine the current situation with regard to factors monitoring and controlling practices on public building construction in JimmaZoneand assess the factors that affect monitoring and control measures with a view to seeking for ways to practices construction public building in future construction projects.

1.3. Research of Questions

To achieve the objectives this Research, the following questions were asked.

1. What factor that affect monitoring and controlling practices on public building construction in Jimma zone?
2. How to evaluate monitoring and controlling practices in public building construction project in Jimma zone?
3. What an impact project monitoring and controlling practices on public building construction in Jimma zone?
4. What your recommendation of project monitoring and controlling practices on construction in Jimma zone?

1.4. Objectives

1.4.1. General Objective

To assess factors that affect monitoring and controlling practices on public building construction projects in Jimma Zone.

1.4.2. Specific Objectives

1. To identify factors that affect monitoring and controlling practices on public building construction in Jimma zone.
2. To evaluate monitoring and controlling practices in public building construction project in Jimma zone.
3. To determine impact of monitoring and controlling practices on publicbuilding constructionprojects.
4. Toprovideрecommendations to upgrade the knowledge of monitoring and controlling practices on public building construction in Jimma Zone.

1.5. Significance of the Research

This research was significant in that it may help the people engaged in the construction industry how they can monitoring and controlling practices on public building construction while they manage, monitor and control practices at project. In addition, the study intends to provide some framework for the development toexplore the issues that hinder the successful implementation of these practices.

1.6. Scope and Limitation of the study

This research was limited and focuses on selected public building construction projects in Jimma zone at wareda level. TheContractors considers in this study are GC3, GC4 and GC5. The monitoring and controlling practices on public building construction of under construction and completed projects were considered in the study.

CHAPTER TWO

LITERATURE REVIEW

2.1. INTRODUCTION

The factors that affect monitoring and controlling practices background is mainly derived from the Project Management Body of Knowledge (PMBOK), written by PMI (2004, 2008**,** and 2013)

Construction as outlined by the international organization Statistics Division is "an economic activity directed to the creation, renovation, repair or extension of fastened assets within the sort of buildings, land improvements of an engineering nature, and other such engineering constructions as building, roads, bridges, dams and so forth". It is a process that consists of the building or assembling of infrastructure in the fields of architecture and civil engineering. It contains the building of latest structures, together with website preparation, still as additions and modifications to existing ones. It conjointly incorporates maintenance, repair, and enhancements on these structures. It is the process of adding structure to real property (Central Statistical, 2008).

Now a days building construction industries are boosting globally and consuming huge amounts of resources. Responsibly factors that affect monitoring and controlling practices on public building construction project is a vital component of optimum use of the limited resources we have that sustain the ongoing development. In this context, Preliminary focus is on scope factors, time factors, and cost factors, quality factors, stakeholder and communication factors of that affect monitoring and controlling practices. (Karan Singh, Satish Singh, SwapnilPatil, 2015).Appropriate visibility permits timely corrective action to be taken once performance deviates considerably from the set up. A deviation is important if, once left unresolved, it precludes the project from meeting its objectives. These actions may require preplanning, which may include revising the original plan, establishing new agreements, or including additional mitigation activities within the current plan (Gaurav Kumar, Ashu Bansal 2014).

2.2. Definition Projects

Many authors and references have defined project in different ways emphasizing its different aspects. Summarizing those definitions given, this paper defines a project as: A temporary endeavor that has definite beginning and end time. The project is ended

when the objectives have been achieved or that the project is terminated because the objectives can no longer be met. A project is a temporary endeavor with a defined beginning and end, usually time constrained, and often constrained by funding or deliverables (Pritchard, 2006), undertaken to meet unique goals and objectives (Sebastian, 2007), typically to bring about beneficial change or added value. The temporary nature of projects stands in contrast with business as usual or operations (Dins more, 2005), which are repetitive, permanent, or semi-permanent functional activities to produce products or services.

It is a sequence of unique, complex, and connected activities that have one goal or purpose and that must be completed by a specific time, within budget, and according to specification. In general, a project is a unique, well-defined effort to produce specified results within a set timeframe, at a given cost, in a multifunctional environment and under special management (Berry and Duhig1987). A project is a temporary endeavor undertaken to create a unique product or service. So projects are an activity that is conducted to achieve something new which was not present before, which is temporary or that with a defined time limit and quality PMI (2000). A project is an organized effort to a specific, typically one time goal. A has a specific beginning and an end, it has a specific goal, and it is complex and has many details (Bender, 2008). A project is a non-repetitive enterprise, characterized by a clear and logical sequence of events, with a beginning, middle, and end, focused on the accomplishment of a clear and defined objective on deadline, with costs, resources, and quality parameters specified (Ricardo 2008). So the term project is very broad term and it is defined differently by different scholars. Even if they define it by their own understanding it represents the same idea. There is no one universally agreed definition of project. But it all definitions of scholars gave similarity. So in this paper the term project is considered as a temporary activity conducted to achieve a given objective with a defined time, in specified quality, and predetermined budget.

2.3. Factors that affect monitoring and controlling practices

Project Monitoring and Control is to provide an understanding of the project's progress so that appropriate corrective actions can be taken when the project's performance deviates significantly from the project plan. A project's documented plan is the basis for monitoring activities, communicating status, and taking corrective actions. So factors that affect progress is primarily determined by comparing actual

work product and scope factors, cost factors, schedule factors, quality factors, stakeholder factors and communications factors to the plan at prescribed milestones or control levels within the project schedule. The term "project plan" is used throughout these practices to refer to the overall plan for controlling the project. When actual status deviates significantly from the expected values, corrective actions are taken as appropriate. Appropriate visibility enables timely corrective action to be taken when performance deviates significantly from the plan (Gaurav Kumar et al, 2010). These actions may require re-planning factors, which may include revising the original plan, establishing new agreements, or including additional mitigation activities within the current plan.

Project monitoring and controlling are opposite sides of selection and planning.Bases for selection dictate and what to monitor plans identify elements to control factors. Control factors uses monitored data to align actual performance with arrange of take correct action project (PMBOK, 2013).

According to PMBOK, 2008 and 2013 good project monitoring and controlling practices are the following result.

- ✓ Good project monitoring is to detect, at any time of the project, are deviation from budget, Lagging schedule and poor quality are reducing factors in any construction projects.
- ✓ Good project controlling is to correct, at any time of the project, the deviations from budget, schedule, and quality are bring project performance (budget, time, quality) back in line with plans and sometimes, revise plans to bring them in line to align project performance.

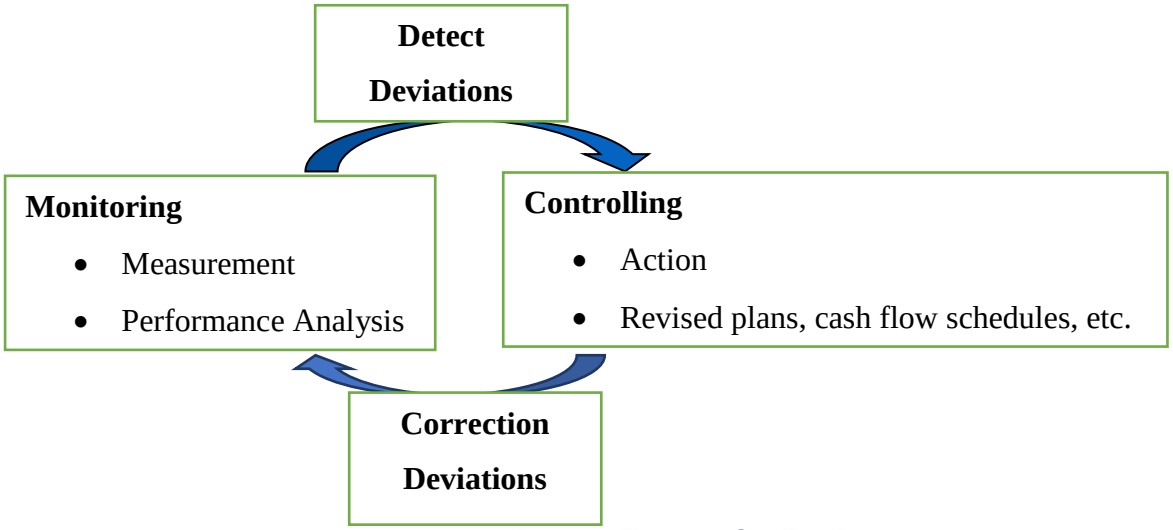


Figure2.1:- Monitoring and controlling: A feedback process

2.4. Project monitoring factors

Project Monitoring is the set of procedures and management practices used to collect information about the performance achieved or forecasted in a project and the developing organization, based on a set of performance metrics. Project monitoring factors tracks and reports on progress in implementing the project during its life.

According to (Saad H. Al-Jibouri 2003) as indicated earlier, monitoring project performance involves making measurements as the project proceeds and comparing those measurements with the desired or expected values. The measurements made are limited in number because of the cost factor of data collection and also by company policy and precedent factor. Performance in a project is complex and a limited number of measurements will provide a less than complete picture of the performance. This partial picture may be adequate for the purposes of controlling the work or it may not. According to Mahmoud Khraiwesh, 2013 are describe the following.

2.4.1. Project monitoring practice

A. **Monitor factor planning parameters**

Monitoring involves the measure practices of the actual parameter values of project planning, comparing these values to that estimated in the plan factors, and then identify the deviation include size, complexity, and availability. The monitoring the project planning parameters to the Monitoring the project progress against the schedule. Project plan are Attributes of work products, Attributes of costs, Parameters of estimated and Attributes of schedule. Monitoring periodically the actual completion of activities and milestones are Actual activities and Actual milestones measures. The monitor resources provided andused Resources of the projects.

B. **Monitor Stakeholder Involvement factors**

Monitor stakeholder involvement practices the project plan factors. The project monitoring stakeholder involvement to ensure that appropriate interactions occur are measures stakeholders involved.

2.4.2. Manage corrective action to closure factors.

Analyze Issues: Collect and analyze problems and confirm corrective actions to deal with them.

Take Corrective Action: Take corrective action on known problems.

Manage Corrective Actions: Manage corrective actions to closure.

According to PMBOK, 2013Monitoring and controlling method group consist of these processes required to track, review and regulate the progress and performance of the project. Identify any area unites during which changes to the plan are needed and initiate the corresponding changes. The key good thing about this method cluster is that project factors is discovered and measured often and variances from the project management factors.

Determining and documenting the appropriate actions to address identified issues are modifying requirement, revising estimates and plans, renegotiating commitments, adding resources, and revising project risks. Monitoring corrective actions for completion

These consist offactors that affect monitoring and controlling method cluster additionally includes:

- ✓ Controlling changes and recommending preventive action in anticipation of possible problems of factors,
- ✓ Monitoring the ongoing project activities against the project management plan and the project performance baseline factors, and
- ✓ Influencing the factor that could circumvent integrated change control so only approved changes are implemented factors.

This Continuous monitoring gives the project management team insight into the health of the project and identify any areas require additionalattention. The monitoring and controlling method cluster not solely monitors and controls the work being done at intervals a method cluster however conjointly monitors and controls the complete project effort. In multiphase projects, the monitoring and controlling process group coordinates project phase in order to implement corrective or preventive actions to bring the project into compliance with the project management plan. The review can result in recommended and approved updates to the project management plan. Monitoring and Controlling processes occur at the same time as processes contained within other Process Groups. Thus, the Monitoring and Controlling Process is pictured as a “background” Process Group for the other four Process Groups shown in Figure 2.2 & 2.3.

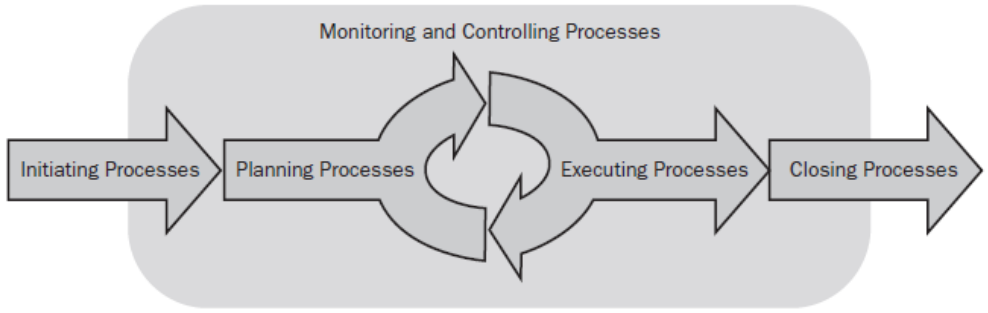


Figure 2.2:-Single phase of project

(Source PMBOK Guide _5th _Ed, 2013)

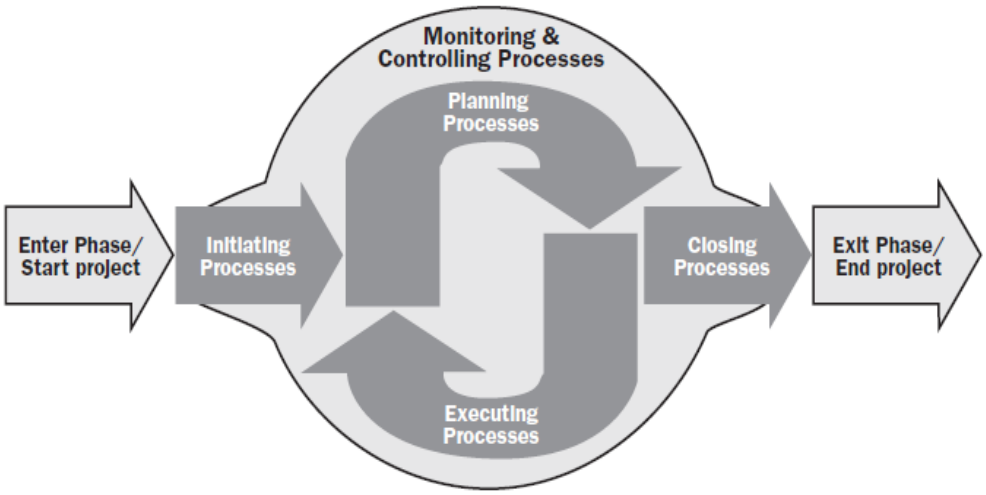


Figure 2.3:- project monitoring and controlling process

*(*Source PMBOK, 2013)

2.4.3. Project Information

Throughout the life cycle of the project, a significant amount of information and data is collected, analyzed, reworked, and distributed in numerous formats to project team members and alternative stakeholders. Project information area unit collected as results of numerous corporal punishment processes and area unit shared inside the project team. The information could then be communicated verbally or hold on and distributed as reports in numerous formats.

According to PMBOK 2013 the project information area unit continuously collected and analyzed throughout the dynamic context of the project execution. The indiscriminate use of those terms will result in confusion and misunderstandings by the varied project stakeholders. The following pointers facilitate minimize miscommunication and facilitate the project team use acceptable terminology:

Work Performance data. The raw observations and measurements known throughout activities performed to hold out the project work. Examples include reported percent work physically completed, quality and technical performance measures, begin and end dates of schedule activities, variety of amendment requests, variety of defects, actual prices, actual duration, etc.

Work Performance information. The performance information collected from numerous controlling processes, Analyzed in context and integrated supported relationships across areas.

Work Performance reports. The physical or electronic illustration of work performance data compiled in project documents, supposed to come up with choices or raise problems, actions, or awareness. Examples include status reports, memos, justifications, information notes, electronic dashboards, recommendations, and updates.

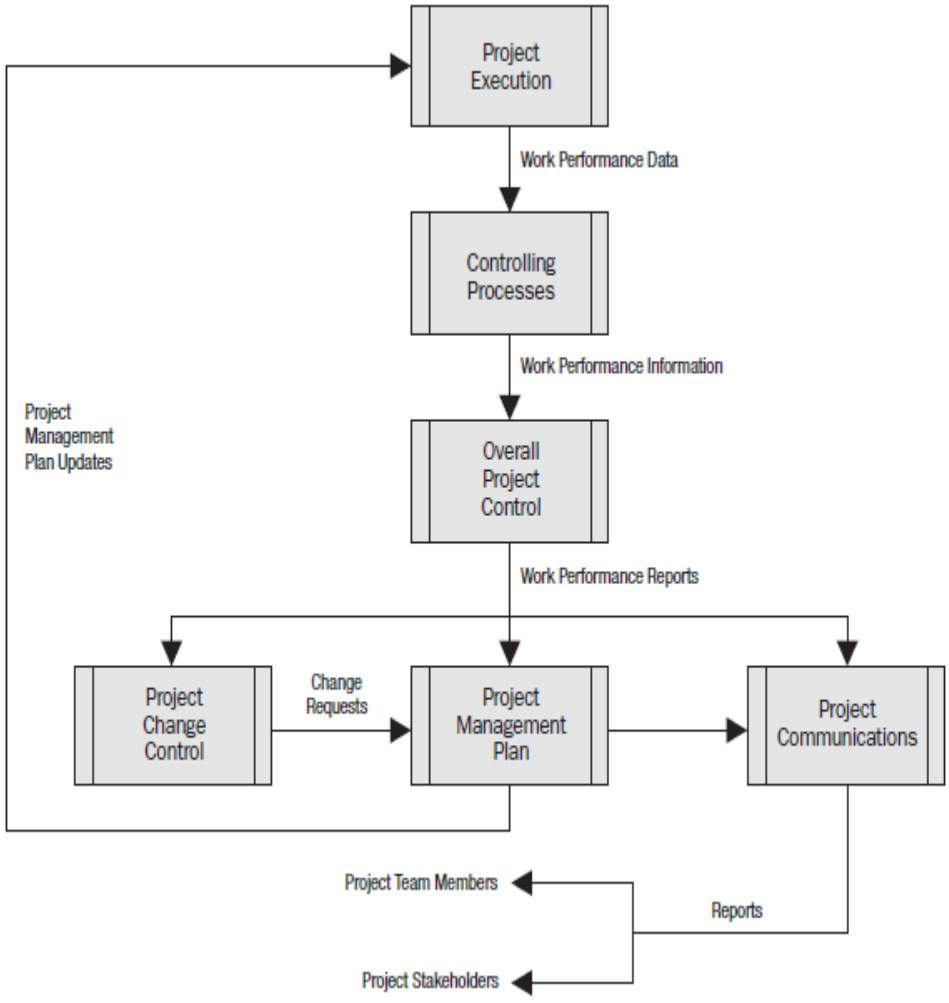


Figure 2.4:- Project data, information and report flow (Source PMBOK, 2013)

2.4.4. Design the project Monitoring System

The design project monitoring system is for begin, one has to reestablish the needs of a project monitoring system. It should be emphasized that, whereas a project monitoring system could be a method of comparison actual use of inputs and completed outputs with planned use of inputs and planned completed outputs, the aim of a project monitoring system is to produce info to stakeholders that may be accustomed create choices throughout the implementation of the project (Burke, R, 1999 Then, through group action, teams will establish the attainable stakeholders during a project. Among these may well be the beneficiaries, the project management workers, regional and national ministry officers, and also the donors /financiers.

Once this is often done, it's necessary that clear plan of the way to accomplish monitoring whereas guaranteeing maximum benefits is place in situ. It is thus instructed that before beginning of a project, a discussion ought to guarantee to undertake and establish these. Among them might be: straightforward, quickly provides information for corrective action, price effective, flexible, accurate, comprehensive, relevant, accessible, results in learning, transparent, and shares information up and down (According toPMBOK, 2013).

Generally, the design project monitoring system is to provide a conceptual framework that may be used in designing a project monitoring system as following;

- ✓ Identify special characteristics of performance, Cost, and time that need to be controlled in performance characteristics should be set for each level of detail in the project.
- ✓ Real time data should be collected and compared practices the plans this mechanisms to collect of data must be designed.
- ✓ Avoid tendency to focus on easily collected data
- ✓ One way of linking planning and control is to monitor project progress on MSP Gantt chart.

2.5. Project control factors

Control is defined as a task, as a method, associate degreed as an outcome (Olawale and Sun, 2010). Control is additionally mentioned as a practice, a system and a problem (Isaac and Navon, 2014). The difficulty of agreeing on a normally accepted definition is also owing to the burdensome variety of ability sets required to live, monitor, analyze, report and re schedule comes. Ma et al (2014) known five high

project manager skills, however management isn't on their list. DelPico (2013), on the opposite hand, writes that management could be elementary social control factors ability necessary for all project management roles. Thus, all construction managers would like expertise and information of the aim, perform and processes of management among comes. This knowledge is embedded in project management tools and methodologies (Rozenes et al, 2006).

Therefore, during this report the term ‘construction project factors practitioners United Nations agency all have expertise with a variety of styles of construction comes and project control mechanisms (LeyBourne and Sadler-Smith, 2006).

In addition, the dynamic nature of a construction project (Bakry et al, 2014) is best understood from a systems perspective as a result of improvement in productivity needs measures of more than one form of activity. The advanced interaction between activities of construction comes involves factors like work readiness, work flow dependability, materials provision, etc. (Vanhoucke, 2012). To determine the project factorsis distinguished from project designing in two importantways :(Jorgen Dahlgren, 2010).

1) project control factors yields a set of designs, decision and actions, whereas project planning yields a design, and
2) Project control factors areal time process during the implementation, not before the implementation begins.

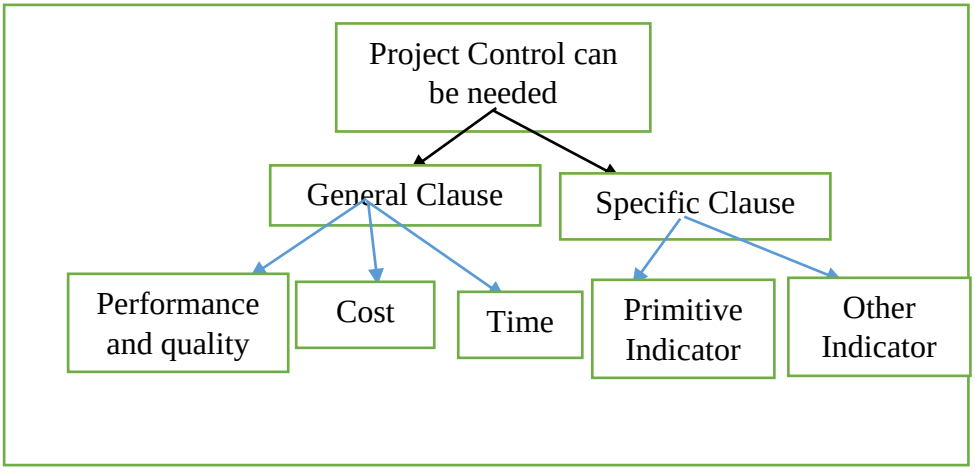


Figure 2.5:- Project Control (Source Meredith and Mantel, 2006)

General Clause (Meredith and Mantel, 2006)

a) **Performance**

- ✓ Unexpected technical problems arise
- ✓ Sufficient resources are not available when needed
- ✓ Quality or reliability problems occur
- ✓ Owner/Client requires changes in technical specifications

b) **Cost**

- ✓ Reporting of the monitoring results are poor/late.
- ✓ Project budgeting for contractor cash flows not done right.
- ✓ Changes in market prices of the inputs.

c) **Time**

- ✓ Technical difficulties require more time to solve
- ✓ Scope of work increases
- ✓ Unexpected utilities needing relocation

Specific Clause (Meredith and Mantel, 2006)

a) **Primitive Indicator**

- ✓ May be biased.
- ✓ Do not consider that progress may be overestimated or underestimated due to:
  - execution of unscheduled work done, or
  - execution of more work of low value and less work of high value
- ✓ More resources or less resources have been used than planned
- ✓ Activities are taking longer than planned
- ✓ Cost of activity (or of project to date) is higher than expected

2.5.1. Resources for Project Control

a) **Money:-** Factors a direct resource that use rather to influence the amounts or quality of other resources

b) **Equipment:-** Often used to augment labor in order to speed up project can be expensive and may involve renting or purchasing factors

c) **Material and Supplies: -** An increasing in quality or quantity may be necessary to enhance project control to improve for materials factors.

d) **Manpower: -** Project problem (time delays, excess costs, poor performance, etc.) are partly due to the human element (action or inaction). In Using

Manpower as a tool for project control factors, PM encounters human emotions (anger, fear, frustration, etc.)

2.5.2. Elements of project control factors

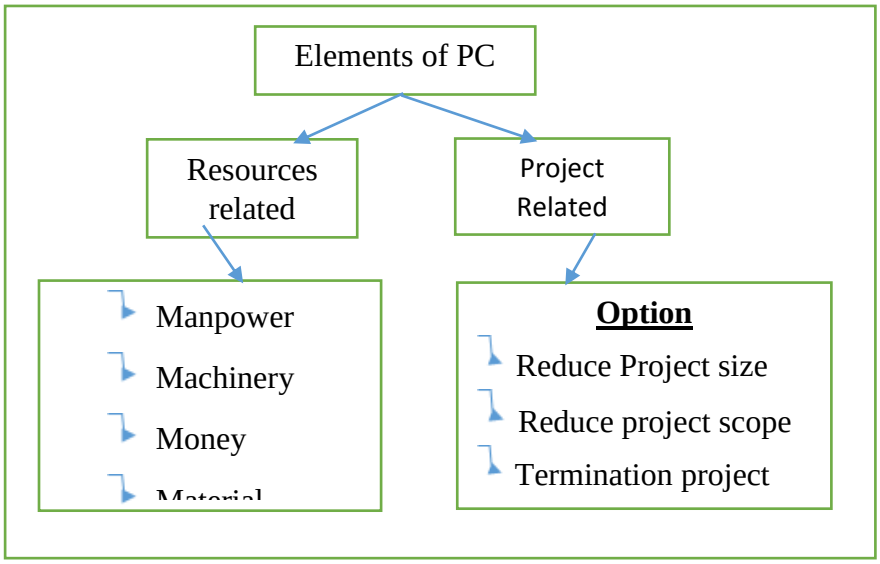


Figure 2.6: - Element of Project control

2.5.3. Mechanisms of Project Control

The Control in most Project Monitoring fall into this category (Cooper, 1994; Meredith and Mantel, 2006) to testing see if some specific precondition has been achieved. Actively time completed and cost completed within budget.

2.5.4. Measures of control factors

In practice, a control system consists of making measures of performance; According to (Saad H. Al-Jibouri 2003) judging these against standards, and taking any necessary control action. The effectiveness of control is an amalgam of the effectiveness of each of these features.

In this work control action is assumed standard and the efficiency of the control system is directly related to the content and clarity of the information provided by the monitoring system. There are many different means by which a project control system can indicate efficiency or inefficiency. To be effective, a project control system must draw the project management's attention to problem factors areas.

2.6. Factors thataffect monitoring and Control practices

The factors that affect projectmonitoring and control factors are scope factors, quality factors, costfactors; schedule factors, communication factors and Stakeholder

engagement factors are the basic projectmonitoring and control areas which have direct factors that effect on project results.

2.6.1. Integrated change factors

An integrated change control factor involves identifying, evaluation and managing changes throughout the project life cycle. View project management as a process of constant communications and negotiations for plan change and establish a Forman change control system, including a change control Board (CCB) use good configuration management. Define procedures for making timely decisions on smaller change, use written and oral performance reports factors. Identify and manage change, use project management and other software to help manage and communication change factors.

According to PMBOK fifth edition 2013 The process factors that affect all change requests; approving changes and managing changes to deliverables, organizational process assets, project documents, and the project management plan; and communicating their disposition.

Three main objectives of change control:

- ✓ **Influence-**the factor that creates changes to ensures they are beneficial.
- ✓ **Determine-**that a change has occurred to factors
- ✓ **Manage-**actual changes when and as they occur to factors

2.6.2. Scope factors

A project scope factors that's too broad and grandiose will cause severe issues. Scope control factors are involves dominant changes to the project scope. It is very difficult to make an honest scope factors statement and WBS for project even tougher to verify project scope factors and minimize scope changes factors. Scope factors verification involve formal acceptance of the finished project scope by the stakeholders factors. Acceptance is commonly achieved by a client review then log off on key deliverables.

According to Fred, et al., 2016 Project scope factors is that the overall definition of what the project is supposed to accomplish, and a particular description of what the tip result ought to A major part of scope factors are that the quality of the ultimate product. The amount of your time place into individual tasks determines the quality of the project. Some tasks might need a given quantity of your time to complete adequately, however given longer might be completed exceptionally. Over the course of an outsized project, quality will have a big impact on time and value (or vice

versa). Scope management is that the ability project managers use to outline the work that has to be done on any given project (PMI, 2013; Armstrong, et al., 2013; Dobson, 2004; Dobson, et al.,2007; Wayngaad, et al., 2012).

According to PMBOK fifth edition 2013 management Scope is that the method of observance the standing of the project and products scope and managing changes to the scope baseline. The key advantage of this method is that it permits the scope baseline to be maintained throughout the project. Goal of scope control are to:-

- ✓ **Influence** the factor that causes scope changes.
- ✓ **Assure change** is processed according to procedures developed as part integrated change.
- ✓ **Manage change** when they occur
- ✓ Tools for performing scope control include a change control system and configuration management. **Variance** is the difference between planned and actual performance

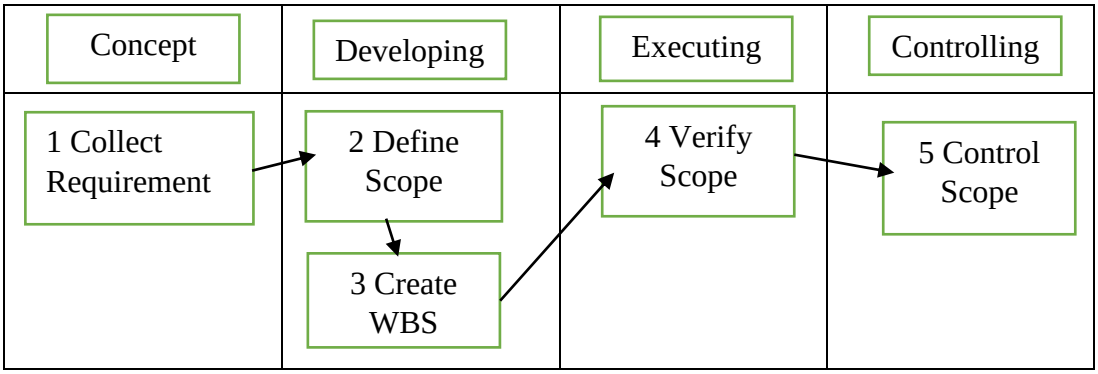


Figure 2.7: - Scope Management process

2.6.3.Schedule factors

Control Schedule factors are that the method of monitoring the standing of project activities to update project progress and manage changes to the schedule baseline to realize arranges. The key advantage of this method is that it provides the means that to recognize deviation from arrange and take corrective and preventive actions and therefore minimize risk (According to PMBOK fifth edition 2013).

The Control of project schedule factors may be a very important half within the method of project construction, particularly for those comes that take into account project time and budget as targets. Delivering project on time or not has much to try

and do with earning or losing a profit and/or a comeback on investment for parties (Liu Jun-yan, 2012).

During project execution, however, project schedules area unit littered with uncertainties in weather, design, labor efficiency, equipment efficiency, site conditions, etc. Those unsure factors might directly or indirectly cause schedule risks. It is well-known that bar charts and CPM area unit strictly settled in nature while not considering uncertainty. In the CPM and bar charts, those length values can't be modified by numerous risk factors that cause lead appropriate crucial path identification and a defective completion time (Liu Jun-yan, 2012).

The Schedule factors needed to supply a deliverable is estimated using several techniques (Fred, et al., 2016). One technique is to spot tasks required to supply the deliverables documented during a work breakdown structure. The work effort for every task is calculable and people estimates area unit rolled up into the ultimate deliverable estimate, the project time. Tasks area unit prioritized, dependencies between tasks area unit known, and this information is documented during a project schedule. The dependencies between the tasks will have an effect on the length of the general project, as will the supply of resources. Restricting the schedule affects either the price or scope. The a lot of resources performing on a task equates to a better value for task completion (PMI, 2013; Armstrong, et al., 2013; Dobson, 2004; Dobson, et al., 2007; Wayngaad, et al., 2012).

Schedule Control is concerned with:-

a) **Influenced** the factors that affect create schedule changes to ensure that changes are agree upon,
b) **Determined** that affect the schedule has changes, and
c) **Managing the actual changes** when and as they occur. Schedule control must be thorough integrated with the other control processes, as described.

The purpose of scheduling is to organize and allocate the resources of, equipment and labor with the construction project's tasks over a set period of time. Benefits of good scheduling include, avoiding project bottlenecks, allowing for suitable procurement or necessary materials, and overall ensuring that the project is completed as quickly as possible. Poor scheduling can result in unnecessary waste of time caused by delays as laborers wait for materials of equipment to become available or proceeding tasks to be completed (Hendrickson 1998).In order to successfully schedule a project, there must

be some methodology to the process. For the basis of this study it will be assumed that computer based scheduling is applied. Proper applications of scheduling factors that affect will help avoid unnecessary delays and in turn reduce cost overruns.

Employee Training/Skills: - Employee training benefits are much under or over estimated. Overall, investing in employee training programs will increase productivity and reduce costs caused by rework and lost time.

Employee Age: Many studies suggest that the "working class" is aging, which is leading to a shortage of young skilled workers. The shortage is caused by the retirement of the baby boom generation and popularity within the younger working class to opt for office oriented jobs. Current solutions to this growing problem include a strengthening and modernization of the nation's vocational school system.

Temperature/Humidity: -When not scheduled adequately, weather can cause delays due to forced changes in the schedule as well as damages causing rework. Productivity decreases in poor weather conditions for many reasons. Some construction processes are affected poorly by suboptimal weather conditions. Hot weather, in particular, has both a physiological and psychological effect on workers. Psychologically workers tend to become restless and irritable. Physiologically they can acquire heat cramps, heat stroke, heat exhaustion, etc. The four factors in a hot environment that cause the increased stress include: Humidity, Air Movement, Air Temperature and Heat Radiation (Schwarzkopf 1995). The most effective solution to curb the effect of inclement weather is planning with a consideration for seasonal conditions. Forecast bad weather and plan weather sensitive activities accordingly. In otherwise, build some amount of flexibility into the work schedule to allow for weather delays conditions.

1) Control Schedule Process Group

Control schedule is that the last method of your time management information space as explicit within the (PMP, 2008) coaching course. During the opposite method teams that precede management Schedule, we've determined the project activities, outlined the link of activities, calculable the length of activities and at last reached This schedule should be controlled throughout the project whether or not actual results square measure aligned with the planned values. And PMP Project Management course tells America that this is often drained management Schedule method cluster. In this article, we tend to square measure reaching to outline what

management schedule method is and list what square measure the most activities that should be done drained management schedule.

Control schedule is that the method of monitoring the standing of the project activities to update project progress and manage changes to the schedule baseline to attain the plan. After develop schedule method is complete, you'll have the project schedule and it'll embrace begin and finish dates of every project activity. During project execution, actual results of the project can disagree from the planned values. While some activities may be completed prior to planned, some activities can take longer to finish. During management schedule method, actual results of the activities are going to be compared with the schedule baseline to work out any variances.

During monitoring and controlling schedule method, project managers should live against the plan and management the project. If there's a variance supported the schedule performance management, and if the project cannot be completed on time, corrective actions should be planned and brought. For instance schedule compression is planned to finish the remaining project activities prior to plan to finish the project on time.

During project execution, if factors inflicting several changes square measure found, these factors should be eliminated to stop or prevent the basis reason behind changes. If they can't be eliminated, the impact of these factors should be decreased by taking preventive actions.

2.6.4. Cost factors

The cost controlfactors are also a vital ingredient for a successful project. The first step of cost control is to identify the factors that affect project costs. The existing factors can be divided into two major categories: quantitative factors and qualitative factors. Currently, the AEC industry researchers have given many efforts to develop techniques that only consider quantitative factors and ignore qualitative factors such as “client priority on construction time, contractor’s planning capability, procurement methods and market conditions including level of construction activity” (Elchaig, et al., 2005). Due to a great number of factors that need to be considered, it is difficult to predict the exact cost to complete construction projects (Gould, 2004). It is common to see that the final project cost is higher than the budgeted cost. It was reported that a cost overrun is one of the main problems in the AEC industry (Reina, at el., 2002).

Peters, et al., 2008 stated the biggest cause of cost overruns is inaccurate estimation at the beginning of a project.

An estimate is a general evaluation of the future project cost, and the budget represents the amount of money that the stakeholders would like to invest. The more accurate the estimate is, the closer the budget is to the actual cost, which means the profit is closer to what the project participants expect. According to Cleland, et al., 2002 cost control factors is the process of monitoring; evaluating and comparing planned result with actual results to determine the status of the project cost, schedule reducing the project cost will most likely affect the project negatively as it could mean a reduction in scope. The more resources assigned to a project to shorten the schedule or meet increased scope, the more the cost will increase (PMI, 2013; Armstrong, et al., 2013; Dobson, 2004; Dobson, et al., 2007; Wayngaad, et al., 2012).

A project cost control is an attempt to restrict the actual costs within the budgeted costs. Variances between the actual and budget costs a proper corrective action will be carried out when any cost overrun is found. Project costs are all expenditures that occur on construction site including both direct and indirect costs. The level of the control depends on the breakdown structure of project costs into the number of individual cost centers. A cost center is the finest unit of control. The actual cost of each cost center is cumulated over time. A cost overrun that is lately discovered may not be able to correct.

Guo-li (2010) stated that the main cost of a project includes staff cost, material cost and delay cost. To control these costs, managers should first set up a cost control system to:

a. Allocate responsibilities administration and analysis of financial data.
b. Ensure all costs are properly allocated against project codes.
c. Ensure all costs are genuinely in pursuit of project activities.
d. Ensure contractors. Payments are authorized.
e. Check that other projects are not using the budget.

According to (Adjei, et al., 2017) cost control is the process of monitoring; evaluating and comparing planned result with actual results to determine the status of the project cost andschedule. The table 2.8 below shows the summary of cost control identified from different countries

Table 2.1:-Cost control literature reviews

S/NO	Source	Country	Cost of Control
1	(Kirun and Var ghese,2015)	India	Improper planning and scheduling, ineffective planning, reworks due to errors, due to defective work, wastage of materials, design changes, additional works, currency value, fluctuation in material cost and increase in interest rate
2	(Sanni& Hashim, 2013)	Nigeria	Improper contract document, engagement of inexperience staff, unstable market condition, complexity of the project, unstable government regulations, choice of procurement method, lack of research and innovation, price and design risk, quality factors of cost information, non-provision of training of young professionals, inadequate access to software packages, non-clarity of exclusions, and ineffectiveness of professional bodies.
3	(Ademola, 2012)	South Africa	Lack of knowledge on the use of available tools and technology, Abandonment of complicated strategies
4	(Song, 2014	china	Using obsolete methods and concepts Over emphasizing results, and ignoring the process of PCC Lacking PCC processes and systems suitable to the

			Enterprise Lack of consistency in cost management by managers' Serious decision failure, exorbitant marketing expenses.
5	(Charoenngan&Sriprasert, 2001)	Thailan	Difficulty in monitoring different sources of day-to-day cost data
6	Authors con struct,2017		Poor attitude towards ICT usage Lack of financial commitment in projects

Source: - Literature review (ICAST, 2017)

Control Costs is the process of monitoring the status of the project to update the project costs and managing changes to the cost baseline. The key benefit of this process is that it provides the means to recognize variance from the plan in order to take corrective action and minimize risk (According to PMBOK fifth edition 2013).

Cost Control factors are concern with:-

a) **Influenced** the factors which create changes to cost baseline to ensure that changes are beneficial,
b) **Determined** that the cost baseline has changed, and
c) **Managing** the actual changes when and as they occur.

2.6.5. Quality factors

Quality control is taken into account to be the method of testing and inspecting material and craft or workmanship for compliance with the specifications and therefore the applicable codes. This method is additionally compact by the kind of organization, contract format and therefore the project life cycle. Quality control could also be studied in an lump sum contract atmosphere and inside the execution and end stages of the project life cycle. Also, quality control is extremely associated with each price and schedule functions. Furthermore, quality could also be thought of as a product of price and schedule management (Atalla, 1996).

Quality Control is that the method of monitoring and recording results of execution the standard activities to assess performance and suggest necessary changes. The key benefit of this process includes:

- ✓ Identifying the causes of poor process or product quality and recommending and/or taking action to eliminate them.
- ✓ Validating that project deliverables and work meet the requirements specified by key stakeholders necessary for final acceptance.

According to (Adebayo, et al., 2018) Quality control is considered to be the process of testing and inspecting material and workmanship for compliance with the specifications and the applicable codes. This process is also impacted by the type of organization, contract format and the project life cycle.

According to (Ishikawa 2016) Engineers who pass judgment based on their experimental data, must know statistical methods by heart. Control Quality the process of monitoring and recording results of executing the quality activities to assess performance and recommend necessary changes (PMBOK 2013). The key benefits of this process include:

a. Identifying the causes of poor process or product quality and recommending and/or taking action to eliminate them; and
b. Validating that project deliverables and work meet the requirements specified by key stakeholders necessary for final acceptance.

Alfred (1988) states that there are two measures for construction quality, they are accuracy and workmanship. Some benefits associated with quality control are avoided rework, generation of new work methods, and circumventing long term problems. Following is a list of key quality control factors that affect and quality problem areas that should be addressed within a jobsite quality inspection checklist. The list includes:

- ✓ Design requirements, Completed preceding work segments, Work done by qualified employees, Accepted materials used, appropriate amount of materials. Scope of work requirements achieved, Installation specifications met, Entire work phase complete and all quality problems have been fixed

2.6.6.Communication factors

Communication is therefore necessary to project success that it's been stated because the lifeblood of a project by over one professional. Project team members have to be compelled to collaborate, share, collate and integrate information and information to appreciate project objectives. Therefore, it's necessary to grasp the method of communication. At its most elementary level, communication consists of three

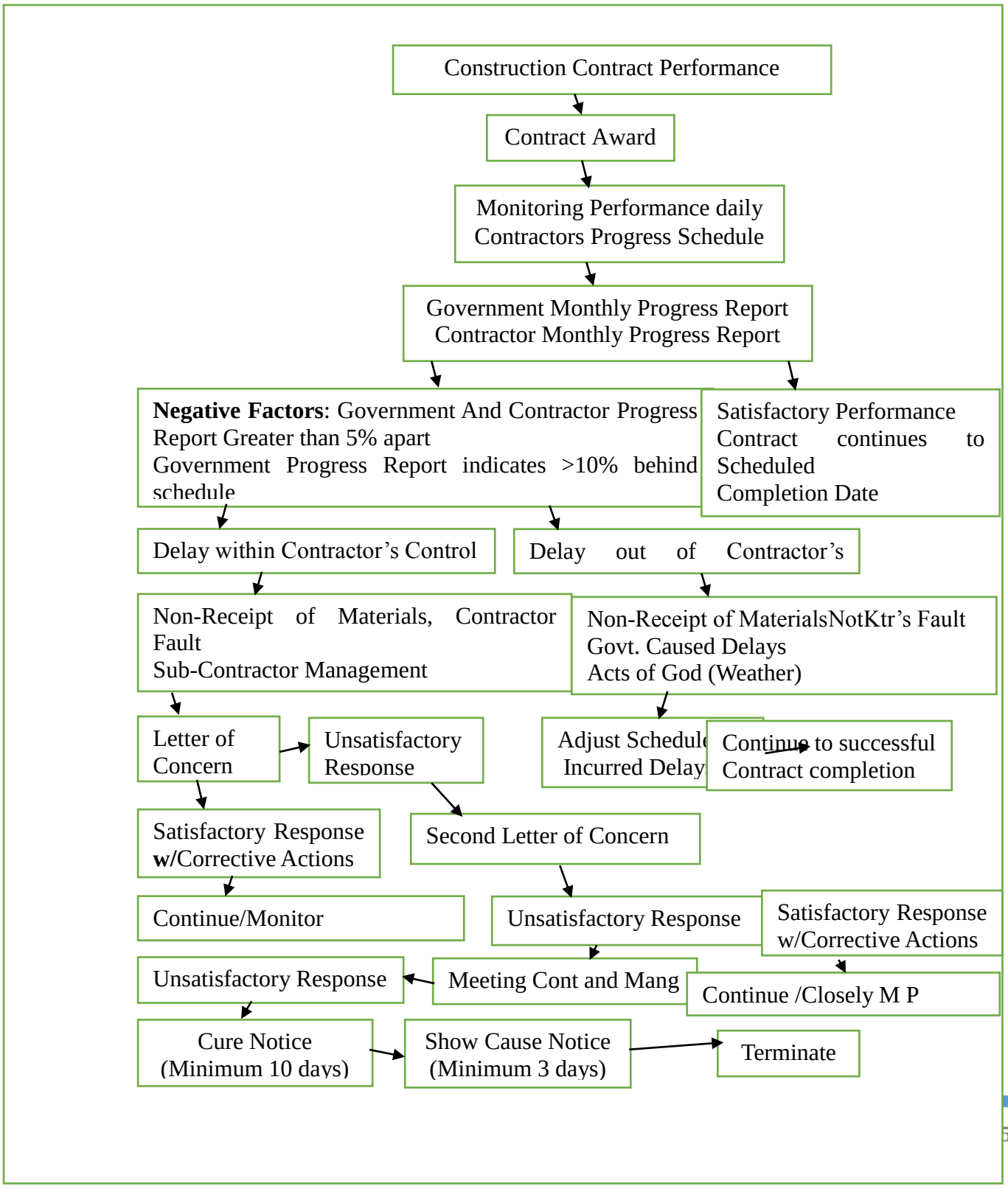
components: a transmitter/sender, a transmission channel/medium and a receiver (BG Zulch, 2014). The communicated message flows from the sender, encodes the message through the transmission channel/medium by a verbal or non-verbal technique, to the receiver that decodes the message. To ensure effective communication, all parts should operate to forestall misunderstanding. The sender is that the start line of the communication cycle and contains a purpose to speak. The reason for communication in project management could also be letter of invitation for information, causation information, asking queries, giving associate instruction, building groups or networking. The success of communication primarily depends on the sender's ability to talk, write, reason and listen competently.

Communication management is that the method of monitoring and controlling communications throughout the whole project life cycle to make sure the knowledge desires of the project stakeholders are met. The key advantage of this method is that it ensures associate best info flow among all communication participants, at any moment in time (PMBOK 2013).

The management Communications method involves the activities that are needed for information and communications to be monitored, acted upon, and discharged to stakeholders. Project communications return from multiple sources and will vary considerably in their format, level of detail, degree of ritual and confidentiality. Managing a project needs constant merchandising and reselling of concepts, explaining the scope and methodologies of the project to various teams of individuals (the public, management, purposeful departments and alternative stakeholders), threatening or talks with service suppliers and suppliers, or negotiating to settle disputes or social conflict between project team members or alternative stakeholders.

Good communication is critical to with efficiency complete a project. Lack of comfortable communication will result in lack of employee motivation. Lack of communication will cause delays thanks to mistakes inflicting work, lack of knowledge inflicting time period, and mistaking. Although endless choices for communication are on the market, technical issues do exist. Other common issues related to communication on construction comes embody understanding the chain of command and unendingly act regarding the project and foreseeing potential issues within the future. This can be avoided by holding regular project management team conferences (Cingoranelli 2007).

The main reason behind this downside is poor communication due to inaccurate directions and inaccurate drawings. The most common sort of communication is verbal and, moreover, face-to-face. The other reason is that almost all of the acquiring used ancient or traditional approach.



All decision point determinations will depend upon the gravity of that situation, overall performance,

Source: - Literature review (ECPMI, 2008)

Figure 2.8:- Communication control within contract performance

2.6.7. Stakeholders Engagements Control

Stakeholder's engagements factors of control are the process of monitoring overall project stakeholder relationship and adjusting strategies and plans for engaging stakeholders. Control stakeholders Engagement areProject Management Plan, Issue logs, work performance data and project document Tools and Techniques of information management systems, Expert judgment, meetings. Stakeholders Control Work performance information, change requests, project management plan updates, project document updates and organizational process assets updates (PMBOK et al, 2013). Stakeholders is defined by Cooper (2004) as "the process that directs your people's work energy.

People's behavior is affected by motivation that successively ends up in a committed energy throughout the work. Some guidelines for increasing motivation inside the work include: give a secure work setting, acknowledge sensible behavior, Show appreciation, and Set attainable goals, Develop a good pay system and supply adequate training programs (Cooper 2004).

2.6.8. Project monitoring & control impact

The Project monitoring and controlling of careful designing, determination, and application of metrics and development of corrective or preventative actions is to maximize the alignment between planned work and actual work to deliver the meant product or service. Effective monitoring and controlling affects the project monetary, schedule, and quality results. Financially, there is also no larger waste than process.

According to PMBOK 2013 context is Project Monitoring and Control should be planned beforehand of project work commencing. The Project Manager, project team, and alternative stakeholders should determine what is going to be measured, however progress are measured, and once the Monitoring cycle can occur of factors that affect. The Project Manager should actually implement the plan, though, and follow through to spot or identify new risks and continue the reiterative method of project set up refinement through amendment requests. To maximize impact for flourishing completion, project Monitoring and Control should be planned for and enforced

systematically. There is no guarantee for fulfillment in each project. But higher designing, preparation, Monitoring and application of plans may result in drum sander sailing on the approach.

2.6.9. Change Monitor and Control factors

Adebayo,et al., 2018states that dynamic changes of project surroundings or environment can influence the method of project implementation, the project itself and will cause heightened risk. When winding or carrying up some activities, the ways totally different from that within the original arrange should be wont to keep the method moving forward (as knowledgeable beneath practice). Therefore, changes area unit inevitable and want to be managed throughout project life-cycle. An effective amendment system should be established to confirm amendment procedure is evident and unambiguous and straightforward for worker to request amendment or change. And the following things ought to be concerned:

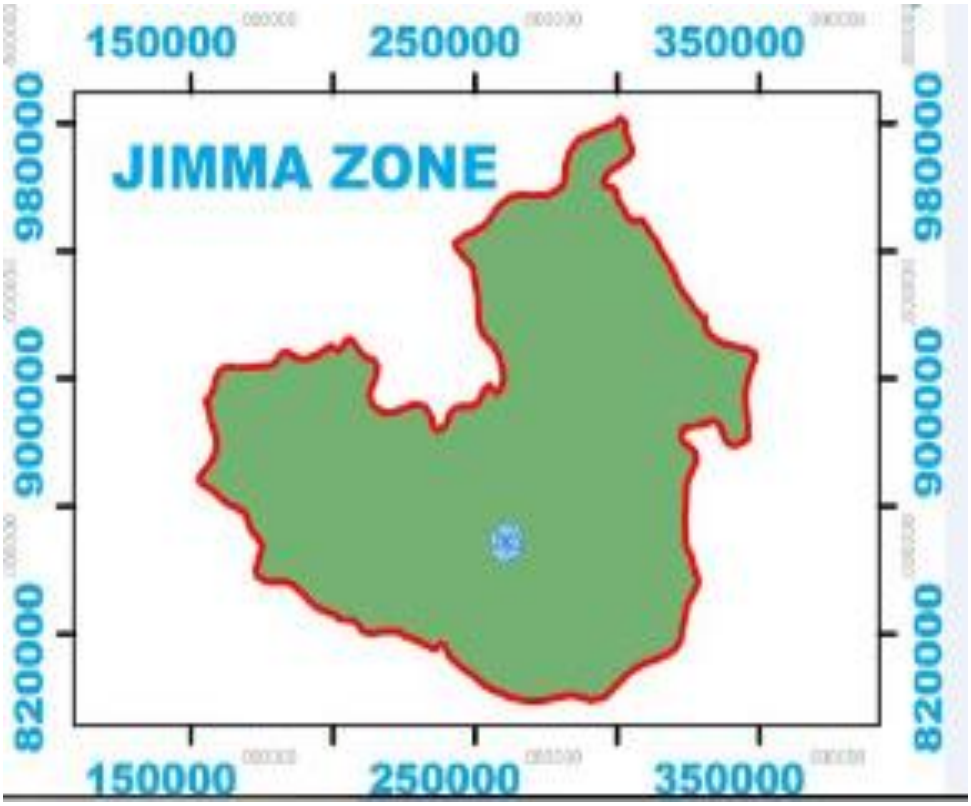
a. Monitoring and statement key factors that generate amendment or changes to confirm.
b. Ensuring that change is beneficial factors
c. Request for amendment should be checked by suitable person before being approved
d. Changes ought to ensue once it's approved and be monitored to see whether or not it worked for sure expected.

CHAPTER THREE

METHODOLOGY

3.1. Study Area

The research would be concerned with an assessment of the project monitoring and controlling practices on public building. It would be on done the study monitoring and controlling practices on selected public building in Jimma Zone at wareda level.



Source (Jimma Zone Districts Socio Economic Profile, 2001 E.C)

Figure 3.1:- Map of research area- Oromia region Jimma Zone

3.2. Study design

Research design is that the overall arrange for getting answers to the queries being studied and for handling a number of the difficulties encountered throughout the analysis method. Research design is an action plan for getting from here to there where here may be defined as the initial set of questions to be answered, and there is some set of conclusion (answers) about these questions. Between here and there were a number of major steps, including the collection and analysis of relevant data (Al-Moghany, 2006). The structured questionnaire was probably the most widely used data collection technique for conducting surveys to find out facts, opinions and views. Interviews can be classified according to the degree to which they were structured. In

an unstructured or nondirective type of interview the interviewer asks questions as they come to mind. On the other hand, in the structured or directive interview the questions were specified in advance (Agyerum, 2012).

In a quantitative study, the steps involved in conducting an investigation were fairly standard (Al-Moghany, 2006). In this study, interviews, structured questionnaire and site visits were used in the gathering of data. The interviews were adapted to collect detailed information about respondent experiences and impressions about project monitoring and controlling practices on public building Construction. It was also used to collect preliminary information to help in structuring the questionnaires. The questionnaire survey was also adapted to get feedback on opinions of respondents‟ about project monitoring and controlling practices on public building in Jimma zone construction.

The site visits involved observations where the researcher sought to find out how project monitoring and controlling practices and also to provide a compendium on factors of project generating building in the construction industry.

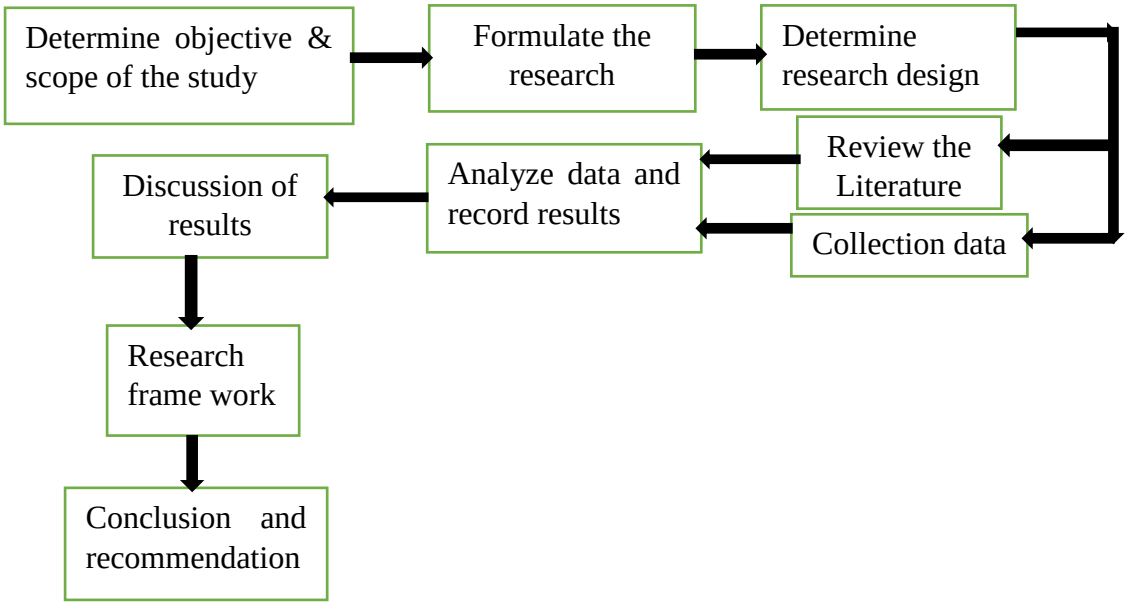


Figure 3.2:- The Research frame work

3.3. Study variables

Dependent variables of the study was Project monitoring and controlling practices which depend on the scope factors, cost factors, schedule factors, quality factorsstakeholder engagement factorsand communication factors

3.4. Sources of data

The study depended on both primary and secondary data. Primary data was made up of first hand data collected by the candidate through the use of questionnaires, interviews and site visits (observation). The secondary sources of data were obtained using relevant books, journals, magazines and research papers.

3.5. Research Instrument

The research data were collected mainly through interviews and questionnaires. Field observations through site visits were also employed to gather data on project monitoring and controlling practices.

3.5.1. Questionnaire Design

The questionnaire design was undertaken to determine the opinion of contractors, consultants, client and regulatory regarding the factors of project monitoring and controlling practices on public building construction projects in Jimma zone. The questionnaire was consists of three major sets of closed ended and one open questions on the factors of monitoring and controlling practices, the questionnaire further sought to obtain information on the level of knowledge of construction professionals on the concept of project monitoring and controlling practices on public building of construction in Jimma zone. Interviews and site visit were also used to obtain specific information about construction on building projects.

3.5.2. Structure of questionnaire

The questions were constructed using the ordinary scale. The respondents were asked to rank on a scale of factors project monitoring and controlling practices on public building construction sites where 5 = extremely factor, 4 = very factor, 3 = moderately factors, 2 = slightly factor and 1 = not factor.

3.6. Target Population

The term population refers to the mixture or totality of all the objects, subjects, or members that adjust to a collection of specifications. In quantitative studies, the investigator identifies the population to be studied throughout the look section. A smaller population may be studied additional extensively at a set value than a bigger population; therefore it had been vital or important to make a decision what population has very of essential importance.

3.7. Sample Size Determination

In order to evaluate and assess the project monitoring and controlling practices on public building construction projects in Jimma zone, a wide range of Construction parties involved in construction of projects were targeted.

Therefore, the following equation was used to determine theKish (1965) showed that the sample size (Moore et al, 2003):

$$Ss = \frac{Z^2 * P(1-p)}{C^2} \quad \text{..... \{Equation 3.1\}}$$

Where SS = Sample size

Z = Z worth (e.g. 1.96 for ninety fifth confidence level)

P = percentage selecting a alternative, expressed as a decimal (0.50 used for sample size needed).

C = margin of error (9%)

$$Ss = \frac{(1.96)^2 * 0.5 * (1-0.5)}{(0.09)^2} = 118.568 \approx 119$$

Correction for Finite Sample:-

$$SSnew = \frac{Ss}{1+\frac{Ss-1}{Pop}} \quad \text{..... \{Equation 3.2\}}$$

Where: Total sampled of construction parties = 140 match the proposed contracting companies

So, Pop = 140

$$Ssnew = \frac{119}{1+\frac{119-1}{140}} = 64.6 \approx 65$$

To ensure good representation of each stratum, the following was done:

Client = 42

$$\text{Ss new Clients} = \frac{42*65}{140} = 19.5 \approx 20 \text{ Clients}$$

Contractor = 63

$$\text{Ss new Contractors} = \frac{63*65}{140} = 29.25 \approx 29 \text{ Contractors}$$

Consultant = 15

$$\text{Ss new Consultants} = \frac{15*65}{140} = 6.96 \approx 7 \text{Consultants}$$

Regulatory = 20

$$\text{Ss new Regulators} = \frac{20*65}{140} = 9.286 \approx 9 \text{ Regulators}$$

3.8. Selected Sample construction parties

Based on the sampling method and criteria cited above, the researcher selected sixty five (65) construction parties which participated on public building projects in Jimma Zone.

3.9. Data collection

In this research, methods of data collection include questionnaire with personal interview and site visits. The site visits involved observations where the researcher sought to find out how monitoring and controlling practices; and to provide a compendium on high factors building construction used on those public building projects.

3.10. Analysis and Findings

The sample for this study was relatively small. As a result, the analysis had combined all groups of respondents (clients, consultants, contractors& Regulatory) in order to obtain significant results. Data was analyzed by calculating frequencies and Relative Importance Index (RII). The Relative Importance Index (RII) is calculated as follows (Aibinu and Jagboro, 2002).

$$\text{RII} = \frac{\sum W}{(A * N)} = \frac{1n1 + 2n2 + 3n3 + 4n4 + 5n5}{5N}$$

Where RII = relative importance index; W = weighting given to each factor by respondents (ranging from 1 to 5); A = highest weight (i.e., 5 in this case); and N = total number of respondents. The RII value had a range of 0 to 1 (0 not inclusive); the higher the RII, the more important was the factor of monitoring and controlling practices.

Where:

N = Total number of respondents

ni = the variable expressing the frequency of the *I* th response.

n5= Number of frequency 'extremely factor' response,

n4= Number of frequency 'very factor' response

n3 = Number of frequency 'moderately factor' response

n2 = Number of frequency 'slightly factor' response.

n1 = Number of frequency 'not factor response.

CHAPTER FOUR
RESULTS AND DISCUSSION

4.1. Results

This chapter describes the results that have been obtained from processing of sixty-five (65) questionnaires using Excel and Relative Important Index (RII). The results are prepared to present the information about the sample size, response rate and contracting companies‟ characteristics in Ethiopia especially; in Jimma zone. It also includes the ranking of factors of project monitoring and controlling practices on public building construction projects based on their relative mean ranks.

4.2. Part 1: General Organization Information

4.2.1. Classification of sample size

A total of 52 were received and valid from 65 respondents solicited as shown in the table 4.1 below.

Table 4.1:- Response rate

Item no	Classification	Target population	Questionnaire Distribution	Number of responses	Percentage of responses against Distribution (%)
1	Contractor	63	29	20	38.46
2	Consultant	15	7	6	11.54
3	Client	42	20	17	32.69
4	Regulatory	20	9	9	17.31
Total		**140**	**65**	**52**	**100**

4.2.2. Response rate

Out of the 65 questionnaires distributed on the contracting companies, 52 responses were received with 80% return rate in this study. The other 13 questionnaires as follows: 8 (12.31%) have not been received, 3(4.62%) are uncompleted and 2 (3.08%) are illogical or incorrect responses, see table 4.2

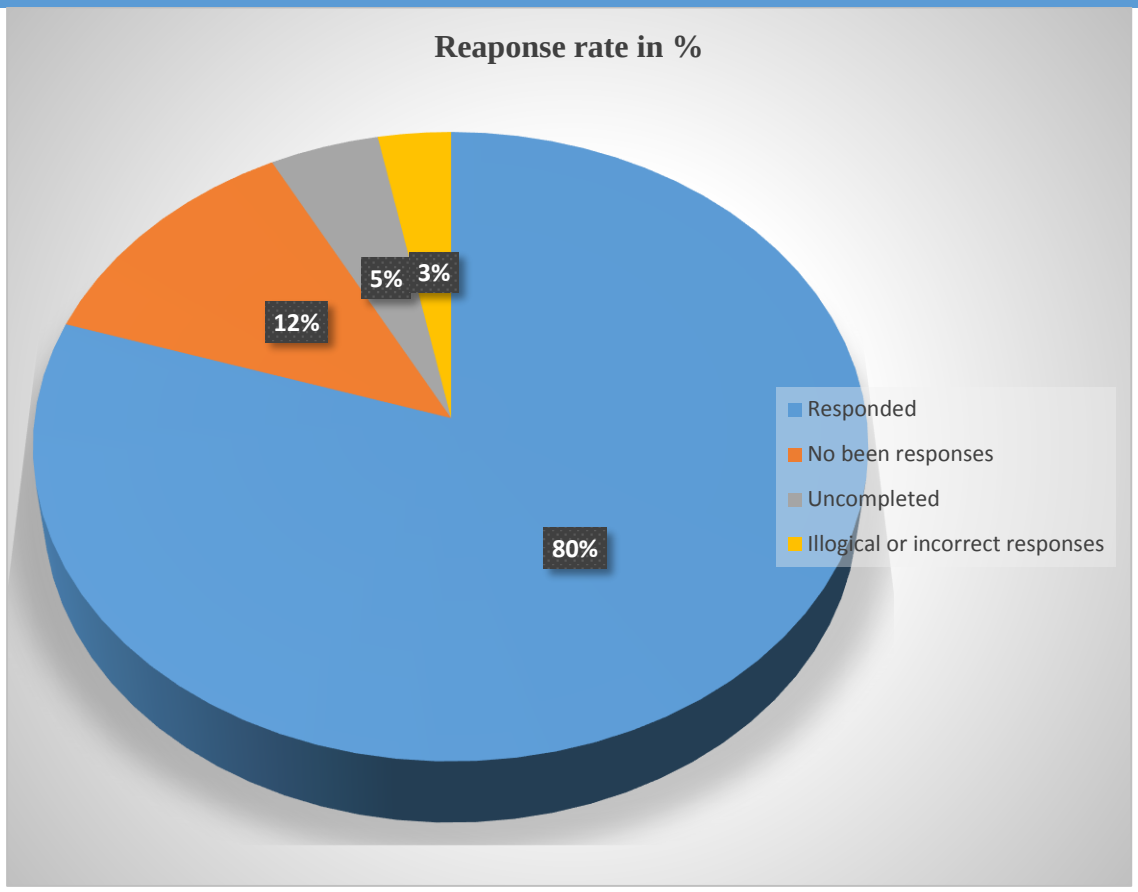


Figure 4.1:- Questionnaire Respondents rate

Table 4.2 represents the response rates among the groups of contracting companies, these rates are 68.97% Contractors, 100% Regulatory, 85.71% Consultants and 85% for Clients.

Table 4.2:- Response rate among the groups of construction parties

Companies classification	No. of Selected company sample	No. Relevant Responded	Not been received	uncompleted responses	incorrect responses
Contractor	29	20	7	2	
Consultant	7	6	1		
Client	20	17		1	2
Regulatory	9	9			
Total	**65**	**52**	**8**	**3**	**2**

4.2.3. Respondent's experience

Table 4.3:-Experience of respondent

Work experience	Amount of respondent
0__5	25
6__10	12
11__15	6
16__20	4
21__25	3
More than 25	2
Total	**52**

There for in table 4.3 shows the years of experience for the surveyed contracting companies in Jimma zone. About 25 of contracting companies have 0-5 years of experience and 12 of them have 6- 10 years of experience, 6 have 11_15 years of experience, 4 them have experience 16_20 years of experience, 3 they have 21_25 years of experience and while 2 of them have more than 25 years of experience.

4.2.4. Executed projects and their value during the last five years

Table 4.4:- Typical Size of Projects

Typical Size of Project	**No. of Projects**
0-10 Millions	53
10-100 Millions	12
> 100 Millions	0

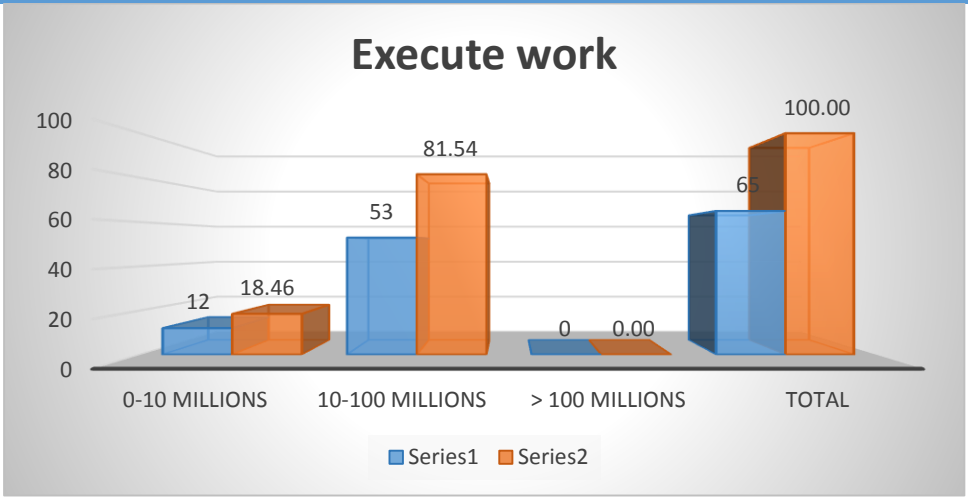


Figure 4.3:-value of the executed project during last five years

Since Series 1 is Number of respondent and Series 2 is percentage of respondent

The value of the executed projects during the last five years is illustrated in chart 4.3 (55.56%) the executed projects up to 10 million ETB ,(44.44 %) of the executed projects from(10_100) million ETB, (0%) executed projects of them with more than 100 million ETB.

4.2.5. Level of education of respondents

About 71% of respondents have bachelor degree and 10% have master's degree in level of education and 19 % of respondents acquire college training. This indicate that the respondent have enough education to assure the questionnaire and to provide their feedbacks regarding the factors that project monitoring and controlling practices on public building construction projects.

Table 4.5:-level of education of Respondent to questionnaire

Work experience	Amount of respondent	Bsc	Msc	Technical Level
0__5	25	24	1	
5__10	12	6	2	4
11__15	6	4	2	
16__20	4	2		2
21__25	3	1	0	2
More than 25	2	0		2
Total	**52**	**37**	**5**	**10**

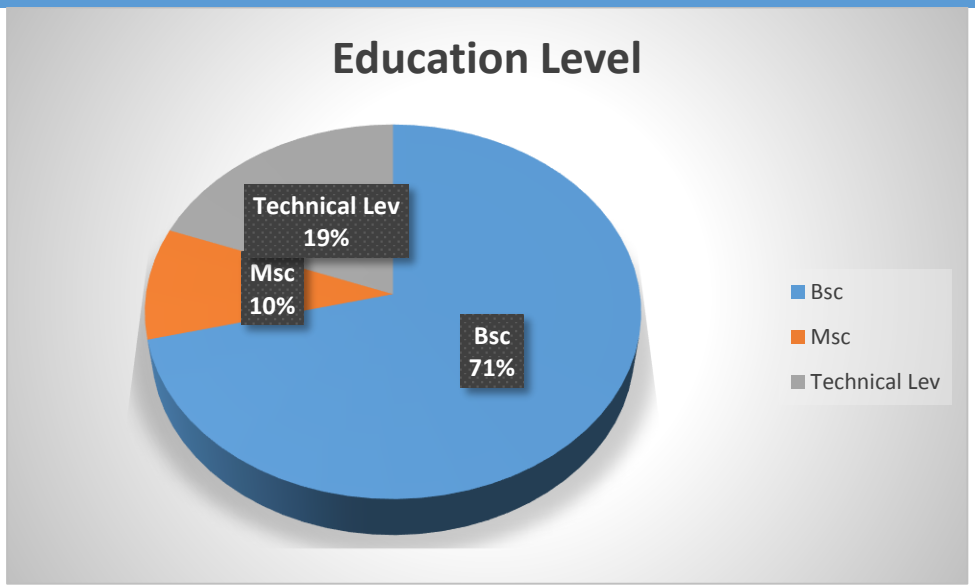


Figure 4.4:-level of education of Respondent to questionnaire.

4.3. The factors that affect monitoring and controlling practices

The results of this study provide an indication of the Relative Importance Index and Rank of Factors that affect monitoring and controlling practices on public building construction in Jimma zone. Table 4.6 below shows the summary ranking and Relative Importance Index of all factors.

Table 4.6:- Summary of RII of factors project M&C practices

Factor group	No	Factor of project monitoring and controlling practices	Respondent Scores					RII	Rank
			1	2	3	4	5		
Scope factors	1	Cause of boundary project	3	6	12	23	8	0.704	26
	2	Keep the scope realistic	8	11	10	18	5	0.604	39
	3	project scope management plan	6	4	12	25	5	0.673	32
	4	Scope baseline	9	11	16	12	4	0.565	48
	5	Change management plan	5	12	20	10	5	0.592	42
	6	Scope Variance	6	8	15	17	6	0.635	36
	7	Quantified evaluation of project	8	11	13	16	4	0.588	44
	8	Scope change within time, cost and quality change	0	3	5	21	23	0.846	6
	9	Delay in approving major changes in scope of work by consultant	3	5	8	22	14	0.750	20
	10	Project authorization confirmed with owner	10	11	12	14	5	0.573	46
Cost factors	1	Changes to cost baseline	3	10	15	20	4	0.646	34

	2	Cost performances to detect variances	0	6	18	21	7	0.712	24
	3	Determining resource requirements	4	8	12	18	10	0.685	31
	4	Performance report	2	7	16	19	8	0.692	29
	5	Ongoing control of project finances	0	5	12	18	17	0.781	17
	6	Cost planning during design stage	3	6	15	19	9	0.696	28
	7	Cost Variations	0	2	7	19	24	0.850	5
	8	In adequate design within site work	0	2	6	20	24	0.854	4
	9	Price fluctuations	0	3	1	21	27	0.877	1
	10	Modifying cost during construction	7	10	14	13	8	0.619	37
	11	Budget Updates	11	9	15	11	6	0.569	47
	12	Delay corrective Action	2	2	11	18	19	0.792	13
	13	Estimate at Completion	4	6	11	14	17	0.731	22
	14	Delays in decisions making	1	2	4	25	20	0.835	9
	15	Change Order by Engineer	10	15	14	11	2	0.523	52
Schedule factors	1	Schedule changes	1	2	3	21	24	0.838	8
	2	Managing the actual changes	13	13	12	10	4	0.519	53
	3	Using schedule Baseline	13	13	13	10	3	0.512	55
	4	Adopting realistic times for estimating;	13	11	12	12	4	0.535	50
	5	Construction Schedule (Master Schedule)	0	6	12	26	8	0.738	21
	6	Resource schedule	0	12	13	19	8	0.688	30
	7	Time /scheduling to minimizing variation	0	6	12	20	14	0.762	19
	8	Working as per schedule	1	5	9	21	16	0.777	18
	9	Additional Planning	0	6	6	22	18	0.800	11
	10	Schedule Updated	4	7	11	19	11	0.700	27
	11	Effect have schedule	3	6	12	22	9	0.708	25
	12	Use of Software and tools for Schedule control	10	7	12	20	3	0.596	41
Quality factors	1	Shortage of materials	0	2	3	24	23	0.862	2
	2	High quality of required works	16	16	13	4	3	0.454	59
	3	Quality inspection delay	12	15	15	8	2	0.496	54
	4	Rework due errors	15	16	12	5	4	0.473	57
	5	Produce quality deliverables	15	17	16	3	1	0.438	62

	6	Project Success in quality customer satisfaction	18	18	9	7	0	0.419	65
	7	Clear scope and quality of work control	12	20	13	5	2	0.465	58
	8	Poor quality of work as a result of shortage of funds	13	17	19	2	1	0.450	60
	9	Plan quality identifying quality requirements	15	19	13	5	0	0.431	64
	10	quality Policy, Procedures and Standards	19	18	7	8	0	0.415	66
	11	Poor quality of construction	1	0	8	24	19	0.831	10
	12	Effective quality planning	0	3	9	22	18	0.812	12
	13	Late delivery of materials	2	1	11	20	18	0.796	45
	14	Specification	3	7	9	20	13	0.727	23
	15	Control charts & analysis	6	10	12	16	8	0.638	35
Stakeholder Engagement factors	1	Lack awareness of all project	7	11	15	13	6	0.600	40
	2	Project team needs to identify engagement	9	8	17	13	5	0.588	44
	3	Payment delay	0	3	6	20	23	0.842	7
	4	Lack of follow up the work progress	1	3	10	23	15	0.785	15
	5	Ineffective project planning & scheduling	2	5	10	23	14	0.785	16
	6	Political situations	7	11	13	14	7	0.612	38
Communication factors	1	Written communication	9	10	19	11	3	0.558	49
	2	Electronic communication	18	12	17	3	2	0.442	61
	3	Oral communication	6	9	12	14	11	0.658	33
	4	Project communication plan	13	14	12	10	3	0.508	56
	5	Lack of communication b/n 3C's	0	1	6	22	23	0.858	3
	6	Lack of General support to contractor	4	0	8	23	17	0.788	14
	7	By communicating to reduce conflict of project	16	15	17	4	0	0.435	63
	8	The effectiveness of controlling information	12	11	14	15	0	0.523	51

Based on the above table 4.6, the top five factors that highly project monitoring and controlling practices is Price escalation1st(RII= 0.877), Shortage of materials 2nd(RII=0.862), Lack of communication b/n 3C's 3rd(RII=0.858), Price fluctuations 4th(RII=0.854) and Cost variations 5th(RII= 0.850).

4.3.1. Scope factors

Under Project scope control factor there are 10 sub factors are listed and each of them are ranked according to their relative importance index (RII) in their group and as a whole. Scope Control factor has been ranked sixth from 6 groups of factors that Project Monitoring and controlling practices with relative importance index of 0.615 which indicates that the factors listed under this group are least factor of project monitoring and controlling practices on public building construction projects. The relative importance index (RII) and rank of Project scope control factors are summarized in Table 4.7.

Table 4.7:- RII and rank of Project scope factors

Factor group	No	Factor of project monitoring and controlling practices	Respondent Scores					RII	Rank
			1	2	3	4	5		
Scope factors	1	Cause of boundary project	3	6	12	23	8	0.704	3
	2	Keep the scope realistic	8	11	10	18	5	0.604	6
	3	project scope management plan	6	4	12	25	5	0.673	4
	4	Scope baseline	9	11	16	12	4	0.565	10
	5	Change management plan	5	12	20	10	5	0.592	7
	6	Scope Variance	6	8	15	17	6	0.635	5
	7	Quantified evaluation of project	8	11	13	16	4	0.588	8
	8	Scope change within time, cost and quality change	0	3	5	21	23	0.846	1
	9	Delay in approving major changes in scope of work by consultant	3	5	8	22	14	0.750	2
	10	Project authorize action confirmed with owner	10	11	12	14	5	0.573	9

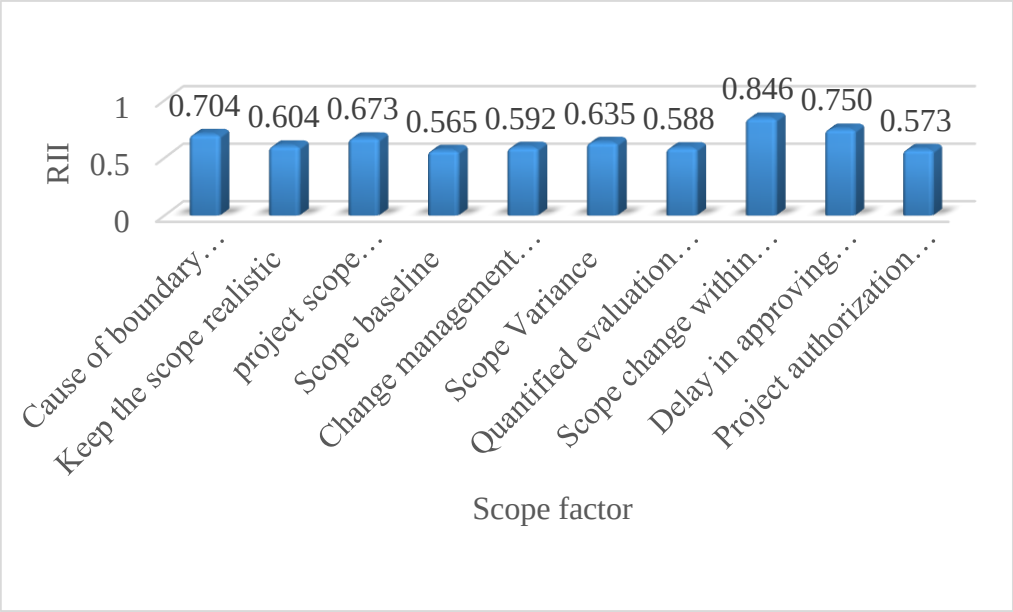


Figure 4.5:-Relative importance index and rank of Project scope factor

From project scope control group Scope change within time, cost and quality change is ranked in the 1st place with RII of 0.846 and also ranked on 6thplace from all factors with RII 0.846.This shows that Scope change within time, cost and quality change have high monitoring and controlling and improving the scope change within time, cost and quality changethis should be the major target for project factors to finish the work within proposed budget and time. Delay in approving major changes in scope of work by consultants ranked 2nd from this group but ranked on 20th from overall factors. Cause of boundary project is among most significant factors of project monitoring and controlling practices ranked 3rd from its group and ranked 26th. Project scope management plan, Scope Variance andKeep the scope realistic ranked 4th, 5th, and 6th from their group and 32th, 36th and 39th from overall factors respectively. The factor ranked on the 7th place is Change management plan, even though its ranked 42th from overall factors. Quantified evaluation of project, Project authorization confirmed with owner andScope base line ranked from 8th to 10th respectively from their group with RII of 0.588, 0.573, 0.565respectively and ranked 44th, 46th and 48th from the overall list of factors.

Best Practices for Avoiding Scope Problems: -Scope change within time, cost and quality change: Don't scope change make projects so large that they can be completed within time, cost and quality change. Delay in approving major changes in scope of

work by consultant: Involve users in project scope management assign key users to the project team and give them ownership of requirements definition and scope verification on time. Cause of boundary project: Use off the latest technology whenever possible many Engineers enjoy using the latest and greatest technology, but business needs, not technology trends, must take priority.

4.3.2. Cost factors

Project cost factors group have 15 sub factors which ranked according to their relative importance index (RII) value. The study identified the core factors that project monitoring and controlling practices, under project cost control factors including: Changes to cost baseline, Cost performances to detect variances between construction parties, Determining resource requirements, Performance report, Ongoing control of project finances, Cost planning during design stage, Cost variations, Price fluctuations,Cost escalation, Modifying cost during construction, Budget Updates, Delay corrective Action, Estimate at Completion, Delays in decisions making and Change Order by Engineer.

This group of factor ranked on 2ndwith RII of 0.746from 6 major groups of factors. Any Cost control problems reduce the output of monitoring and controlling practices. The relative importance index (RII) value and rank in group and overall rank monitoring and controlling factors are summarized in the below table 4.8

Table 4.8:- Summary of RII and Cost factor

Factor group	No	Factor of project monitoring and controlling practices	Respondent Scores					RII	Rank
			1	2	3	4	5		
project cost control	1	Changes to cost baseline	3	10	15	20	4	0.646	12
	2	Cost performances to detect variances	0	6	18	21	7	0.712	8
	3	Determining resource requirements	4	8	12	18	10	0.685	11
	4	Performance report	2	7	16	19	8	0.692	10
	5	Ongoing control of project finances	0	5	12	18	17	0.781	6
	6	Cost planning during design stage	3	6	15	19	9	0.696	9
	7	To identify cost variations, evaluate	0	2	7	19	24	0.850	3

	8	In adequate design within site work	0	2	6	20	24	0.854	2
	9	Price fluctuations	0	3	1	21	27	0.877	1
	10	Modifying cost during construction	7	10	14	13	8	0.619	13
	11	Budget Updates	11	9	15	11	6	0.569	14
	12	Delay corrective Action	2	2	11	18	19	0.792	5
	13	Estimate at Completion	4	6	11	14	17	0.731	7
	14	Delays in decisions making	1	2	4	25	20	0.835	4
	15	Change Order by Engineer	10	15	14	11	2	0.523	15

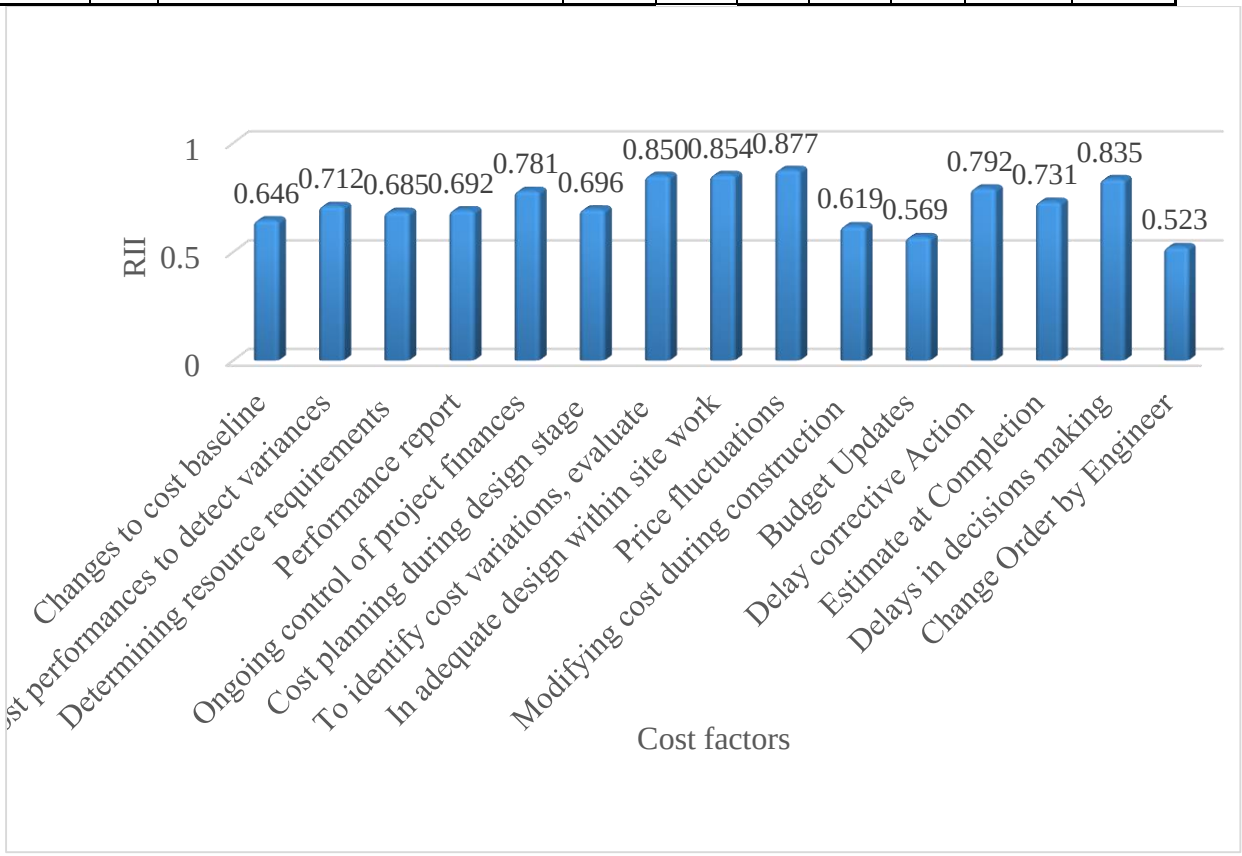


Figure 4.6:-Relative importance index and rank of cost factors

Price fluctuation of material is the mostly factors of cost monitoring and controlling practices and ranked 1stfrom its group with RII 0.877 and 1stfrom overall factors. Inadequate design without site investigation, cost variations, Delays in decisions making and coordination between construction parties and Delay corrective Action are ranked from 2ndto 5thin their group with RII of 0.854, 0.850, 0.835and 0.792respectively but ranked 4th, 5th, 9th, and 13th from the overall factors. Ongoing control of project finances, Estimate at Completion, Cost performances to detect variances, Cost planning during design stage, Performance report, Determining

resource requirements and Changes to cost baseline ranked on the 6th to 12th place in their group with RII of 0.781, 0.731, 0.712, 0.696, 0.692, 0.685 and 0.646respectively but ranked 17th, 22th, 24th, 28th, 29th, 3th and 34th from the overall factors and 3th from the overall with relative importance index of 0.651 factors is Modifying cost during construction, Budget Updatesand Change Order by Engineer with labors ranked 13thto 15threspectively but ranked 37th, 47thand 52th position with RII value of 0.619, 0.569 and 0.519 respectively.

4.3.3. Schedulefactors

In a typical construction project, a contractor could typically notice that the time ordinarily expected to perform the work has been severely reduced. The reduction of your time out there to finish a project is usually known throughout the development construction industry as schedule. Schedule control is a problem because it negatively impacts project monitoring and controlling practices in various ways, and it becomes a source of dispute between the owners and contractors.

Schedule control is extremely important. Non schedule control the construction parties can have several negative effects on the work. These include friction on the job, substandard output in quality, effective of time and cost a high turnover of Client, consultant, contractors, and many of the public body construction functional problems that you wish to avoid.

The control of project scheduling is a vital part in the process of project construction, especially for those projects which consider project time and budget as targets. Delivering project on time or not have much to do with earning or losing a profit and/or a return on investment for parties. In that case, many different techniques and tools have been developed to support better project scheduling, and these tools are used widely by a great majority of project planners

There are 12 sub-factors related to Schedule factor are shown in table 4.10. These sub-factors includes: Schedule has changes, Additional Planning, Working as per schedule, Time scheduling to minimizing variation, Construction Schedule (Master Schedule), Schedule Updated, Resource schedule, Use of Software and tools for Schedule control, Adopting realistic times for estimating, managing the actual changes and Using schedule Baseline, schedule control factor is ranked on the 4thposition with RII of 0.700. The relative importance index (RII) value and rank in

group and overall rank of schedule control factors are summarized in the below table 4.9.

Table 4.9:-summary of RII and rank of schedule factors

Factor group	No	Factor of project monitoring and controlling practices	Respondent Scores					RII	Rank
			1	2	3	4	5		
Schedule Control	1	Schedule has changes	1	2	3	21	24	0.838	1
	2	Managing the actual changes	13	13	12	10	4	0.519	11
	3	Using schedule Baseline	13	13	13	10	3	0.512	12
	4	Adopting realistic times for estimating;	13	11	12	12	4	0.535	10
	5	Construction Schedule (Master Schedule)	0	6	12	26	8	0.738	5
	6	Resource schedule	0	12	13	19	8	0.688	8
	7	Time scheduling to minimizing variation	0	6	12	20	14	0.762	4
	8	Working as per schedule	1	5	9	21	16	0.777	3
	9	Additional Planning	0	6	6	22	18	0.800	2
	10	Schedule Updated	4	7	11	19	11	0.700	7
	11	Effect have schedule	3	6	12	22	9	0.708	6
	12	Use of Software and tools for Schedule control	10	7	12	20	3	0.596	9

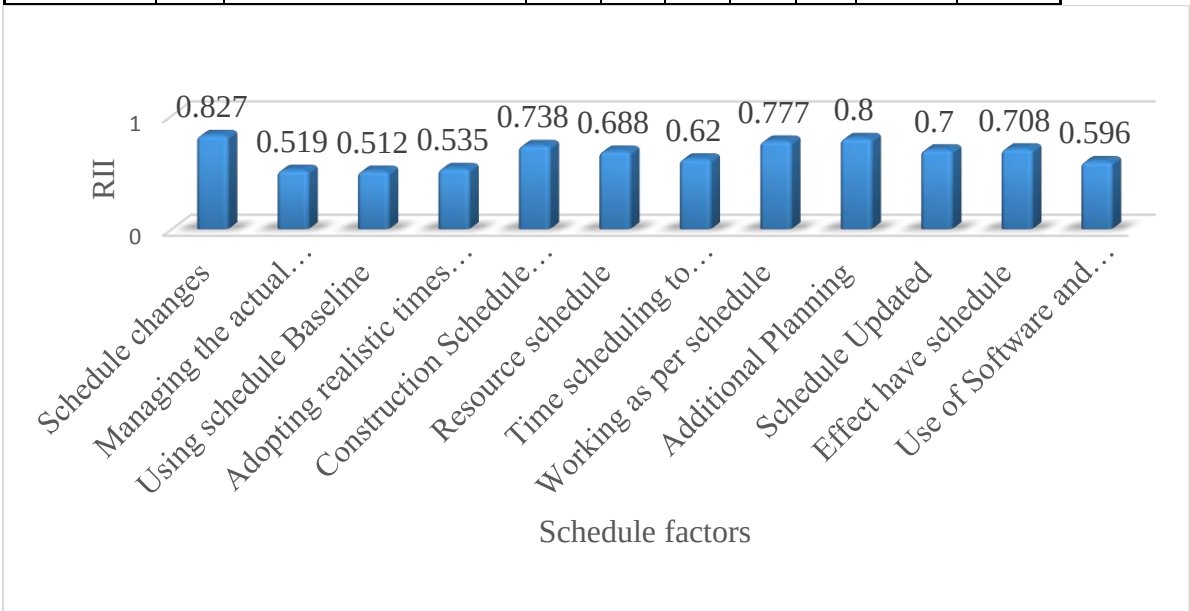


Figure 4.7:- Relative importance of index and rank of schedule factors

Schedule factors are among the factors those factor of project monitoring and controlling practices even though it ranked 4thas a whole. From this group Schedule changes is the most severe factor of project monitoring and controlling practices; ranked with 1stfrom group and 8th from overall factor. Additional Planning, Working as per schedule, Time scheduling to minimizing variation, Construction Schedule (Master Schedule), Effective have schedule, Schedule Updated, Resource schedule, Use of Software and tools for Schedule controland Adoptingrealistic times for estimating ranked from 2ndto 10thposition and ranked on 11th, 18th, 19th, 21th, 25th, 27th, 30th, 4thand 50thposition in overall rank of factors schedule controlling. Managing the actual changes and Using schedule Baseline, position and ranked 11th and 12th in group and 53th and 55thin overall rank with (RII=0.504 and 0.492 respectively in overall rank of factors.

4.3.4. Quality factors

Quality factors includes: Shortage ofmaterial, Poor quality of construction, Effective quality planning, Specification, Control charts & analysis, Late delivery of materials, Quality inspection delay, Rework due errors, Clear scope and quality of work control, High quality of required works, Poor quality of work as a result of shortage of funds, Produce quality deliverables, Plan quality identifying quality requirements, Project Success in quality customer satisfaction, quality Policy and Procedures and Standards. This factor is ranked 5th(RII=0.673). The relative importance index and rank of Quality factor is summarized in the following table 4.10.

Table 4.10:- Summary of RII rank of quality factors

Factor group	No	Factor of project monitoring and controlling practices	Respondent Scores					RII	Rank
			1	2	3	4	5		
Project quality control	1	Shortage of material	0	2	3	24	23	0.862	1
	2	High quality of required works	16	16	13	4	3	0.454	10
	3	Quality inspection delay	12	14	14	8	4	0.515	7
	4	Rework due errors	15	16	12	5	4	0.473	8
	5	Produce quality deliverables	15	17	16	3	1	0.438	12

	6	Project Success in quality customer satisfaction	18	18	9	7	0	0.419	14
	7	Clear scope and quality of work control	12	20	13	5	2	0.465	9
	8	Poor quality of work as a result of shortage of funds	13	17	19	2	1	0.450	11
	9	Plan quality identifying quality requirements	15	19	13	5	0	0.431	13
	10	quality Policy, Procedures and Standards	19	18	7	8	0	0.415	15
	11	Poor quality of construction	1	0	8	24	19	0.831	2
	12	Effective quality planning	2	1	11	20	18	0.796	3
	13	Late delivery of materials	12	9	11	12	8	0.581	6
	14	Specification	3	7	9	20	13	0.727	4
	15	Control charts & analysis	6	10	12	16	8	0.638	5

The following graph shows the graphical representation of Quality control

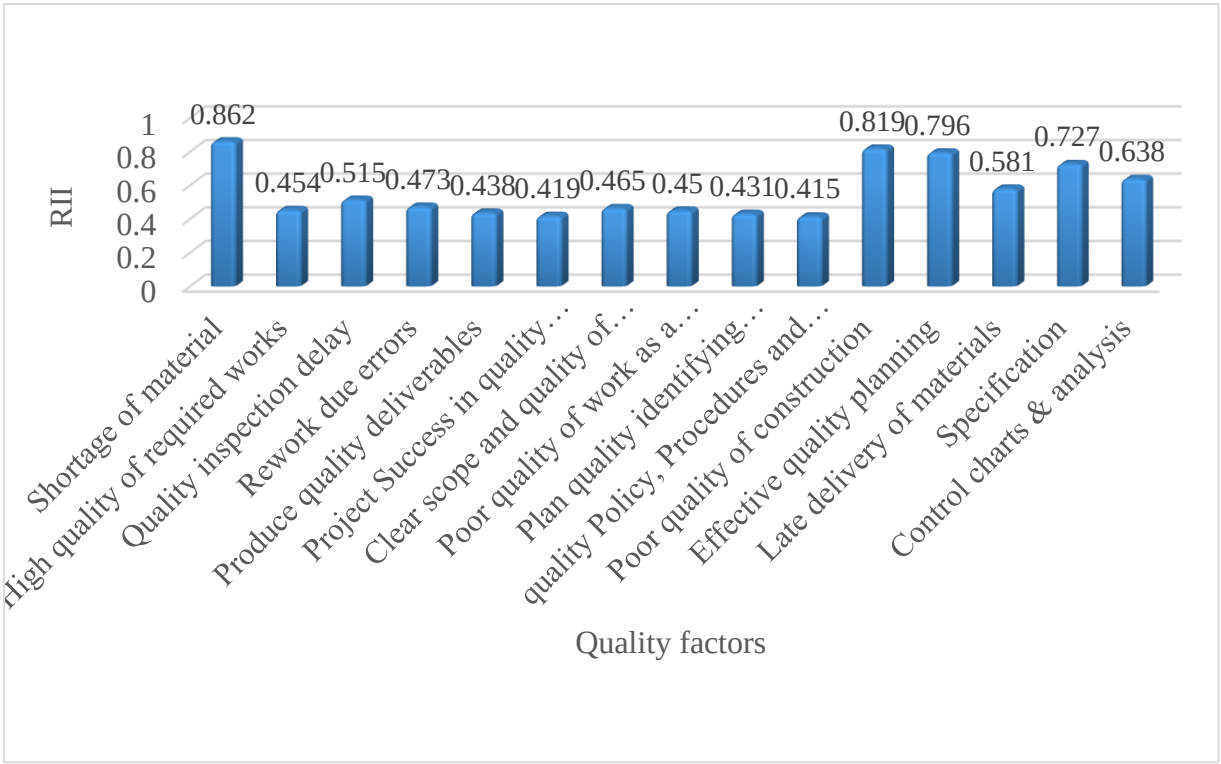


Figure 4.8:- Relative importance index and rank of quality factors

The above Table and graph show the ranking factors for the quality control factor group. Shortage of material was ranked first in the quality factor group, with an RII of 0.862, and was 2nd among all 66 factors of project monitoring and controlling practices. Poor quality of construction was ranked 2nd in quality factor group, with an RII of 0.831, and 10th among all 66 factors of project monitoring and controlling practices.

Effective quality planning, Specification, Control charts & analysis, Late delivery of materials, Quality inspection delay, Rework due errors, Clear scope and quality of work control, High quality of required works, Poor quality of work as a result of shortage of funds, Produce quality deliverables, Plan quality identifying quality requirements ranked from 3rd to 13th position and ranked on 12th, 23th, 19th, 35th, 45th, 54th, 57th, 58th, 59th, 60th, 62th, and 64th respectively in quality control factors in group and with RII 0.796, 0.727, 0.638, 0.581, 0.515, 0.473, 0.465, 0.454, 0.450, 0.438 and 0.431 ranks respectively among all 66 factors of project monitoring and controlling practices.

Project Success in quality customer satisfaction, quality Policy and Procedures and Standards ranked 14th and 15th quality factors in group and 65th, and 66thamong all 66 factors with RII 0.419 and 0.415position in overall rank of factors schedule controlling factors.

4.3.5. Stakeholder Engagement factors

Stakeholders engagements of control is the process of monitoring overall project stakeholder relationship and adjusting strategies and plans for engaging stakeholders. Law and order, Security of project site are essential for high monitoring and controlling practices on public building construction. Project Stakeholder Engagement control including:-Payment delay, Lack of follow up the work progress, Ineffective project planning &scheduling, Political situations/ unpredictability (ie protest), Lack awareness of all project, Project team needs to identify engagement the relative impotence index rank of stakeholder engagement control factors are summarized in the below table

Table 4.11:-RII rank of stakeholder engagement factors

Factor group	No	Factor of project monitoring and controlling practices	Respondent Scores					RII	Rank
			1	2	3	4	5		
Stakeholders	1	Lack awareness of all	7	11	15	13	6	0.600	5

Engagements Control		project							
	2	Project team needs to identify engagement	9	8	17	13	5	0.588	6
	3	Payment delay	0	3	6	20	23	0.842	1
	4	Lack of follow up the work progress	1	3	10	23	15	0.785	2
	5	Ineffective project planning & scheduling	2	5	10	23	14	0.785	3
	6	Political situations/ unpredictability(ie protest)	7	11	13	14	7	0.612	4

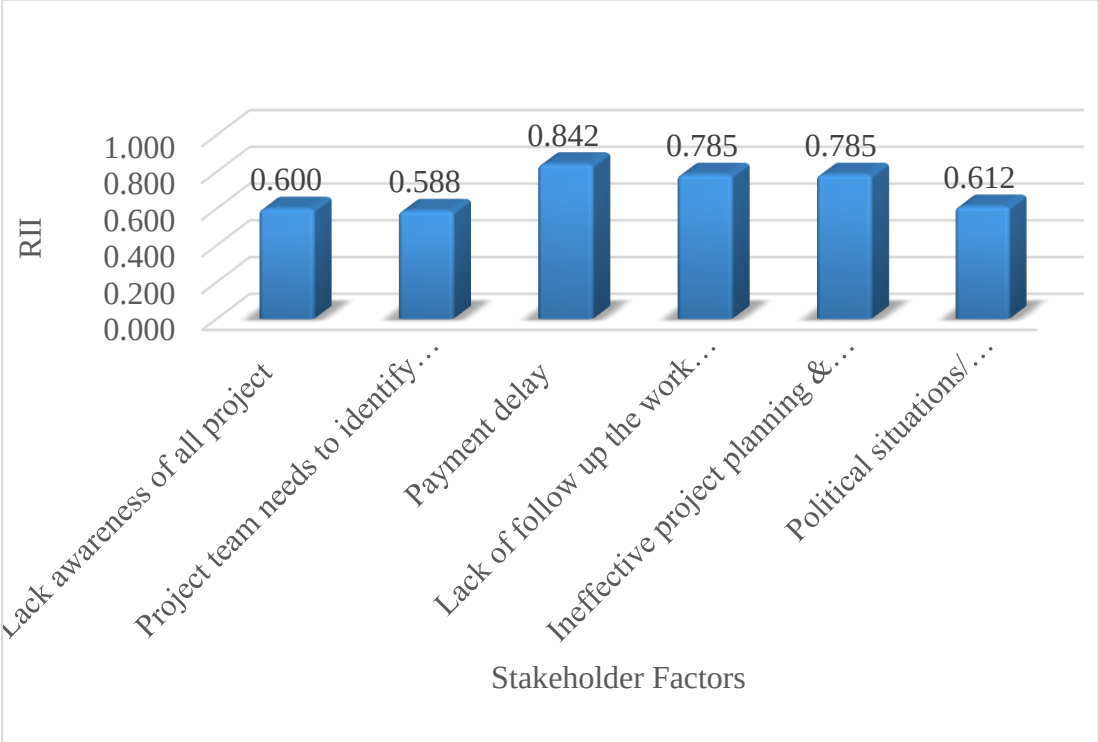


Figure 4.9:-RII and rank of stakeholder factors

Payment delay is ranked on the 1st position from this group with RII of 0.842and ranked 7th in the total ranking from 66 factors while; Lack of follow up the work progress, Ineffective project planning &,Political situations/unpredictability (ie protest), Lack awareness of all project and Project team needs to identify engagement is ranked 2nd to 6th position from this group and 15th,16th,38th,40th and44th factors position in overall ranking respectively with RII of 0.785, 0.785, 0.612, 0.600 and 0.588 from their group

Output of Stakeholders factors: Work performance information, change requests, project management plan updates, project document updates and organizational process assets updates.

4.3.6. Communication factors

Good communication is critical to expeditiously complete a project. Lack of spare communication will cause lack of employee motivation. Lack of communication will cause delays because of mistakes inflicting retread, lack of knowledge inflicting time period, and mistaking. Although endless choices for communication square measure obtainable, technical issues do exist. Other common issue related to communication on construction comes embody understanding the chain of command and ceaselessly human activity concerning the project and foreseeing potential issues within the future. This can be avoided by holding regular project management team conferences (Cingoranelli 2007). Communication management issue was graded within their cluster and out of the sixty six list of things of project watching and dominant practices consistent with their importance is shown in the Communication control factor was ranked in their group and out of the 66 list of factors of project monitoring and controlling practices according to their importance is shown in the following table 4.12.

Table 4.12:-RII and rank of communication factors

Factor group	No	Factor of project monitoring and controlling practices	Respondent Scores					RII	Rank
			1	2	3	4	5		
project communication control	1	Written communication	9	10	19	11	3	0.558	4
	2	Electronic communication	18	12	17	3	2	0.442	7
	3	Oral communication	6	9	12	14	11	0.658	3
	4	Project communication plan	13	14	12	10	3	0.508	6
	5	Lack of communication b/n 3C's	0	1	6	22	23	0.858	1
	6	Lack of General support to contractor	4	0	8	23	17	0.788	2
	7	By communicating to reduce conflict of project	16	15	17	4	0	0.435	8

	8	The effectiveness of controlling information	12	11	14	15	0	0.523	5

Lack of communication b/n 3C's the most significant factor of project monitoring and controlling practices from this group of factors ranked 1st and 3rd position in overall ranking with RII of 0.858. Lack of General support to contractor is ranked 2nd from this group and ranked 14th position in the overall rank with RII of 0.788. This occurs when communication is diverted from contractor, client, consultant and public body to analyze and plan contract changes, expedite delayed material, manage added crews, or other changes not in the original work scope and schedule. Lack of communication b/n 3C's is also caused by lack of communication8 in manpower, work areas, or project size, delay of project, quality, cost and schedule. Oral communication, Written communication, The effectiveness of controlling information, Project communication plan, Electronic communication and By communicating to reduce conflict of project are ranked from 3rd to 8th position and ranked 33th, 49th, 51th, 56th, 61th, 63th, position in the overall ranking respectively and with RII of 0.658, 0.558, 0.523, 0.508, 0.442 and 0.435out of 66 factors.

The following figure 4.10 shows the relative importance index (RII) and rank of communication control factors.

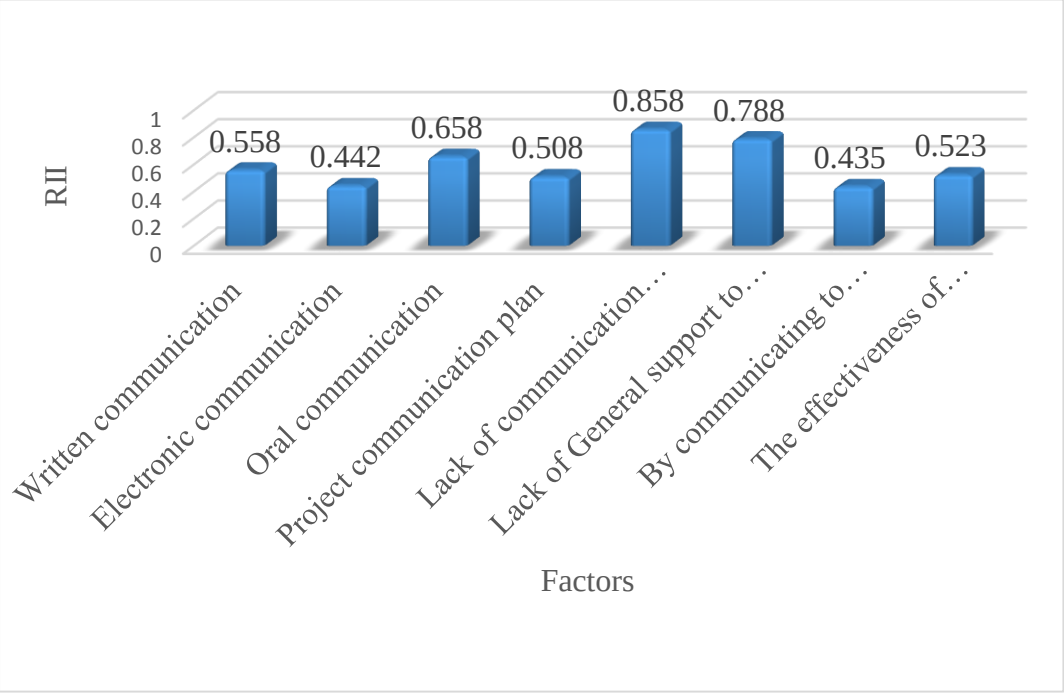


Figure 4.10:- Shows the RII and rank of communication factors

4.4. Most Important factors affect monitoring and controlling practices

The most important factors were ranked in their group list of factors of project monitoring and controlling practices according to their importance is shown in the following table 4.13.

Table 4.13:- Most important factors affectM&C practices

S/No	15 most important factors M&C practices	Factor group	RII	Rank
1	Price fluctuations	Project cost control	0.877	1
2	Shortage of materials	Project quality control	0.862	2
3	Lack of communication b/n 3C's	Project communication control	0.858	3
4	In adequate design within site work	Project cost control	0.854	4
5	Cost variations	Project cost control	0.85	5
6	Scope change within time, cost and quality change	Project scope control	0.846	6
7	Payment delay	project stakeholder control	0.842	7
8	Schedule changes	Project schedule control	0.838	8
9	Delays in decisions making	Project cost control	0.835	9
10	Poor quality of construction	Project quality control	0.831	10

Based the above table 4.13 the most factors of project monitoring and controlling practices: Price fluctuation, Shortage of material, Lack of communication b/n 3C's, Inadequate design without site investigation, Cost variations, Scope change within time, cost and quality change, Payment delay, Schedule changes, Delays in decisions making, Poor quality of construction, Additional Planning, Effective quality planning, Delay corrective Action, Lack of General support to contractorand Lack of follow up the work progress respectively.

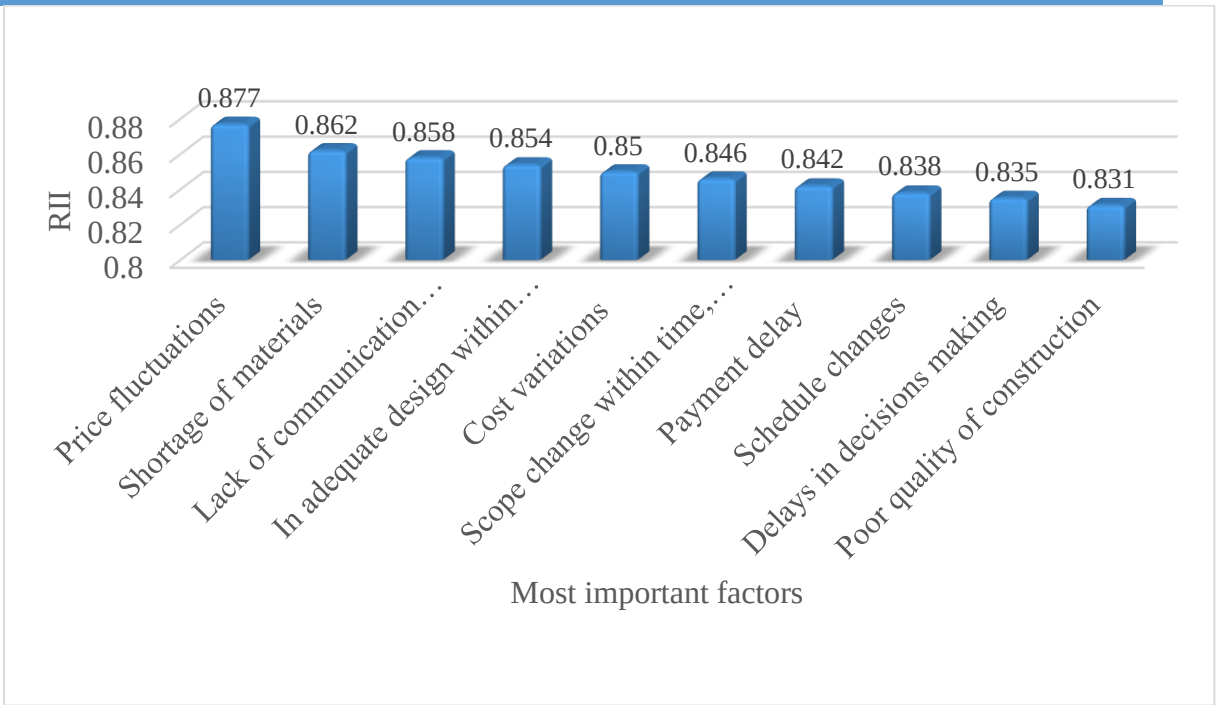


Figure 4.11:- Shows the RII and 10 most important factors

The most factor of project monitoring and controlling practices is Price fluctuation incost whose face monitoring and controlling problems on construction site, it is necessary to concentrate on the major factors such as: Price fluctuation, shortage of materials, Lack of communication b/n 3C's, Inadequate design without site investigation,, Cost variations.

Solving these problems is highly important for contractors, encounter monitoring and controlling problems to fish the work within budget plan, scheduled time frame and to attain the required quality of the work.

4.5. Least Important factors affect monitoring and controlling practices

The least factors that affect monitoring and controlling practices: quality Policy, Procedures and Standards, Project Success in quality customer satisfaction, Plan quality identifying quality requirements, By communicating to reduce conflict of project, Produce quality deliverables, Electronic communication, Poor quality of work as a result of shortage of funds, High quality of required works, Clear scope and quality of work control, Rework due errors, Project communication plan, Using schedule Baseline, Quality inspection delay, Managing the actual changes and Change Order by Engineer respectively. Shown in the following table 4.14.

Table 4.14:- Least important factors affectM&C practices

Number	15 most important factors of Project M&C practices	Factor group	RII	Rank
1	quality Policy,	Project quality control	0.415	66
2	customer satisfaction	Project quality control	0.419	65
3	quality requirements	Project quality control	0.431	64
4	By communicating to reduce conflict of project	Project communication control	0.435	63
5	Produce quality deliverables	Project quality control	0.438	62
6	Electronic communication	Project communication control	0.442	61
7	Poor quality of work as a result of shortage of funds	Project quality control	0.45	60
8	High quality of required works	Project quality control	0.454	59
9	Clear scope and quality of work control	Project quality control	0.465	58
10	Rework due errors	Project quality control	0.473	57

The following figure 4.12 shows the Relative Importance Index (RII) and 10 least important factors.

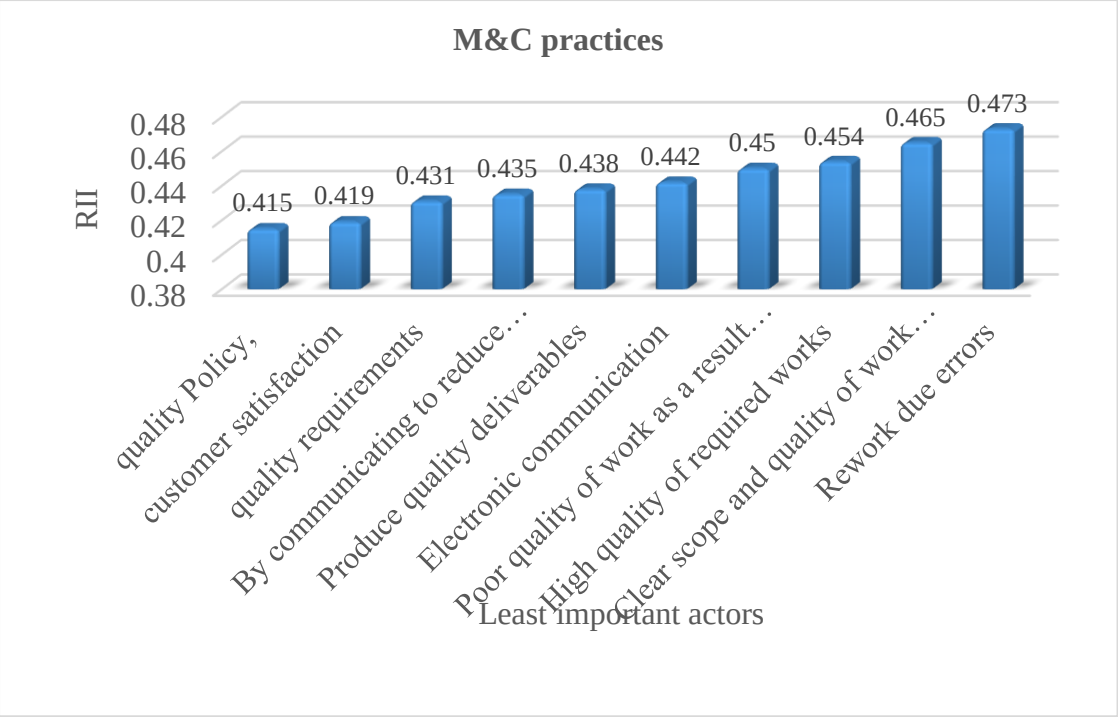


Figure 4.12:- Show the RII and 15 least important factors

4.6. To evaluate monitoring and controlling practices

Project evaluates monitoring and controlling practices on public building construction in Jimma zone. There are 5 sub evaluate to list and each of them are ranked according to their relative importance index (RII).

Table 4.15:- an evaluate of monitoring and controlling practices

No	To what extent do you agree with the statement of evaluate to take action projects?	Respondent Scores					RII	Rank
		1	2	3	4	5		
1	Reduce project delivery costs and increased profits	15	12	14	6	5	0.500	5
2	Higher degree of project successes increases competitive	6	9	10	11	16	0.685	3
3	Better project requirement leading to motivated staff	2	5	10	16	19	0.773	1
4	Produce quality deliverables	3	6	11	15	17	0.742	2
5	Customer advantage arising to meeting expectations	6	7	15	12	12	0.665	4

The following figure 4.13 shows the relative importance index (RII) and rank of evaluate monitoring and controlling practices on public building constructions.

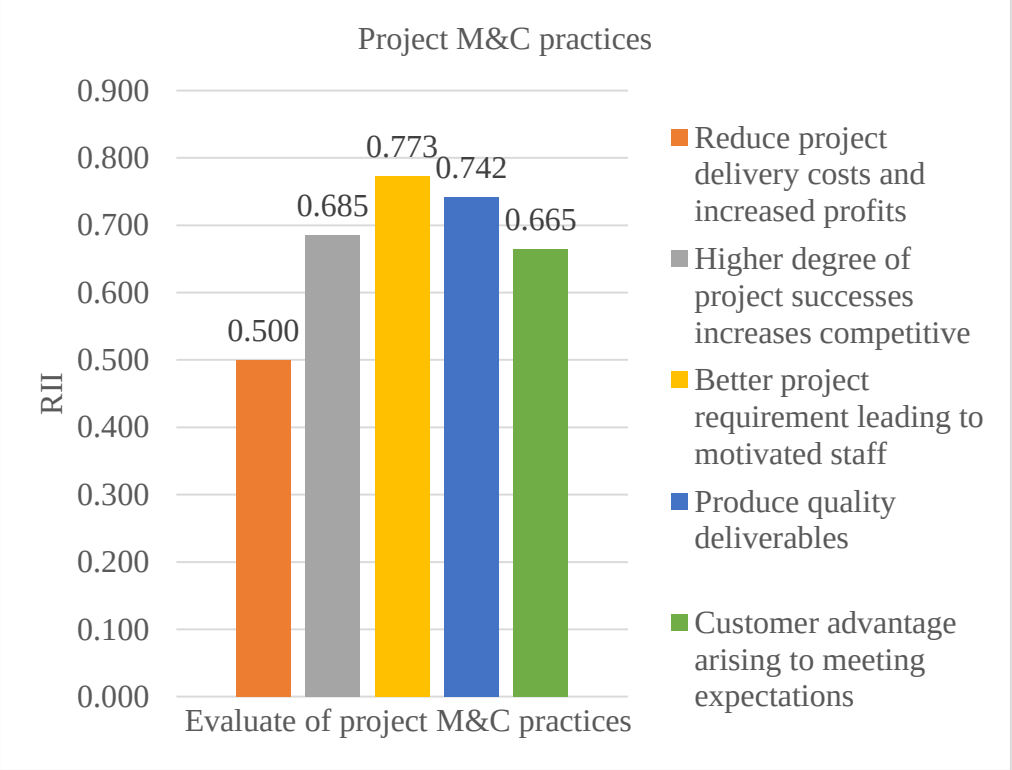


Figure 4.13:- Shows the RII and evaluate M&C practices

Better project requirement leading to motivated staffs the most significant evaluate monitoring and controlling practices. From this group of evaluate ranked 1st position in overall ranking with RII of 0.773. Produce quality deliverables is ranked 2nd position in the overall rank with RII of 0.742.Higher degree of project successes increases competitive and customer advantage arising to meeting expectationsand Reduce project delivery costs and increased profits are ranked from 3rd to 5thposition in the overall ranking respectively and with RII of 0.685, 0.665, and 0.500out of 5evaluate monitoring and controlling practices on public building construction projects in Jimma zone.

4.7. An impact of lack monitoring and controlling practices

The four parties to the project comprising of the consultants, the contractors, regulatory and client were interviewed, each evaluating the case through their point of view. The research findings from an impactprojects are presented according to scientific study, opinion and lessons learned.

In this part, respondents were asked to impact of monitoring and controlling consists of those processes performed to observe project execution so that potential problems can be identified in a timely manner and corrective action can be taken, once necessary, to manage the execution of the project. The key benefit project performance was observed and measured regularly to identify variances from the project management plan. The results exposed that the key monitoring and controlling practices, which are factors affect time, cost and quality most on construction projects.

4.7.1. Analysis of Case Studies

Jimma Zone high school buildingconstructions are total of 12 educational building projects since January 2008. Among these 10 were completed and the remaining 2 are under construction. Since the title of this study directly related to educational building projects owned by the Jimma zone education office, the case study narrowed its focus on selected representative projects. Accordingly, four projects are selected to show the significance of this work. The selection criteria for these projects are accessibility of the required information for case studies and their exposure for lack of monitoring and controlling practices high impact in term of cost, time and quality excessive delays. The selected projects are comprises of the completed three andone ongoing

projects and those critically suffering by abandonment and/or termination of the contract.

Table 4.16:- Selected projects for case study

S/No	Project Name	Contractor	Consultant
1	Gatta High school	Ibrahim Kalil	Urban development plan
2	Sombo dosha high school	Kamal Harabuu	Urban development plan
3	Kusaye High school	Bekele Debele	Urban development plan
4	Seka High school	Yosef Hariruu	Urban development plan

A) Gatta High school

The gatta high school project is located in the Jimma zone sigmo wareda. The project comprises of a gatta high school, which is completed construction by a local contractor, Ibrahim Kalil general construction. (See table 4.17:- for project details and information). The project commenced on January 27, 2008EC and supposed to be completed on January 26, 2009EC with a contract period of 365 days. The initial contract amount of the project was ETB 13,964,557.7435 but revised to ETB 15,453,038.63 including a Variation works amounting to ETB 1,488,480.887. The amount of work completed May 28; 2010EC was project is delayed by 485 days. As per the data collected site investigate design from the Consultant, Contractor, regulatory and Employer. The major impact lack of monitoring and controlling practices are time delay, cost increase and quality factors from initial contract on this project are originated by the Employer, Contractor, regulatory and Consultant.

Table 4.17:- Gatta high school project

Project particulars	
Client [Owner]	Jimma Zone High school
Consultant	Jimma Zone Urban development
Contractor	Ibrahim Kalil

Specific location	Jimma zone sigmo wareda
Specific Name	Gatta
Contract Type	Admeasurements (unit rate)
Initial Contract Amount	ETB 13,964,557.7435
Addition [Variation]	ETB 1,488,480.887
Revised Contract Amount	ETB 15,453,038.63
Initial Contract Period	365 days
Completed project in May 28, 2010EC	100%
Total days delay beyond contract period	485ys

B) Sombo Dosha High school

Sombo Dosha high school project is located in the Jimma zone Nono Benja wareda and it have 10 (ten) block construction. The project comprises of a Sombo dosha high school, which is completed construction by a local contractor Kamal Harabu general contractor. (See table 4.18:- for project details and information). The project commenced on January 27, 2008EC and supposed to be completed on January 26, 2009EC with a contract period of 365 days. The initial contract amount of the project was ETB 12,960,286.698 but revised to ETB 13,298,717.17 including a Variation works amounting to ETB 338,430.47. The amount of work completed Jun 25, 2010EC was project is delayed by 485 days. As per the data collected site investigate design from the Consultant, Contractor, regulatory and Employer. The major impact lack of monitoring and controlling practices are time delay, cost increase and quality factors from initial contract on this project are originated by the Employer, Contractor, regulatory and Consultant.

Table 4.18:- Sombo Dosha high school project

Project particulars	
Client [Owner]	Jimma Zone High school
Consultant	Jimma Zone Urban development

Contractor	Kamal Arebu
Specific location	Jimma zone Nonno Benja wareda
Specific name	Sombo dosha
Contract Type	Admeasurements (unit rate)
Initial Contract Amount	ETB 12,960,286.698
Addition [Variation]	ETB 338,430.47
Revised Contract Amount	ETB 13,298,717.17
Initial Contract Period	365 days
Completed project in May 28, 2010EC	100%
Total days delay beyond contract period	485days

C) Kusaye High School

Kusaye high school project is located in the Jimma zone Mncho wareda and it have 10 (ten) block construction. The project comprises of a Kusaye high school, which is completed construction by a local contractor Bekele Debele general contractor. (See table 4.19:- for project details and information). The project commenced on January 27, 2008 EC and supposed to be completed on January 26, 2009 EC with a contract period of 365 days. The initial contract amount of the project was ETB 12,463,002.05 but revised to ETB 13,029,603.74 including a Variation works amounting to ETB 566,601.69. The amount of work completed October 25, 2012 EC was project is delayed by 985 days. As per the data collected site investigate design from the Consultant, Contractor, regulatory and Employer. The major impact lack of monitoring and controlling practices are time delay, cost increase and quality factors from initial contract on this project are originated by the Employer, Contractor, regulatory and Consultant.

Table 4.19:- Kusaye high school project

Project particulars	
Client [Owner]	Jimma Zone High school
Consultant	Jimma Zone Urban development

Contractor	Bekele Debele
Specific location	Jimma zone Mancho wareda
Specific name	Kusaye
Contract Type	Admeasurements (unit rate)
Initial Contract Amount	ETB 12,463,002.05
Addition [Variation]	ETB 566,601.69
Revised Contract Amount	ETB 13,029,603.74
Initial Contract Period	365 days
Completed project in October 25, 2012 EC	100%
Total days delay beyond contract period	985 days
Completed project in October 25, 2012 EC	100%
Total days delay beyond contract period	985ys

D) Seka High School

Seka high school project is located in the Jimma zone Limu Seka wareda and it have 10 (ten) block construction. The project comprises of a Seka high school, which is under construction by a local contractor Yosef Hariru general contractor. (See table 4.20:- for project details and information). The project commenced on February 22, 2007 EC and supposed to be completed on February 22, 2008 EC with a contract period of 365 days. The initial contract amount of the project was ETB 7,425,567.55 but revised to ETB 12,792,169.24 including a Variation works amounting to ETB 5,366,601.69. The amount of work executed until December 25, 2012 EC was ETB 9,027,859.24 which is 69.5% of the contract amount. The project is delayed by 1435 days excluding the time required to complete the project in the future. As per the data collected site investigate design from the Consultant, Contractor, regulatory and Employer. The major impact lack of monitoring and controlling practices are time delay, cost increase and quality factorsfrom initial contract on this project are originated by the Employer, Contractor, regulatory and Consultant.

Table 4.20:- Seka high school project

Project particulars	
Client [Owner]	Jimma Zone High school
Consultant	Jimma Zone Urban development
Contractor	Yosef Hareru
Specific location	Jimma zone Limu Seka wareda
Specific name	Seka
Contract Type	Admeasurements (unit rate)
Initial Contract Amount	ETB 7,425,567.55
Addition [Variation]	ETB 5,366,601.69
Revised Contract Amount	ETB 12,792,169.24
Initial Contract Period	365 days
Total Amount of Work executed until December 2012 EC	9,027,859.24
Executed Vs. Contract	69.5%
Time elapsed up to December, 2012EC	1,800
Elapsed time Vs. Contract	493.15%
Total days delay beyond contract period	1435

4.7.2. General impact of lack monitoring and controlling practices

The questions were summarized and focused more impactssuccessful completion and sustainable construction. The results exposed that the key monitoring and controlling practices in Jimma zone high school construction projects are factors affect time, cost and quality most on construction projects.

1) Impact of time: - It defines the impact of time by which the project not properly schedule to cause delay of projects. The problem an impact of time are weather condition change, accessibility road, and availability of material on site, tracking systems, and approval levels necessary forproject schedulingare time factors. The challenging factors of time for successful completion on schedule problem the opinion of the contractors, client, regulatory and consultants are as follows:-

- ✓ Bad weather condition change to affect schedule.
- ✓ Accessibility problem not consider during schedule.

- ✓ Lack of communication between parties.
- ✓ Inadequate design without site investigates.
- ✓ Delay in payment by client progress work done.
- ✓ Mismanagement by the contractor and the consultant to complete and deliver project on time.
- ✓ Price fluctuation of the construction materials.

2) **Impact of Cost**

It is defines the impact of cost by that price baseline could also be modified to change initial contract cost and actual cost to variance. An impact of cost for successful completion cost factors an opinion of the contractors, client, regulatory and consultants are as follows:-

- ✓ Cost overrun.
- ✓ Increasing the variation change.
- ✓ Additional budget required.
- ✓ Delay Change order by client.
- ✓ In case Inadequate design to affect cost change.
- ✓ Termination of contract.
- ✓ Difficulty in financing the construction project by contractor.

3) **Impact of quality**

Quality impact lack of monitoring and controlling practices in Jimma zone high school projects not completed in the given time. An impact of quality for successful completion on quality problem the opinion of the contractors, client, regulatory and consultants are as follows:-

- ✓ Rework due to errors by contractor.
- ✓ Poor site management by contractor.
- ✓ Inadequate materials delivered on site.
- ✓ Design data is not available at the right time causing changes to the design at the time of construction.
- ✓ Less quality and reworks by contractor due to work speeding.
- ✓ Ineffective construction planning by contractor.
- ✓ Poor qualification of contractor's staffs.

4.8. Therecommendations to upgrade knowledge of m &c practices.

The four parties to the project comprising of the consultants, the contractors, regulatory and client were interviewed, each evaluating the case through their point of view, according to scientific study, opinion and recommends are the following summarize:-

1. **Take action to control the project**

Necessary steps, management points, and actions square measure taken to monitoring and controlling the project. These actions give if the project is deviating from the planned baseline. For a productive project, there square measure some best practices to implement a decent project monitoring &controlling.

2. **Measure performance**

You should measure the performance so as to visualize whether or not the project goes well. For instance, cost performance of the project can give an indication whether or not the planned budgets are spare to complete the project. Schedule performance of the project can give an indication whether or not the planned schedule and dates will be reached.

3. **Request changes**

Modification may be requested to fulfill the planned values once more.

4. **Perform integrated change control**

Performing an integrated change control evaluates the changes and its impacts on the project. Then, a correct amendment/change implementation is planned to minimize**.**

5. **Approve or reject changes**

Project monitoring and controlling method might approve or reject changes. Changes are evaluated by the amendment instrument panel and if this board rejects the amendment, it won't be implemented.

6. **Inform stakeholders of approved changes**

The amendment/change instrument panel is approving an amendment. Because, the previous arrange, scope, and targets have an amendment. So the stakeholders should be notified concerning this alteration/change.

7. **Manage configuration**

The configuration of a project describes the significant and properly operating combination of various modules or elements. In order to confirm healthy project progression, the configuration is managed.

8. **Create forecasts**

Project monitoring and controlling method cluster activities produce forecasts. What would be the budget of the project on completion? What would be the top date of the project if the project performs because it performed until now? These styles of forecasts facilitate to check however so much the project is from its targets.

9. **Gain acceptance from customer**

Once the project deliverables are completed, presented to the client. If the deliverables meet the necessities in agreement with the client, within the starting, the client accepts the project and shutting part is triggered.

10. **Perform quality control**

Quality control activities check the standard attributes of the delivered outputs. For instance, the product of a project would possibly meet the budget and schedule targets. But the standard necessities may not meet the customers' expectations. In this case, the project is going to be thought of as failing likewise.

11. **Report on project performance**

Since estimating and project performance is measured throughout monitoring and controlling, project performance reports square measure sent to relevant stakeholders throughout this part in addition.

12. **Perform risk audits**

Risks might affect a project drastically. Therefore, every anticipated risk should be documented, and risk response ways for every risk should be planned just in case a risk happens.

13. **Manage reserves**

Reserves are planned to accommodate costs of risks and unexpected situations in projects. For instance, a 10% from the budget reserve can be planned to accommodate impacts of risks. Or, if the project duration is 12 months, an additional 2 months can be planned as a buffer to overcome any kind of risks that might occur during the project. These reserves square measure managed in in monitoring and controlling part.

14. **Administer procurements**

Tools, equipment or resources will be outsourced from a provider throughout a project. Administration of those purchases, outsourcing, and leasing activities are done throughout monitoring and control part of a project.

4.9. A future framework for monitoring and controlling practices

The framework proposed was emphasizes how principles could be applied to monitor and control practices on construction projects. The objectives of framework are to help construction parties to:

- ✓ Identify what could be done to tackle or counter balance these challenges (what to do),
- ✓ Identify how to address these challenges (how to do it) and
- ✓ Realize the possible outcome (results), which are monitor and control practices

Based on the questioner survey, the respondent identifies the major factors of m &c practices and its future framework to monitor and control practices on construction projects in the table 4.21.

Table 4.21:- a framework for monitoring and controlling practices

Major factors of monitor and control practices on construction project	**What to do to**	**How to do it**	**Result**
Price fluctuation	sufficient management skills	Sufficient construction material store with time	Good Project monitoring and controlling practices
Shortage of material	Prepare good project management	Government order to achieve a timely project	
Lack of communication b/n 3C's	Prepare good communication between parties	Improve communication among players	
Inadequate design without site investigations	careful planning, designM&C the project	Should be investigate site work before design	
Cost variations	Prepare effective cost management plan and control	Timely delivery of materials, Prevent detect production Understand client needs and expectation	

A successful project requires careful planning, organization, monitoring and control throughout the project to achieve the correct result for the client. For the contractor, good planning, organization, monitoring and control are essential in order to achieve a timely and satisfactory outcome for the client, and to ensure a financial profit. To ensure the successful implementation of construction projects there should be an effective communication between all parties. To ensure proper teamwork on construction projects, managers should be committed to change, workers should be able to work in teams, companies should be more clients focused, firms should be willing to change organizational cultures that do not promote lean construction, partnering to maximize team building and team members should be empowered in decision making to make partnerships meaningful.

Managing a construction project was depends on how parties in a construction project interpret the construction process. Main strategies such as training of employees on lean concepts and dealing with uncertainties and fears that cause organizations to conceal information instead of sharing it should be employed to enhance the implementation of main principles. The enhancement of technical capabilities was very important in order to effectively implement the managing materials on construction projects. To ensure that technical capabilities are enhanced, the managers should understand and use standards to define normal and abnormal conditions and develop clear, user friendly, visual controls at all levels to help monitor and improve standards.

The lack of standardization can be viewed as one of the reasons for the inefficiency of the construction sector. There is also the need for managers to maintain personal discipline, direct and coach others to keep within standards and procedures and always react to off standard and off target situations with immediate investigation. In addition, standardized construction elements should be promoted to improve monitoring and control practices on construction projects. In an organization, communication is carried out in several ways including verbal and signs. Authority, control and motivation are the functioning of an organization. Workers communication needs to be effective for coordinate efforts, leading to improvement in quality of the works. Communication quality which has characteristics of being timely, accurate and useful and complete enhances productivity and quality of work.

Communication should be improved among players to enhance the successful implementation of lean strategies.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions

The study aims at identifying the factors that affect monitoring and controlling practices on public building construction in Jimma zone.

5.1.1. Factors thataffect project M & C practices on construction

The questionnaire of this study considered 66 factors which factors that affect monitoring and controlling practices on public building construction and those factors were distributed into six groups namely, Scope factors, Cost factors, Schedule factors, Quality factors, Stakeholders Engagements factors and Communication factors.

Therefore, the results from analysis ranked from the overall factors are price fluctuation the most significant factors that affect monitoring and controlling practices on public building construction projects with RII 0.877.

5.1.2. To evaluate monitoring and controlling practices

Project evaluates monitoring and controlling practices on public building construction in Jimma zone. There are 5 sub evaluated to list and each of them are ranked according to their relative importance index (RII). The better project requirement leading to motivated staffs the most significant evaluate monitoring and controlling practices. From this group of evaluate ranked 1st position in overall ranking with RII of 0.773, so for project monitoring and controlling practices are the most important to leading motivated staffs.

5.1.3. An impact of lack monitoring and controlling practices

The four parties to the project comprising of the consultants, the contractors, regulatory and client were interviewed, each evaluating the case through their point of view. The major impact lack of monitoring and controlling practices are time delay, cost increase and quality factors from initial contract on this project are originated by the Employer, Contractor, regulatory and Consultant.The selected projects are comprises of the completed three andone ongoing projects and those critically suffering by abandonment and/or termination of the contract.Gatta high school, Sombo Dosha high school and Kusaye high school are the completed projects and Ilke High school is under construction projects.

5.2. Recommendations

The following recommendations have been made to improve the application of principles the factors affect monitoring and controlling practices at Jimma Zone public building constructions projects.

5.2.1. Recommendations for the construction organizations

- ✓ Should improve factors of project monitoring and controlling practices
- ✓ Contractors should assign project manager and construction supervisors with sufficient management
- ✓ Should sufficient construction material delivered in project siteto start of the project.
- ✓ Materials should be stored at appropriate location.
- ✓ Should be easily accessible and close to project supervision
- ✓ Should provide strong assistance and support regarding the continual training of their craftsmen
- ✓ Develop human resources proper and continuous training programs a strong assignment, vision and a planned
- ✓ Accident and any safety problems should be minimized because overcoming these problems has much significant help in improving.
- ✓ Should avoided as much as possible to increase interrelation communicate solved problem.

5.2.2. Recommendations for the Government bodies

A) Owners

- ✓ Should asking contractors to prepare and submit an acceptable work schedule plan.
- ✓ Should take the waste management plan of the contractors as a criterion in awarding contracts.
- ✓ Should visits to construction site at all critical stages.
- ✓ Should approve payment with the work progress.

B) **Consultants**

- ✓ Should give attention to avoid design and planning errors at the design and planning stages.
- ✓ Should optimize the use of resources during design.
- ✓ Should review the specifications, design, detailing drawing or other errors at the construction stage.
- ✓ Should give daily inspections to contractor.

C) **Contractors**

- ✓ Should assign qualified staff and workforce in construction projects.
- ✓ Should prepare good handling and storing materials on site.
- ✓ Should provide monitoring and controlling practices to site staff to raise their environmental awareness and improve working procedures to reduce waste generation in construction projects.
- ✓ Should proper site and monitoring and controlling and controlling practices techniques, and preparation of accurate specification for materials to adopt in the quest to minimize time delay and cost in construction

D) Regulatory Body

- ✓ Should be closed supervision continues.
- ✓ Should be approved schedule consider environmental impact.
- ✓ Should approving design must be site investigate.
- ✓ Should assigned qualified engineer's staff to the project.

5.2.3. Recommendations for Future study

Federal and state governments invest significant amounts of capital on construction of building projects, public institution, condominiums housing construction, road projects, railway, hydropower and other mega projects. So, a study similar to the present research was needed for public building projects, road projects construction

and other mega projects in Ethiopia to find factors that affect the monitoring and controlling practices of construction projects and price fluctuation, which help government to minimize unnecessary cost escalations and project schedule delays.

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APPENDICES

APPENDIX –A

QUESTIONNAIRE SURVEY FOR THESIS PAPER THE

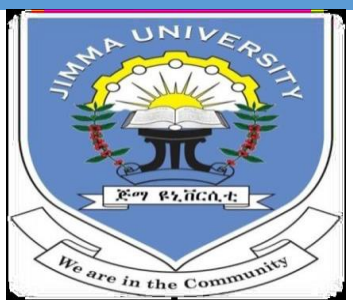
FACTORS THAT AFFECT MONITORING AND

CONTROLLING

PRACTICES ON PUBLIC BUILDING CONSTRUCTION

PROJECT IN

JIMMA ZONE.



JIMMA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

JIMMA INSTITUTE OF TECHNOLOGY

SHOOL OF CIVIL AND ENVIRONMENTAL ENGINEERING

QUESTIONNAIRE SURVEY FOR THESIS PAPER THE

FACTOR THAT AFFECTING MONITORING AND CONTROLLING

PRACTICES ON PUBLIC BUILDING CONSTRUCTION PROJECTS IN JIMMA

ZONE.

February 2020

Jimma, Ethiopia

M.Sc. Thesis Questionnaire Survey for Respondents

Dear Respondent,

I am presently pursing a Master of Science Degree in Civil Engineering under construction Engineering & Management at Jimma University School of Graduate Studies. The aim of this questionnaire are factors that affect monitoring and controlling practices on public building construction in Jimma zone. Please answer all questions where possible. All the information gathered will be kept strictly confidential and will be used only for academic research and analysis without mentioning the names of individuals companies involved.

Thank you in advancing for your time and kind cooperation. For further information please don't miss to contact me via my address given below.

Researcher: Abera Birhanu Jimma University Jimma Institute of Technology Department of Construction Engineering and Management Address: Email: ababirhanu2@gmail.com/ Mobile: +251 910388510	**Main Advisor**: Dr. Getachew Kebede (Ass. Professor)Jimma University Jimma Institute of Technology Address: Email: getchitaly@yahoo.com Mobile:+251 904474628	**Co-advisor:** Eng. Abay Legasa Jimma University Jimma Institute of Technology Address: Email: didaamoo5@gmail.com Mobile:+251 929180408

Part 1: Personal and General Organization Information

✓ Please respond by ticking (“√”) appropriate in box (□)

1. Type of Organization (Respondents designation)

□ Owner/Client	□ Regulatory	□ SMME contractor
□ Contractor	□ Consultant	□ Other Specify_____

2. Years since your organization established

□ Less than 5	□ 5-10	□ 11-15	□ More than 15

3. Which the following relative you professional?

□ Level/10+ 0r Diploma	□ Masters	□ Level
□ degree	□ PhD	□ Other_____

4. Relevant Work experience (Year)

□ 0-5	□ 10-15	□ 20-25
□ 5-10	□ 15-20	□ more than 25

5. Which of the following describe your responsibility on project?

□ Project leader	□ project manager	□ project regulatory
□ Contractor	□ project consultant	□ Other

6. Total number of projects worked in the last 5 years

□ Less than 10	□ 11-20	□ 21-30	□ more than 30

7. Value of projects worked total executed in the last five years: (in ETB)

□ Less than 10 Million	□ 30-60 million	□ 90-120 million
□ 10-30 million	□ 60-90 million	□ more than 120 million

8. If contractor, indicate Class of the company

Bc,	□ Grade (1-3)	□ Grade (4 & 5)	□ Grade (6 & 7)
GC	□ Grade (1-3)	□ Grade (4 & 5)	□ Grade (6 & 7)

Part 2: General Research Questions

1. What the factors that affecting monitoring and controlling practices on public building constructions?

The given below are factors influencing projects monitoring and controlling practices on public building constructions projects. Please indicate the significance of each factor by ticking the appropriate boxes. Add any remarks relating to each factor on the last column e.g. as to the reasons, the critical factors or the solutions.

(1) = not factors (4). = very factors

(2) = slightly factors (5). = extremely factors

(3). = moderately factors

No	**The factor of project M&C practice on public building construction**	**Ordinary Scale**				
	Group 1:- Scope factors	**1**	**2**	**3**	**4**	**5**
1	Cause of boundary project					
2	Keep the scope realistic					
3	project scope management plan					
4	Scope baseline					
5	Change management plan					
6	Scope Variance					
7	Quantified evaluation of project					
8	Scope change within time, cost and quality					
9	Delay in approving major changes in scope of work by consultant					
10	Project authorization confirmed with owner					
	If other, please specify					
	Group 2:- Cost factors					
1	Changes to cost baseline					
2	Cost performances to detect variances					
3	Determining resource requirements					
4	Performance report					
5	Ongoing control of project finances					

6	Cost planning during design stage					
7	Cost variations					
8	Inadequate design without site investigation					
9	Price fluctuations					
10	Modifying cost during construction					
11	Budget Updates					
12	Delay corrective Action					
13	Estimate at Completion					
14	Change Order by Engineer					
15	Delays in decisions making					
	If other, please specify					
	Group 3:-Schedule Control					
1	Schedule changes					
2	Managing the actual changes					
3	Using schedule Baseline					
4	Adopting realistic times for estimating;					
5	Construction Schedule (Master Schedule)					
6	Resource schedule					
7	Time scheduling to minimizing variation					
8	Working as per schedule					
9	Additional Planning					
10	Schedule Updated					
11	Effect have schedule					
12	Use of Software and tools for Schedule control					
	If other, please specify					
	Group 4:-Quality factors					
1	Shortage of material					
2	High quality of required works					

3	Quality inspection delay					
4	Rework due errors					
5	Produce quality deliverables					
6	Project Success in quality customer satisfaction					
7	Clear scope and quality of work control					
8	Poor quality of work as a result of shortage of funds					
9	Plan quality identifying quality requirements					
10	quality Policy, Procedures and Standards					
11	Poor quality of construction					
12	Effective quality planning					
13	Late delivery of materials					
14	Specification					
15	Control charts & analysis					
	If other, please specify					
	Group 5:-Stakeholders Engagements factors					
1	Lack aware\ness of all project					
2	Project team needs to identify engagement					
3	Payment delay					
4	Lack of follow up the work progress					
5	Ineffective project planning & scheduling					
6	Political situations/ unpredictability(ie protest)					
	If other, please specify					
	Group 6:- Communication factors					
1	Written communication					
2	Electronic communication					
3	Oral communication					
4	Project communication plan					
5	Lack of communication b/n 3C's					

6	Lack of General support to contractor					
8	By communicating to reduce conflict of project					
9	The effectiveness of controlling information					
	If other, please specify					

2. **How to evaluate factors of monitoring and controlling practices on public building constructions?**

Please rate the following benefits arising from project monitoring and controlling practices, so insert the relevant value (number) to the benefits

(1) = Strongly disagree (2) = Disagree (3) = Neutral (4) = Agree (5) = strongly agree

No	**Group 1:-To what extent do you agree with the statement of evaluate to take action projects?**	**Ordinary Scale**				
		1	**2**	**3**	**4**	**5**
1	Reduce project delivery costs and increased profits					
2	Higher degree of project successes increases competitive					
3	Project requirement leading to motivated staff					
4	Produce quality deliverables					
5	Customer advantage arising to meeting expectations					
	If other, please specify					

Part 3: Open Questioners

1. What factor that affecting monitoring and controlling practices?

   _____

   _____

   _____

2. Who construction parties beneficial by project monitoring and controlling practices on public building construction?

_____

_____

_____

3. Who should take action project monitor and control practices on public building?

_____

_____

_____

4. What are future framework for developing project monitoring and controlling practices on public building constructions?

_____

_____

_____

5. If you have comments regarding the factors that affecting monitoring and controlling practices on public building construction project.

_____

_____

_____

Interview question

1) Form your experience, how could monitor and controlling practices expressed in building construction projects?
2) What do you think impact of monitoring and controlling practices in the construction company?
3) What are the factors that you think will affect the monitoring and controlling practices construction projects during construction phase? Please explain with example.